Draft Environmental Assessment, Regulatory Impact Review and Regulatory Flexibility Act Analysis of Bottlenose Dolphin Conservation Measures to Amend the Bottlenose Dolphin Take Reduction Plan and Sea Turtle Conservation Regulations

March 11, 2014

National Oceanic & Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
727-824-5308
727-824-5305 (fax)
http://sero.nmfs.noaa.gov

This page intentionally left blank

Table of Contents

1.1 Background 1
1.2 Management History 20
2.0 Purpose and Need 26
3.0 Management Alternatives 26
3.1 Action 1. Amend MMPA and ESA implementing regulations to reduce bottlenose dolphin serious injuries and mortalities and sea turtle takes incidental to Virginia pound nets. 26
3.2 Action 2. Modify enforcement and outreach program to establish a different means of facilitating compliance with Virginia pound net gear requirements 36
4.0 Affected Environment 38
4.1 Physical Environment 38
4.2 Biological Environment 39
4.2.1.1 Marine Mammals 39
4.2.1.2 Endangered Species 40
4.3 Social and Economic Environment 52
4.4 Environmental Justice Considerations 66
4.5 Administrative Environment 66
5.0 Environmental Consequences 66
5.1 Action 1. Amend MMPA and ESA implementing regulations to reduce bottlenose dolphin serious injuries and mortalities and sea turtle takes incidental to Virginia pound nets. 66
5.1.1 Direct and Indirect Effects on the Physical, Biological, and Ecological Environment 66
5.1.2 Direct and Indirect Effects on the Economic Environment 72
5.1.3 Direct and Indirect Effects on the Social Environment 83
5.1.4 Direct and Indirect Effects on the Administrative Environment 87
5.2 Action 2. Modify enforcement and education program to establish a different means of facilitating compliance with Virginia pound net gear requirements 90
5.2.1 Direct and Indirect Effects on the Physical, Biological, and Ecological Environment 90
5.2.2 Direct and Indirect Effects on the Economic Environment 90
5.2.3 Direct and Indirect Effects on the Social Environment 91
5.2.4 Direct and Indirect Effects on the Administrative Environment 92
5.3 Cumulative Effects 93
6.0 Regulatory Impact Review 97
6.1 Introduction 97
6.2 Problems and Objectives 97
6.3 Description of the Fishery 97
6.4 Impacts of Management Measures 97
6.5 Public and Private Costs of Regulations 98
6.6 Determination of Significant Regulatory Action 98
7.0 Regulatory Flexibility Analysis 99
7.1 Introduction 99
7.2 Statement of the need for, objective of, and legal basis for the rule 99

7.3 Description and estimate of the number of small entities to which the proposed action would apply 99
7.4 Description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records 100
7.5 Identification of all relevant federal rules, which may duplicate, ... 100
overlap, or conflict with the proposed rule 100
7.6 Significance of economic impacts on a substantial number of small 101
entities 101
7.7 Description of the significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities 102
8.0 Other Applicable Laws 102
9.0 References 104
10.0 List of Agencies and Persons Consulted 112

List of Figures

Figure 1. Proposed action area for bottlenose dolphin pound net regulations recommended by the BDTRT. This is the proposed BDPNRA. 4

Figure 2. Virginia pound net with leader, heart, and pound. (Figure from Nédélec and Prado 1990, p.45). 7

Figure 3. Pound net locations identified by the NEFOP in 2010 and 2011 within the proposed BDPNRA. 9

Figure 4. Dolphin strandings and entanglements in Virginia pound nets from 2002-2011. Data are shown by strandings with fresh and unhealed twisted twine markings or removed dead/alive from an offshore or nearshore pound net leader. 12

Figure 5. Dolphin interactions in Virginia pound net gear by month from 2002-2011. 13

Figure 6. Locations of dolphin strandings and entanglements in Virginia pound net gear from 2002-2011. Data are shown for dolphins removed dead/alive from leaders and stranding with twisted twine markings. 14

Figure 7. Annual Virginia sea turtle strandings from 1995-2011, with the spring and early summer period highlighted. Source: STSSN unpublished data. 17

Figure 8. Monthly Virginia sea turtle strandings for 1995-2011 combined. (Source: STSSN unpublished data). 18

Figure 9. Pound Net Regulated Areas I and II in Chesapeake Bay, Virginia. 22

Figure 10. Picture of traditional and modified pound net leaders. (Figure from NMFS 2006, pg. 15). 23

Figure 11. Virginia State waters where modified leaders are currently required by both the ESA and state regulations. 28

Figure 12. Map depicting the five DPSs of Atlantic sturgeon. 46

List of Tables

Table 1. Population estimates, PBR, and estimated annual average bycatch mortality in gillnets and all fisheries with known mortality for bottlenose dolphin stocks. 11

Table 2. Total and annual average number of pound net interactions assigned to bottlenose dolphin stock(s) and the percent of the stock's PBR. 15

Table 3. NEFOP or research documented entanglements and impingements in Virginia pound net leaders. 19

Table 4. Required modified leader use for the alternatives of sub-action 2..... 31

Table 5. Total annual pound net landings by species group in all Virginia waters (2010) (Source: NMFS SEFSC using VMRC data)..... 49

Table 6. Pound net fishermen total annual landings by gear type in Virginia waters and in the proposed BDPNRA (January-December, 2010) (Source: NMFS SEFSC using VMRC data).... 50

Table 7. 2010 landings (January-December) by species for pound net gear fished in the proposed BDPNRA water bodies east and west of the CBBT (Source: NMFS SEFSC using VMRC data)..... 51

Table 8. Total annual pound net revenue by species group in all Virginia waters (2010)..... 59

Table 9. Pound net fishermen total annual revenue by gear type in Virginia waters and in the proposed BDPNRA (January-December, 2010)..... 61

Table 10. Pound net total annual inflation-adjusted revenue (2010 dollars) by water body in the proposed BDPNRA (east and west of the CBBT)..... 62

Table 11. Revenue by species for pound net gear fished in the proposed BDPNRA water bodies east and west of the CBBT in 2010. 64

Table 12. Pound net annual inflation-adjusted revenue (2010 dollars) by water body in the proposed BDPNRA (east and west of the CBBT)..... 65

Table 13. Cost to Make and Install/Remove Modified vs. Traditional Leaders on Offshore Pound Nets..... 75

Table 14. Cost to Make and Install/Remove Modified vs. Traditional Leaders on Nearshore Pound Nets. 78

Table 15. Cost to Make and Install/Remove Modified Leaders on Offshore Pound Nets for Sub-action 4, Alternative 3. 80

Table 16. Cost to Make and Install/Remove Modified Leaders on Offshore Pound Nets for Sub-action 4, Alternative 4. 82

List of Acronyms

BDTRP – Bottlenose Dolphin Take Reduction Plan
BDTRT – Bottlenose Dolphin Take Reduction Team
BDPNRA – Bottlenose Dolphin Pound Net Regulated Area
BOEM – Bureau of Ocean Energy and Management
CBBT – Chesapeake Bay Bridge Tunnel
CZMA – Coastal Zone Management Act
DEIS – Draft Environmental Impact Statement
DPS – Distinct Population Segment
EA – Environmental Assessment
EFH – Essential Fish Habitat
EJ – Environmental Justice
E.O. – Executive Order
ESA – Endangered Species Act
FONSI – Finding of No Significant Impact
MMPA – Marine Mammal Protection Act
NEFOP – Northeast Fishery Observer Program
NEFSC – Northeast Fishery Science Center
NEPA – National Environmental Policy Act
NM – Northern Migratory coastal stock
NMFS – National Marine Fisheries Service
NNCES – Northern North Carolina Estuarine System stock
OMB – Office of Management and Budget
PBR – Potential Biological Removal
PNRA I – Pound Net Regulated Area I
PNRA II – Pound Net Regulated Area II
PRA – Paperwork Reduction Act
RFA – Regulatory Flexibility Act
RFAA – Regulatory Flexibility Act Analysis
RIR – Regulatory Impact Review
SBA – Small Business Administration
SEFSC – Southeast Fishery Science Center
SM – Southern Migratory coastal stock
STSSN – Sea Turtle Stranding and Salvage Network
TRP – Take Reduction Plan
TRT – Take Reduction Team
VAQ – Virginia Aquarium and Marine Science Center
VMRC – Virginia Marine Resources Commission
ZMRG – Zero Mortality Rate Goal

1.0 Introduction

Combined Management Actions Under Two Different Regulatory Authorities

The proposed rule combines two actions under different regulatory authorities. Specifically, these include: (1) amending the Bottlenose Dolphin Take Reduction Plan (BDTRP) implementing regulations at 50 CFR 229.35 under the Marine Mammal Protection Act (MMPA); and (2) amending current implementing regulations under the Endangered Species Act (ESA) at 50 CFR 223.206 (d)(10) for sea turtle conservation affecting Virginia pound nets. These actions are combined under one rulemaking process for consistency in definitions and regulations for the Virginia pound net fishery. These proposed regulations benefit both bottlenose dolphins and sea turtles, which are managed under different statutory authorities (i.e., MMPA and ESA, respectively). Combining them helps compliance and enforcement by streamlining the overlapping regulatory requirements governing the fishery.

Per MMPA requirements, NMFS is amending the BDTRP to reduce incidental mortality and serious injury of strategic stocks of bottlenose dolphin from the Virginia pound net fishery. Regulations proposed for the Virginia pound net fishery are based on the Bottlenose Dolphin Take Reduction Team's (BDTRT) consensus recommendations. They generally follow regulations that have been previously enacted under the ESA for sea turtle conservation, with some proposed revisions and updates. Therefore, amendments to the ESA sea turtle conservation regulations for the Virginia pound net fishery are proposed under the same rulemaking for consistency in definitions and regulations.

1.1 Background

MMPA: Bottlenose Dolphin Take Reduction Plan and Team

Section 118 of the MMPA requires NMFS to establish Take Reduction Teams (TRTs) to develop and implement take reduction plans (TRPs). TRPs are designed to reduce incidental mortality and serious injury to strategic stocks of marine mammals interacting with Category I or Category II fisheries. The MMPA defines "strategic stock" as a marine mammal stock: (1) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR) level; (2) which is declining and likely to be listed as a threatened species under the ESA; or (3) which is designated as a depleted species under the MMPA (16 U.S.C. 1362 (1), (19), and (20)). PBR is the maximum number of animals, not including natural mortalities, that can be removed annually from a stock, while allowing that stock to reach or maintain its optimum sustainable population level. Category I or II fisheries are those with frequent or occasional accidental mortality and serious injury of marine mammals, respectively [16 U.S.C. 1387 (c)(1)(A)(i) and (ii)].

The MMPA requires TRPs to meet short- and long-term goals. The short-term goal of a take reduction plan is to reduce, within six months of its implementation, the accidental mortality or serious injury of marine mammals in commercial fishing to levels less than PBR for the stock (16 U.S.C. 1387(f)(2)). The long-term goal of a take reduction plan is to reduce, within five years of its implementation, the accidental mortality or serious injury of marine mammals in

commercial fishing to insignificant levels approaching a zero mortality and serious injury rate. The long-term goal takes into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans. The long-term goal is commonly referred to as the zero mortality rate goal (ZMRG), which is 10% of PBR for a marine mammal stock (69 FR 43338; July 20, 2004). The MMPA also requires NMFS to amend take reduction plans and implementing regulations as needed to meet these requirements and goals.

Section 118(f)(6)(C) of the MMPA provides guidance on the membership and composition of TRTs. TRT members are appointed based on their expertise regarding the: (1) conservation or biology of marine mammal species that the take reduction plan addresses; or (2) fishing practices that result in the incidental mortality and serious injury of such species. TRTs must, to the maximum extent practicable, consist of an equitable balance among representatives of resource user interests and non-user interests.

In October 2001, NMFS convened the BDTRT. The BDTRT addresses incidental mortality and serious injury of strategic stocks of bottlenose dolphins incidental to Category I and II fisheries operating along the United States' east coast. The Category I and II fisheries are updated annually in the MMPA's List of Fisheries. This can be found at the following web site: http://www.nmfs.noaa.gov/pr/interactions/lof/.

In May 2002, the BDTRT submitted to NMFS consensus regulatory and non-regulatory recommendations for a draft BDTRP. In May 2003, the BDTRT submitted addenda to the draft BDTRP based on updated information. On April 26, 2006, NMFS issued a final rule (71 FR 24776) implementing the BDTRP based mostly on the BDTRT's consensus recommendations. The BDTRP has been amended twice since then. Both amendments were based on the BDTRT's consensus recommendations for the same nighttime medium mesh gillnet fishing restrictions in North Carolina: (1) December 19, 2008 (73 FR 77531) by continuing the fishing restrictions for three years, expiring on May 26, 2012; and (2) July 31, 2012 (77 FR 45268) by permanently continuing the fishing restrictions.

The BDTRP contains both regulatory and non-regulatory conservation measures. These measures reduce serious injury and mortality of 13 strategic stocks of bottlenose dolphins (*Tursiops truncatus truncatus*) in Category I and II commercial fisheries operating in the same area as the dolphin stocks. These measures are designed to meet the BDTRP's short-term goal and provide a framework for meeting the long-term goal. The regulatory measures in the BDTRP include seasonal gillnet restrictions, gear proximity requirements, and gear length restrictions. The non-regulatory measures include continued research and monitoring, enforcement, outreach, and partnership efforts.

2007 and 2009 BDTRT Consensus Recommendations

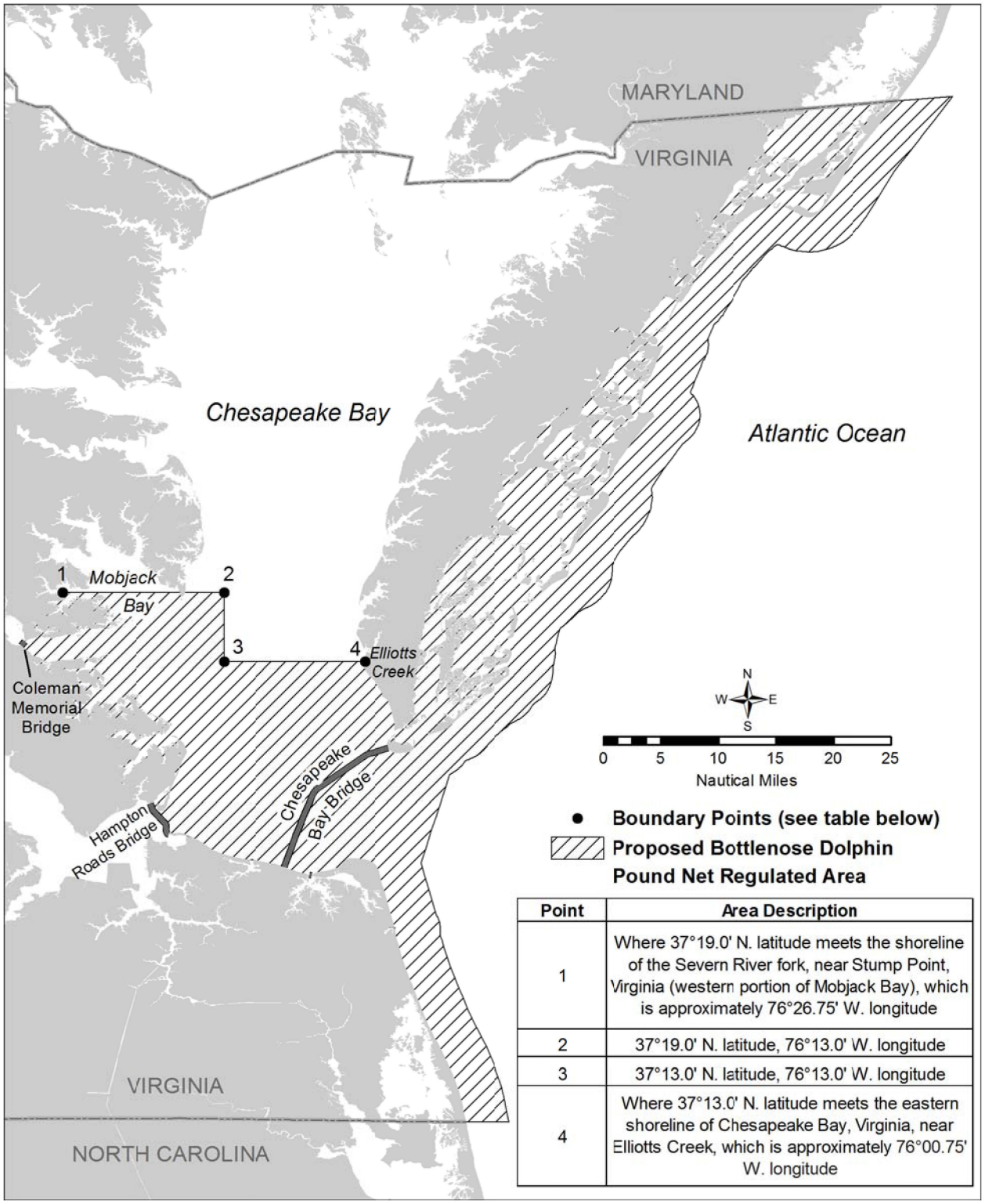
Following the implementation of the BDTRP in May 2006, the BDTRT met in June 2007 and September 2009 to monitor the effectiveness of the BDTRP at meeting its goals. Among other things, NMFS provided the BDTRT with updates on bottlenose dolphin strandings and observed takes in Virginia that were associated with Virginia pound nets. At both meetings, the BDTRP provided NMFS with regulatory and non-regulatory consensus recommendations to ensure the

BDTRP achieves its goals. Some of these recommendations were specific to reducing bottlenose dolphin interactions with Virginia pound nets.

In 2007, the BDTRT provided NMFS with non-regulatory consensus recommendations for gear research related to Virginia pound nets. They recommended continuing to explore the effectiveness of modified pound net leaders (see Figure 10) in the Virginia pound net fishery for maintaining catch efficiency, especially around Lynnhaven, Virginia. The BDTRT focused this research recommendation for nets near Lynnhaven because this is where the majority of bottlenose dolphin interactions were occurring. The BDTRT believed the modified leader design showed promise for reducing entanglements based on how dolphins were interacting with the gear. The full summary of the 2007 BDTRT meeting can be found at the following Web site: http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp_meetings.htm

In September 2009, the BDTRT provided NMFS with both regulatory and non-regulatory consensus recommendations to reduce serious injury and mortality of bottlenose dolphin accidental to the Virginia pound net fishery. The following regulatory consensus recommendations were provided:

(1) Expand the waters in which the use of modified pound net leaders is currently required. This would include Virginia waters of the mainstem Chesapeake Bay west of the Chesapeake Bay Bridge Tunnel (CBBT). Seasonal use of modified leaders is required in this area under sea turtle conservation regulations issued per the ESA [i.e., Pound Net Regulated Area I (PNRA I); see Figure 9]. Regulated waters would also extend east of the CBBT to include waters of the Chesapeake Bay mouth and Virginia coastal state waters north to the Maryland/Virginia line and south to the Virginia/North Carolina line. The area recommended by the BDTRT is the proposed action area and referred to as the Bottlenose Dolphin Pound Net Regulated Area (BDPNRA) throughout this EA (Figure 1).
(2) Maintain a definition for modified pound net leaders consistent with the definition issued under ESA regulations (50 CFR 222.102).
(3) Extend the seasonal requirements for offshore pound nets to use modified leaders year-round in the regulated waters described in (1) above.
(4) Change the definition of "nearshore pound net leaders" in the regulations issued under the ESA (50 CFR 222.102). The new definition would be a "pound net with a leader starting from 10 feet (3 m) horizontally from mean low water and ending at the king post at 12 feet (3.7 m) or less at mean low water (depth)". The intent of this change is to ensure the king post-stake does not extend into depths beyond 12 feet (3.7 m) mean low water. The offshore pound net leader definition would remain the same as defined (50 CFR 222.102).
(5) Ensure consistency between regulations for Virginia pound nets regulated under the authority of ESA for sea turtles and any upcoming regulations for dolphins under the MMPA.
(6) Include the same pound net inspections and certifications required under the existing regulations issued under the ESA [50 CFR 223.206(d)(10)(vii)] or help ensure compliance and enforcement in other ways.



Point	Area Description
1	Where 37°19.0' N. latitude meets the shoreline of the Severn River fork, near Stump Point, Virginia (western portion of Mobjack Bay), which is approximately 76°26.75' W. longitude
2	37°19.0' N. latitude, 76°13.0' W. longitude
3	37°13.0' N. latitude, 76°13.0' W. longitude
4	Where 37°13.0' N. latitude meets the eastern shoreline of Chesapeake Bay, Virginia, near Elliotts Creek, which is approximately 76°00.75' W. longitude

Figure 1. Proposed action area for bottlenose dolphin pound net regulations recommended by the BDTRT. This is the proposed BDPNRA.

The BDTRT also provided NMFS with additional non-regulatory consensus recommendations for the Virginia pound net fishery in 2009. The non-regulatory measures intended to increase the

effectiveness of the recommended regulatory measures. The non-regulatory recommendations included forming a Virginia working group to help, as needed: (1) further refine the BDTRT's consensus recommendations for the Virginia pound net fishery to help with rulemaking; (2) develop proposals for pound net gear research; (3) clarify gear similar to pound nets (i.e., fyke nets); (4) discuss how to address pound nets that may be considered nearshore or offshore pound nets; and (5) identify how many pound nets meet the current definition under ESA regulations of a nearshore pound net leader and if any may be affected by definition changes proposed by the BDTRT.

The BDTRT also recommended outreach and coordination to help with compliance and monitoring of recommended regulatory measures for the Virginia pound net fishery. These included: (1) inform the Virginia Marine Resources Commission (VMRC) of the BDTRT's recommendations for the Virginia pound net fishery; (2) coordinate with the VMRC and other Federal entities to help with enforcement of regulations for the Virginia pound net fishery; and (3) provide outreach and education to Virginia pound net fishermen on all forthcoming regulations. The full summary of the 2009 BDTRT meeting can be found at the following Web site: http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp_meetings.htm.

ESA: Conservation Measures for Sea Turtles

The ESA lists endangered and threatened species. An endangered species is "any species which is in danger of extinction throughout all or a significant portion of its range". A threatened species is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range".

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

Under the ESA and its implementing regulations, taking sea turtles, even incidentally, is prohibited. Section 3 of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct". The term incidental take refers to takings of endangered and threatened species that result from, but are not the purpose of, an otherwise lawful activity. The incidental take of endangered and threatened species may legally be exempted by an incidental take statement or permit issued under Section 7 or 10 of the ESA, respectively.

In Virginia, loggerhead sea turtles are the most abundant sea turtle species, followed by Kemp's ridleys and to a lesser extent green and leatherbacks (Mansfield 2006). In particular, loggerheads and Kemp's ridleys appear to use the Chesapeake Bay waters as important developmental and foraging habitats (Bellmund *et al*. 1987; Musick and Limpus 1997; Mansfield *et al*. 2009). Both juvenile and adult sea turtles can be found in the Virginia Chesapeake Bay (Musick and Limpus

1997). Sea turtles generally occur in the Virginia Chesapeake Bay from May through November (Lutcavage and Musick 1985; Mansfield *et al*. 2009).

Sea turtle conservation regulations at 50 CFR 223.206(d) provide some exemptions for the incidental take of threatened sea turtles in fishing activities and scientific research from the take prohibition in 50 CFR 223.205(a). Regulations for the Virginia pound net fishery (50 CFR 223.206(d)(10)) were issued under the ESA to reduce takes of sea turtles in the gear, as described in section 1.2.

Virginia Pound Net Fishery

Fishery Description

Virginia pound nets are a Category II fishery under the MMPA because of interactions with bottlenose dolphins. A Category II fishery has occasional accidental mortality or serious injury of marine mammals, meaning accidental mortality or serious injury that is greater than 1% and less than 50% of a stock's PBR level.

Pound nets are passive fishing devices that use fixed gear for live entrapment of various finfish species. They are generally fished in Virginia from March/April to October/November depending on weather and fishing success (Schaffler *et al*. 2011). Pound nets target any fish species that swim into the net and become trapped in the "pound". Pound nets are not intended to catch fish through entanglement. Finfish species caught depend on the season the nets are fished and the fish in the Bay at that time (Mansfield *et al.* 2001). The catch is generally non-selective. State landings data in 2010 however show some primary target species, with most landings within the months of March to October. Specifically, for pound nets fished within the proposed BDPNRA (i.e., Cape Charles, Mobjack Bay, and Lynnhaven areas), Atlantic croaker, a demersal fish, comprised almost 70% of the catch. For pound nets fished along Cape Charles, the other fish species that comprised the greatest percent of catch were bait fish at 11%; menhaden at 6%; and summer flounder and ribbon fish both at 2.5%. For pound nets fished in the Mobjack Bay and Lynnhaven areas, the other fish species that comprised the greatest percent of catch were summer flounder at 9%; spot at 8%; and bait fish at 6%. These fish species are both demersal and pelagic.

The pound net is supported by stakes or poles driven into the sediment on which the net is strung, making it a semi-fixed structure. Pound nets have three sections: (1) the leader, a long, straight net set perpendicular to the beach that leads the fish offshore to the pound; (2) the heart, which is the portion of the net that funnels the fish into the pound; and (3) the pound, which is where the fish are entrapped (Figure 2). The net parts act together to turn fish swimming along the shore and guide them into the heart and pound. The fish are trapped (i.e., not entangled) and held in the pound until they are harvested (Mansfield *et al.* 2001; NMFS 2004; NMFS 2006).

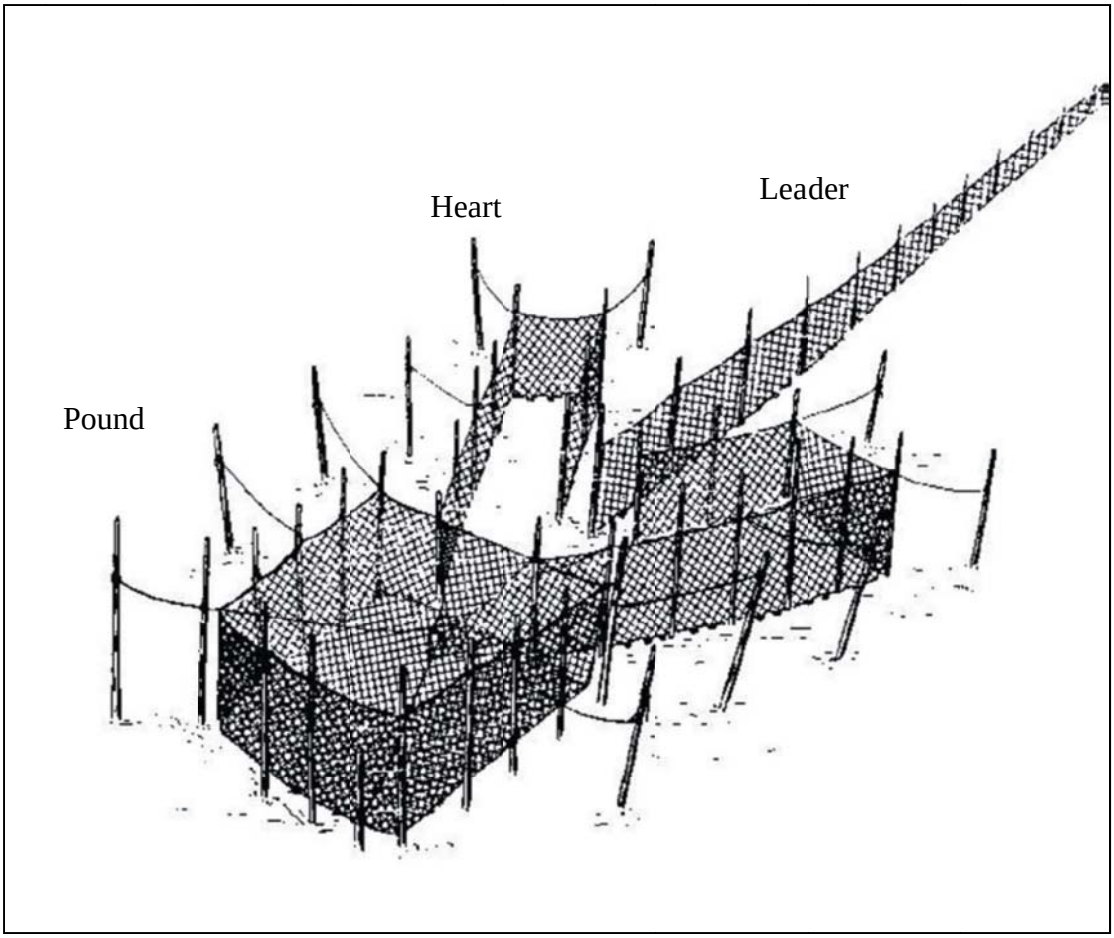


Figure 2. Virginia pound net with leader, heart, and pound. Figure from Nédélec and Prado 1990, p.45.

All pound net components are constructed of multifilament fiber, but each section has differing mesh sizes and configurations. In Virginia, the pound is generally constructed of all mesh measuring approximately 1-2-inch (5 cm) stretched (Mansfield *et al.* 2001; DeAlteris and Silva 2007). The heart is constructed of all mesh measuring approximately 3.9 inches (10 cm) or less stretched (Mansfield *et al.* 2001).

The leader extends from the sea floor to sea surface and is generally several hundred meters in length (DeAlteris and Silva 2007). The location where the pound net is set and strength of the tide and or current flow generally dictates the stretched mesh size and how the leader is constructed (Mansfield *et al.* 2001; DeAlteris and Silva 2007). Mesh sizes range from approximately 8-18 inches (20-46 cm) stretched. The larger mesh sizes are usually on leaders set in deeper waters and further from shore where there are stronger currents and reduced drag is needed. The upper portion of the mesh may also be replaced with stringers, or vertical lines, to further reduce drag and debris entanglement. Leaders constructed of all mesh and smaller mesh sizes are typically found closer to shore where there are weaker currents (DeAlteris and Silva 2007).

There are state and Federal seasonal regulations for how leaders are constructed within the proposed BDPNRA. The type of seasonal requirements depends on whether pound net leaders meet the definition of an offshore or nearshore pound net leader. Requirements for leader construction are either for all mesh (i.e., traditional, or in other words a non-modified, leader) or a combination of mesh and vertical lines (i.e., modified leader). Sea turtle conservation regulations define pound nets as having an offshore or nearshore pound net leader based on distance from shore at mean low water (50 CFR 222.102). From May 6-July 15, offshore pound net leaders fished in proposed BDPNRA waters west of the CBBT (i.e., PNRA I) are required to use modified pound net leaders annually. In the same area, the state requires use of modified leaders for offshore pound nets from May 6-July 31. The state further requires the year-round use of modified leaders for any pound net set in proposed BDPNRA waters east of the CBBT and state coastal waters. Modified pound net leaders must be constructed with hard lay vertical lines instead of mesh for the top-two thirds of the leader and 8-inch or less stretched mesh for the bottom one-third.

Sea turtle conservation regulations require Virginia nearshore pound net leaders set east and west of the CBBT from May 6-July 15 to be constructed of only mesh that measures less than 12-inch stretched (e.g., a traditional leader). Leaders set in these locations from May 6-July 15 may also be constructed with modified leaders rather than a traditional leader. See section 1.2 for more details on federal and state regulations for Virginia pound nets.

To characterize the current pound nets in the proposed BDPNRA, the NMFS' Northeast Fishery Observer Program (NEFOP) surveyed Virginia pound nets in this area from May to July 2010 and June 2011. The NEFOP identified 41 pound net locations within these waters, with an average leader length measuring 795 feet. All 41 pound nets were located within the southern Virginia mainstem waters of the Chesapeake Bay (i.e., Cape Charles, Mobjack Bay, and Lynnhaven areas) with no nets set in Atlantic coastal waters (Figure 3). Most (n=33) of the pound nets were set along the eastern Chesapeake Bay near Cape Charles; two were set in the western Bay at Mobjack Bay; and six were set in the southern Bay near Lynnhaven. Twenty-one of the 41 nets met the definition of a nearshore pound net leader per the ESA regulations, and 20 met the definition of an offshore pound net leader per ESA regulations. Cape Charles was and still is the only area where nearshore pound nets are located. In 2010 and 2011 in the proposed BDPNRA, 21 nearshore and 12 offshore pound nets were set in the Cape Charles area; two offshore nets were set in Mobjack Bay; and six offshore nets were set near Lynnhaven Inlet (Figure 3).

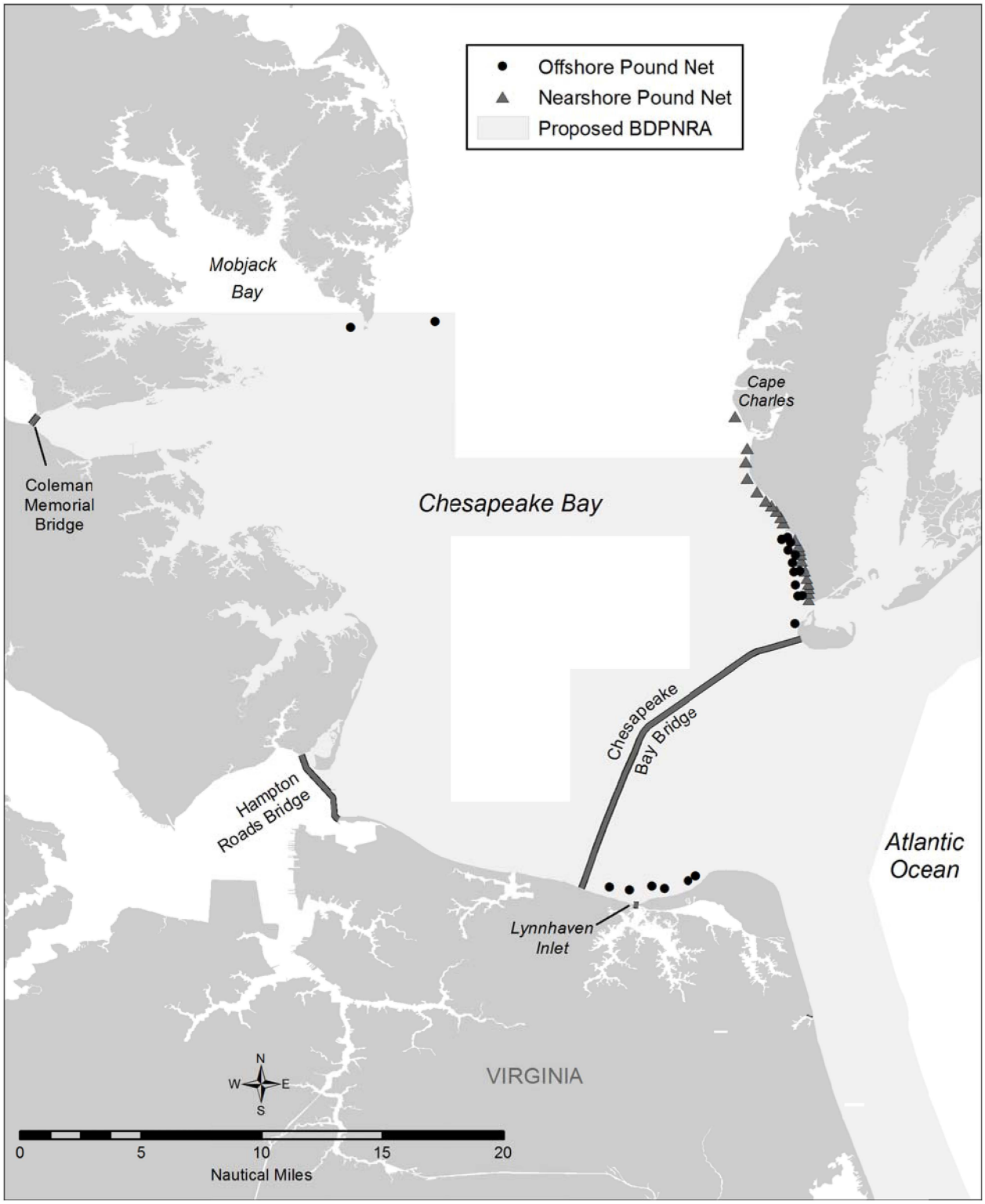


Figure 3. Pound net locations identified by the NEFOP in 2010 and 2011 within the proposed BDPNRA.

Protected Species Interactions with the Virginia Pound Net Fishery

MMPA - Bottlenose Dolphins:

Three stocks of common bottlenose dolphins (*Tursiops truncatus truncatus*) occupy Virginia state waters at various times of the year and interact with Virginia pound nets. The three stocks include: (1) Western North Atlantic Northern Migratory coastal (NM); (2) Western North Atlantic Southern Migratory coastal (SM); and (3) Northern North Carolina Estuarine System (NNCES). The NM and SM are coastal migratory stocks with larger populations and associated PBR levels than the NNCES stock, which is an estuarine stock occupying mainly bays and sounds (Table 1).

There is some uncertainty regarding which of the three bottlenose dolphin stocks or combination of stocks are in Virginia state waters and interacting with the pound net fishery. Satellite tagging and photo identification data provide the best available information on the stocks' movements during the fishing season. The NM stock is the only stock in Virginia state waters during the early (March-April) and later months (November) of the fishing season. From May through June, both the SM and NM stocks occur in state waters and may interact with pound nets. From July through August, both the SM and NNCES stocks are in state waters, which is when the most interactions with the Virginia pound net fishery are documented. From September through October, all three stocks (NM, SM, and NNCES) may occur in state waters and interact with pound nets (Waring *et al*. 2012).

Both the uncertainty in the spatial movements and overlap of these bottlenose dolphin stocks present a challenge for assigning serious injury or mortality from any fishery interaction to a particular stock (Waring *et al*. 2011). Limitations in genetic information also prevent assigning serious injury and mortality to a stock. Stock assignments, therefore, are based on where and when the interaction occurs and which stock(s) is in the area. Because more than one stock may be in a particular area at the same time, the estimated annual average fishing mortality is reported as a minimum and maximum estimate to reflect the uncertainty in assigning observed or reported mortalities to a stock (Table 1). Table 1 shows the overall bycatch mortality estimates as minima and maxima, which include serious injury and mortality from mid-Atlantic gillnets, Virginia pound nets, and blue crab pots, other trap/pots, and research. Gillnet bycatch is also estimated separately as minima and maxima because there is systematic observer coverage for the mid-Atlantic gillnet fishery, whereas there is not for the other fisheries mentioned.

The annual average bycatch mortality estimates from all fisheries with known mortalities from 2004-2008 indicate the: (1) NM stock is approaching ZMRG; (2) SM stock is not approaching ZMRG with overall annual estimated bycatch mortality between 25% and 57% of PBR; and (3) NNCES stock is approaching or exceeding PBR (Waring *et al*. 2011 and 2012). Although the SM is not yet approaching ZMRG, the impact to the NNCES stock from any fishery, including the Virginia pound net fishery, is of the most concern because of its small population size and PBR.

Table 1. Population estimates, PBR, and estimated annual average bycatch mortality in gillnets and all fisheries with known mortality for bottlenose dolphin stocks.

Stock	Minimum Population Estimate	PBR	Estimated Annual Average Gillnet Fishing Mortality (2004-2008)	Estimated Annual Average Overall Fishing Mortality (2004-2008)
Northern Migratory Coastal	7,147	71	Minimum = 5.27 Maximum = 6.02	Minimum = 5.92 Maximum = 8.22
Southern Migratory Coastal	9,591	96	Minimum = 5.71 Maximum = 41.91	Minimum = 24.00 Maximum = 55.00
Northern NC Estuarine	785	7.9	Minimum = 2.30 Maximum = 18.99	Minimum = 4.10 Maximum = 22.60

Source: Waring et al. 2011 and 2012.

Bottlenose dolphin entanglements with the Virginia pound net fishery are documented by Virginia Aquarium and Marine Science Center (VAQ) stranding network since 1997 and the NEFOP since 2003. NEFOP only opportunistically observes this fishery; therefore, most of the information on these entanglements is from stranding data. Dolphins get entangled in the leader portion of the pound net, where they are removed alive or dead (Schaffler *et al*. 2011). Behavioral observations of dolphins show they use the leader as a foraging tool and likely get entangled as they herd fish toward the leader (Schaffler *et al*. 2011). Dolphins removed from the leader have twisted twine markings or impressions in the skin because the leaders are made of multifilament (i.e., twisted twine) material (Lynott and Barco, VAQ, pers. comm).

Dolphins also strand dead close to pound nets with twisted twine marks consistent with a pound net leader entanglement (Schaffler *et al*. 2011). The twisted twine marks are visible on the stranded dolphin's body when the markings are new and unhealed (Lynott and Barco, VAQ, pers. comm.). Careful examination of these markings can provide evidence of a fishery interaction (Read and Murray 2000; Kuiken 1996), and the presence of unhealed cuts or markings on the skin also indicates the animal interacted with and died from that fishery interaction (Read and Murray 2000). Therefore, the presence of unhealed twisted twine marks and the dolphin stranding in areas when the Virginia pound net fishery is active indicates the dolphin interacted with this fishery and is presumed to have ultimately died from that interaction.

In Virginia state waters from 2002-2011, 84 bottlenose dolphins were found with evidence of pound net entanglement by the VAQ and NEFOP (Figure 4). Thirty-one of the 84 animals were found entangled in pound net leaders and removed either dead or alive (Figure 4). Only 3 of the 31 animals removed from pound net leaders were released alive; although it is unknown whether the entanglement caused serious injuries that may have led to death. Twenty-eight of the animals removed directly from pound net leaders were entangled in offshore net leaders; the remaining three animals were in nearshore net leaders. Fifty-three animals stranded dead with twisted twine marks indicating a pound net entanglement and resulting death. All of these animals had new and unhealed twisted twine markings (Lynott and Barco, VAQ, pers. comm.)

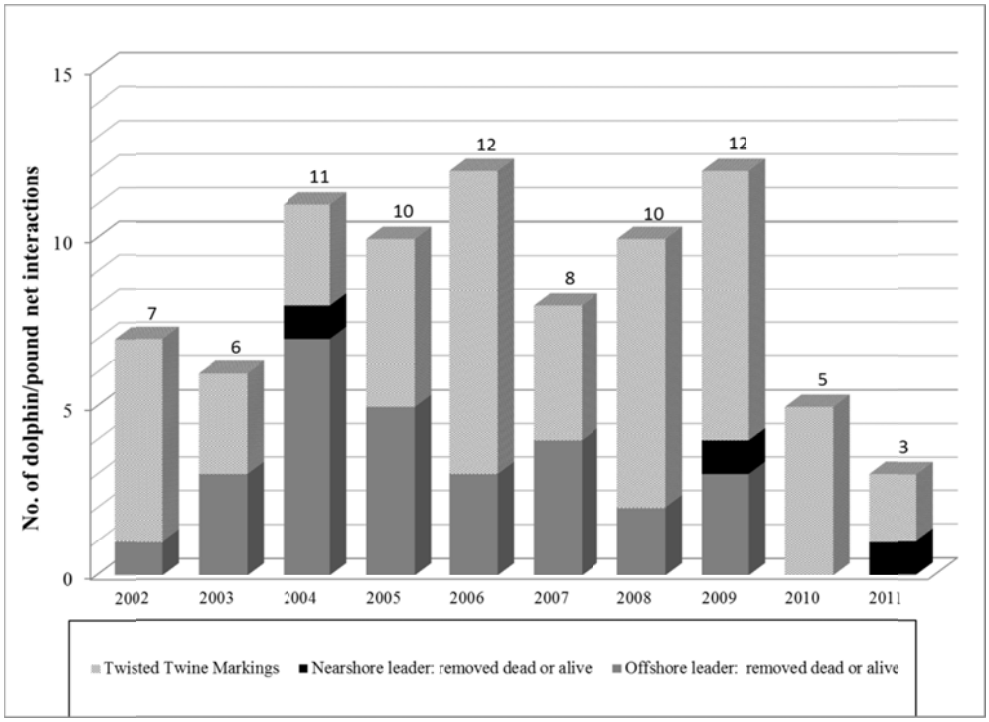


Figure 4. Dolphin strandings and entanglements in Virginia pound nets from 2002-2011. Data are shown by strandings with fresh and unhealed twisted twine markings or removed dead/alive from an offshore or nearshore pound net leader.

Documented pound net strandings and entanglements occurred in all months from April through November, which is typically the season for fishing pound nets in Virginia (Figure 5). Most interactions occurred in May through September, peaking in August. The majority (77%) of the 84 pound net interactions from 2002-2011 occurred in the southern portion of Chesapeake Bay by Lynnhaven (Figure 6). This is the area where the NEFOP documented six offshore pound nets in 2010 and 2011.

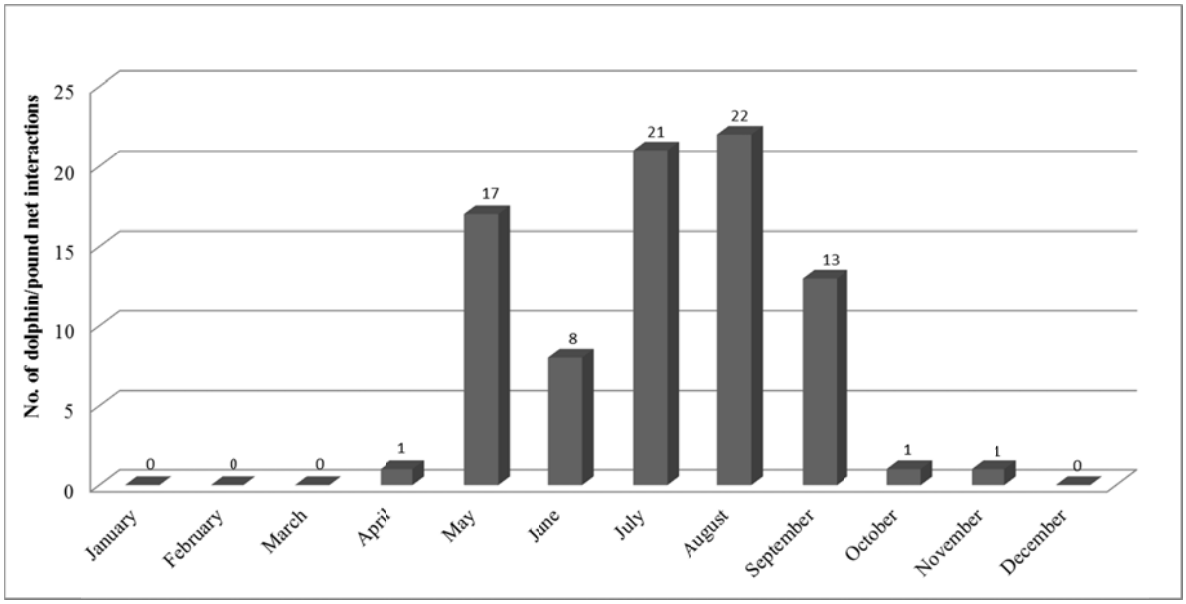


Figure 5. Dolphin interactions in Virginia pound net gear by month from 2002-2011.

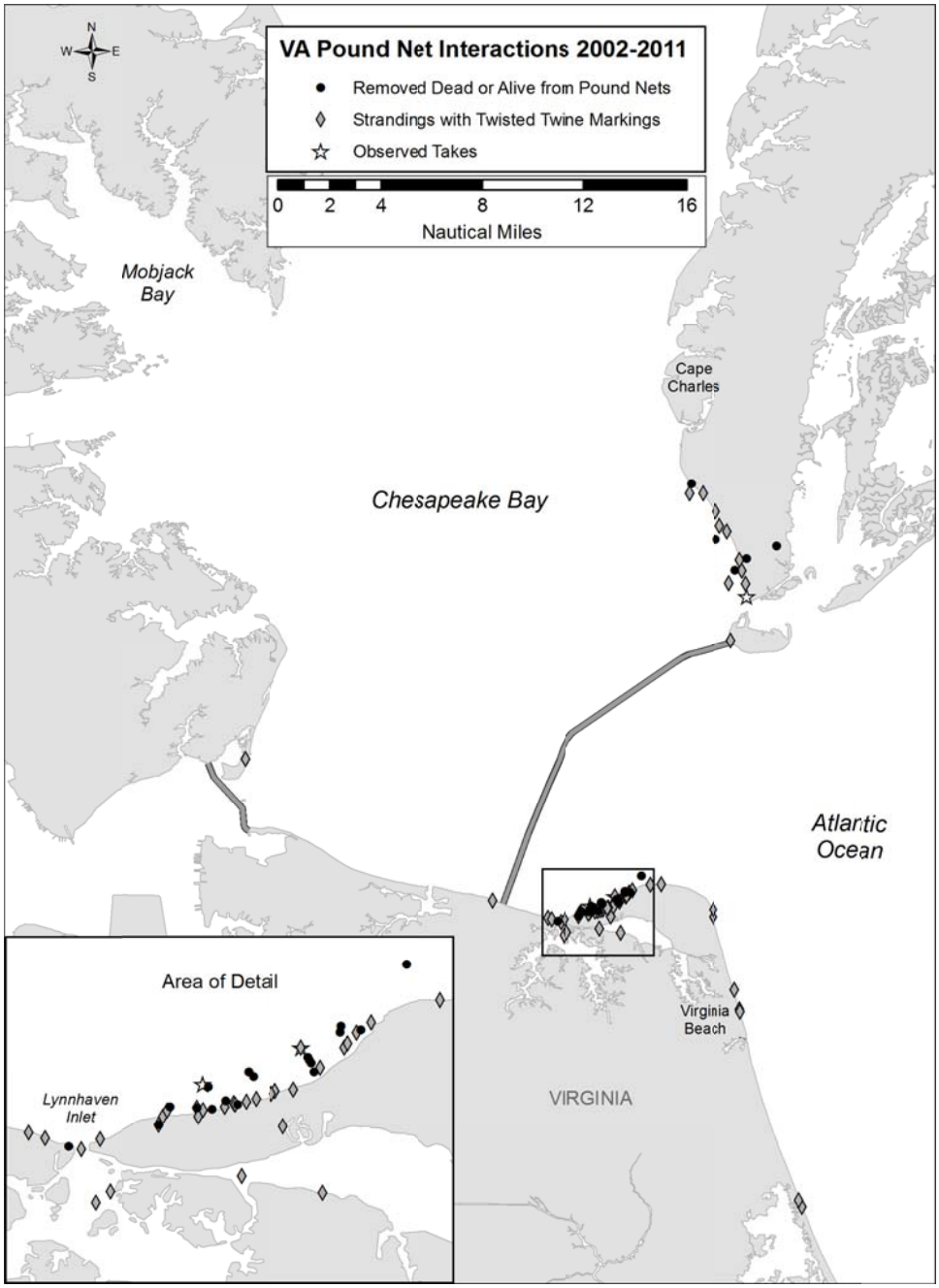


Figure 6. Locations of dolphin strandings and entanglements in Virginia pound net gear from 2002-2011. Data are shown by dolphins removed dead/alive from leaders and stranding with twisted twine markings.

Virginia pound net interactions were assigned to the three dolphin stocks based on which stocks are in waters where pound nets are fished during different times of year (Table 2). Due to spatial overlap of stocks when the fishery is active and uncertainty in stock identification described above, interactions were assigned to either the NM stock only; both the SM and NM stocks; both the SM and NNCES stocks; or all three stocks. As a result, 41 of the 84 pound net interactions from 2002-2011 were assigned to the NM stock; 82 were assigned to the SM; and 57 to the NNCES stock. These assignments are not additive because of the overlapping nature of the

stock and stock uncertainty. Total estimated bycatch mortality from interactions in Virginia pound nets cannot be generated because there is no systematic observer program for this fishery. Therefore, individual entanglements opportunistically observed by the NEFOP or documented by stranding data represent a minimum count of Virginia pound net bycatch mortality per stock.

Table 2. Total and annual average number of pound net interactions assigned to bottlenose dolphin stock(s) and the percent of the stock's PBR.

Stock	Data Time Series	Number of Pound Net Interactions from NEFOP and Stranding Data	Total Annual Average Interactions	% PBR from pound net interactions
NM	2002-2011	41	4.1	5.8%
	2007-2011	22	4.4	6.2%
	2008-2009 (Pre-2010 VMRC regulations)	10	5	7.0%
	2010-2011 (Post-2010 VMRC regulations)	8	4	5.6%
SM	2002-2011	82	8.2	8.5%
	2007-2011	37	7.4	7.7%
	2008-2009 (Pre-2010 VMRC regulations)	22	11	11.5%
	2010-2011 (Post-2010 VMRC regulations)	7	3.5	3.7%
NNCES	2002-2011	57	5.7	72.2%
	2007-2011	25	5.0	63.3%
	2008-2009 (Pre-2010 VMRC regulations)	17	8.5	107.6%
	2010-2011 (Post-2010 VMRC regulations)	3	1.5	19.0%

To evaluate the impact of the Virginia pound net fishery on each stock, documented pound net interactions assigned to stocks are compared against PBR (Table 2). The NNCES stock has the smallest abundance estimate and associated PBR at 7.9 animals, and fishery interactions, therefore, would represents the greatest conservation risk to this stock. Therefore, interactions assigned to both the SM and NNCES stocks or all three stocks are considered to be from the NNCES stock only to evaluate risk of exceeding PBR. From 2002-2011, the 57 pound net interactions assigned to the NNCES stock represent an annual average of 5.7 animals per year. This is 72.2% of PBR (Table 2). When looking at the most recent five years (2007-2011) that include state regulations, 25 pound net related interactions were assigned to the NNCES stock. This represents an annual average of 5 animals per year and 63.3% of PBR.

Stranding data were used to evaluate the effectiveness of the state's 2010 regulations requiring the use of modified pound net leaders and the effect of these gear modifications on bottlenose dolphin interactions. Data are broken down in Table 2 to reflect both the 2006 ESA regulations and 2010 VMRC regulatory requirements for modified leaders (see section 1.2) to evaluate the impact of these on dolphin interactions with pound nets. Although the data set is limited to only

two years (2010-2011), stranding data indicate a decreasing trend of bottlenose dolphin interactions with Virginia pound nets after VMRC regulations (Figure 4). For all proposed BDPNRA waters, the total average annual number of bottlenose dolphin interactions with pound nets decreased by 64% from the two years before and after the state's 2010 regulations. The annual average was 11 dolphins in 2008-2009 compared to 4 in 2010-2011 (Figure 4). When evaluating this for the NNCES stock, the average annual number of bottlenose dolphin interactions with pound nets decreased by 82%. This was a decrease from 8.5 (107.6% of PBR) animals per year from 2008-2009 to 1.5 animals per year (19% of PBR) from 2010-2011 (Table 2).

Pound net gear is not the only gear posing entanglement risks to these bottlenose dolphin stocks. Gillnets are another known significant source of serious injury and mortality. The NEFOP implements systematic observer coverage of the gillnet fishery. The most recent estimates of fishing mortality in coastal gillnets for the NNCES stock are from 2004-2008. These estimates are a minimum of 2.3 animals per year (29% of PBR) or a maximum of 18.99 animals per year (240% of PBR) (Waring et al. 2011). When evaluating total risk to the NNCES stock from known fishery related serious injury and mortality, the total annual human-caused serious injury and mortality must be considered. This means the gillnet mortality estimate must be considered with the most recent five year annual average (2007-2011) for Virginia pound net interactions, which is 5 animals per year (63.3% of PBR). Therefore, the total fishing mortality affecting this stock could be at least 23.99 animals per year.

The NNCES stock is likely exceeding PBR. This is a concern when evaluating either total annual-human caused mortality and/or considering individual fishery-related impacts on the stock. If all the pound net interactions belong to the NNCES stock, then the average annual pound net serious injury and mortality caused more than 50% of the stock's mortality over the last five years (2007-2011). While the regulations appear successful in reducing bottlenose dolphin interactions in pound net leaders overall, interactions are still documented in months when modified leaders are not required. Conservation benefits are lost when requirements to use modified leaders are lifted west of the CBBT on August 1. Furthermore, the seasonal regulatory timeframes for areas west of the CBBT may not be adequate in the future. The Virginia pound net fishing season typically occurs from April through November. However, this is weather dependent, and fishermen may set pound net gear earlier and keep the gear in the water later in years with mild springs and winters. This increases the potential for interactions with bottlenose dolphins outside the timeframe when modified leaders are currently required. Therefore, additional regulations are still needed despite the decreasing overall trend in the average annual pound net interactions following the state's regulations. Requiring offshore nets to use modified pound net leaders year-round in the proposed BDPNRA will help ensure entanglements do not cause serious injury and mortality to exceed PBR for the NNCES stock while allowing the fishery to continue. This will also help reduce serious injury and mortality of both the SM and NM stocks from Virginia pound nets that may be preventing the stocks from meeting or maintaining ZMRG.

The modified leader design is an effective solution to reduce dolphin interactions with Virginia pound net leaders. Dolphins may use the leader as a way to catch fish. The reduced mesh webbing and spacing and design of the vertical lines of the modified leader reduce areas for

dolphin entanglements. Therefore, the modified leader likely reduces the bycatch of dolphins (Schaffler *et al*. 2011). Stranding and observer data also indicate the modified leader design reduces bottlenose dolphin interactions.

ESA - Sea Turtles:

The Sea Turtle Stranding and Salvage Network (STSSN) responds to and reports live and dead stranded sea turtles. VAQ is the current responding organization in Virginia. From 1995 to 2011, total annual strandings ranged from a low of 158 in 1995 to a high of 523 in 2003 (Figure 7).

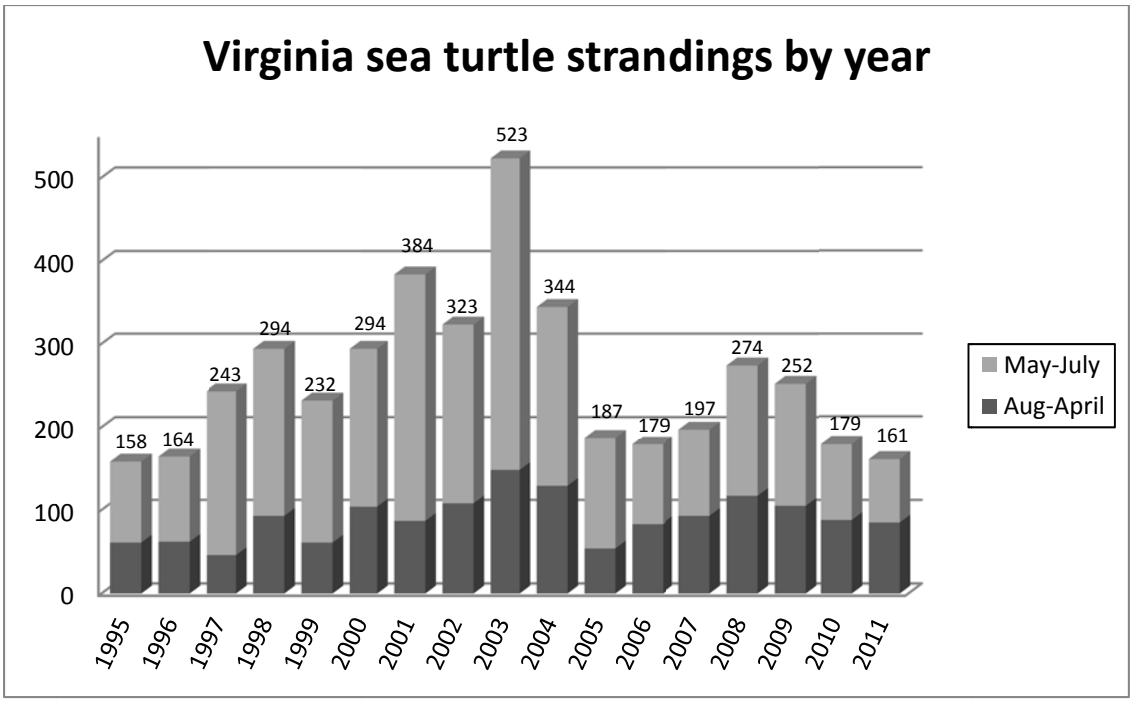


Figure 7. Annual Virginia sea turtle strandings from 1995-2011, with the spring and early summer period highlighted in light gray. Source: STSSN unpublished data.

The STSSN reports high sea turtle strandings in Virginia each spring and early summer, most notably during the second half of May and the month of June (Figure 8). Elevated strandings also continue into July, and stranded sea turtles are found during all months of their residency period in the Chesapeake Bay (typically May through November). Figure 8 shows the total monthly strandings from 1995 to 2011.

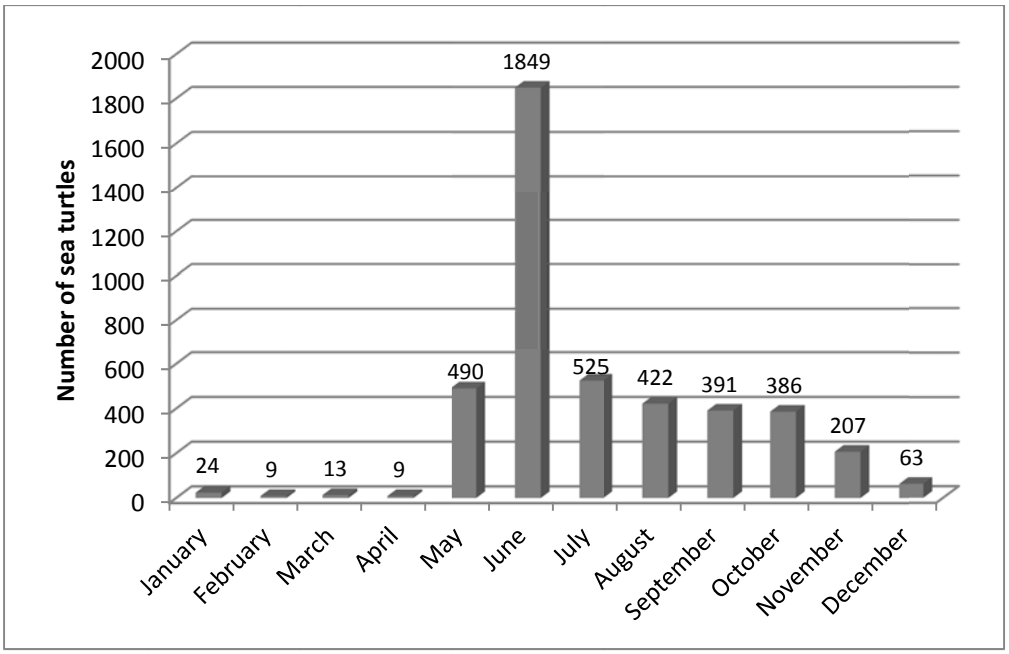


Figure 8. Monthly Virginia sea turtle strandings for 1995-2011 combined. Source: STSSN unpublished data.

While the distribution of strandings in Virginia varies slightly from year to year, there was a high concentration of stranded sea turtles were found along Cape Charles in the early 2000s. In 2000 to 2003 from April through September, the average number of sea turtle strandings along Cape Charles was approximately 43% of all strandings in Virginia. Reported stranding numbers declined after 2004. From 2004 to 2011 for the same months and area, average strandings decreased to 34% of all strandings in Virginia (Thomas *et al*. 2012).

Available data indicated the pound net fishery was a likely cause of a portion of sea turtle mortality in the Chesapeake Bay in the spring (NMFS 2004). A cause and effect relationship between pound net interactions and high spring strandings cannot be statistically derived based on the available data. However, NMFS documented that fishing with pound net leaders resulted in lethal and non-lethal takes of sea turtles.

In the 2000s, the NEFOP explored the potential mortality sources in Virginia waters during the spring. This included evaluating strandings for causes of mortality, investigating bycatch in Chesapeake Bay and nearshore Virginia fisheries, and initiating a monitoring program to further evaluate the potential for interactions between sea turtles and pound net leaders. The NEFOP monitored and/or characterized the pound net fishery while it was active in 2002, 2003, 2004, 2005, 2009, and 2010. Research was also conducted on modified pound net leaders in 2004 and 2005 (see section 1.2). A total of 31 entanglements in leaders and 18 impingements (i.e., turtle held against the leader by the current) were documented by the NEFOP or recorded during modified leader studies (Table 3). These documented entanglements and impingements represent minimum counts of sea turtle interactions in pound net leaders.

Table 3. NEFOP or research documented entanglements and impingements in Virginia pound net leaders.

Year	Numbers of Confirmed Sea Turtle Interactions in Pound Net Leaders		Total
	Entanglement	Impingement	
2002	4	2	6
2003	5	12	17
2004	8	1	9[a]
2005	12	3	15[b]
2009	0	0	0
2010	2	0	2
Total	31	18	49

[a] Eight of the nine interactions occurred during the modified pound net leader study discussed in section 1.2.
[b] All 15 interactions occurred during the modified pound net leader study.

During the April-June 2002 monitoring, a total of six turtles were found impinged or entangled in leaders. Four of the six were found entangled in leaders, including two dead Kemp's ridley and two dead loggerhead sea turtles (Table 3). Entrapment in pound net leaders was determined to be the likely cause of death of these animals based on necropsy reports, constriction wounds, and the magnitude of entanglement. Two loggerheads were also found alive in leaders. They were impinged on the leader with their head and front flippers through the mesh and apparently unable to swim off the leader on their own. Most of the animals were found in leaders along the Cape Charles area, but one turtle was found in the western Bay (Mobjack Bay). All turtles were found in offshore pound net leaders.

During the April-June 2003 monitoring, 17 sea turtles were documented in pound net leaders (Table 3). Of the 17 sea turtles, five were entangled in pound net leaders, of which two were loggerheads (one dead) and three were Kemp's ridleys (two dead). NMFS attributed the death of these turtles to entanglement in the pound net leaders based on the: (1) degree of entanglement and multiple wrapping of line around their flippers; (2) decomposition state (fresh dead to moderately decomposed); and (3) buoyancy (negatively buoyant, which typically suggests recent mortality). The remaining 12 turtles were impinged on pound net leaders. Of these 12 impingements, 10 were loggerheads (one dead), one was a live Kemp's ridley, and one was a live turtle with unknown species identification. Most of the observed sea turtles were found in nets along the Cape Charles area, but two were found in leaders in the western Bay (Mobjack Bay). All turtles were found in offshore pound net leaders except one dead loggerhead that was found in a nearshore pound net leader along the Cape Charles area.

During the May-June 2004 monitoring, NEFOP documented one entangled loggerhead sea turtle in a traditional leader. There were an additional eight sea turtle entanglements or impingements that occurred in leaders used in the modified pound net leader study as discussed in section 1.2. These were either documented by NEFOP or the researchers. Considering both NEFOP monitoring and the modified leader study, there were nine total interactions in pound nets in 2004: eight entanglements and one impingement (Table 3). All sea turtles documented in pound net leaders during 2005 were also associated with the experiment and are discussed in section 1.2.

Most of the prior high stranding events occurred between May and June with elevated strandings during the first half of July. All of the NEFOP documented entanglements and impingements also occurred in either May or June. In 2009, however, a concentration of increased strandings (n=36) occurred along Cape Charles from July 24 to September 30. This was a four-fold increase in strandings compared to the previous four years in the same time and area. These strandings also occurred later, with peak numbers in late July through September. There was also clear evidence of prior entanglement or impingement that included ligature wounds or nets consistent with those documented in known pound net-related interactions for four turtles. While carcass decomposition limited post-mortem assessment of many stranded turtles, available information was consistent with mortality from fisheries interactions (Trapani *et al*. 2009). Because of this stranding event, the NEFOP conducted monitoring in 2009 from August 23 to October 4. Five turtles were observed near pound nets (three floaters and two held against leader), but no sea turtles were documented entangled or impinged in leaders.

From mid-May to early August 2010, the NEFOP monitored the pound net fishery. Two turtles were found entangled in the same leader on the same day (one alive leatherback and one dead loggerhead) (Table 3). A private citizen also found a dead loggerhead in a leader, but entanglement cannot be confirmed. These interactions occurred in offshore pound net leaders located in the southern portion of the Chesapeake Bay near Lynnhaven.

From May to September 2011, the VAQ conducted stranding surveys along the Cape Charles area. In June, one dead loggerhead was found in a nearshore pound net leader.

1.2 Management History

Virginia Pound Net Fishery

Federal Regulations

NMFS issued a series of regulations under the ESA to reduce Virginia pound net interactions with threatened and endangered sea turtles. In 2002, NMFS issued an interim final rule containing several requirements and prohibitions for pound nets set in the Virginia waters of the mainstem Chesapeake Bay and portions of the Virginia tributaries (67 FR 41196; June 17, 2002). In these areas from May 8-June 30, pound net leaders constructed with either stringers or mesh measuring 12 inches and greater stretched were prohibited. Fishermen were also required to report all interactions with sea turtles in their pound net gear to NMFS within 24 hours of returning from the trip. The interim final rule also included a year-round requirement for pound

net fishing operations to be observed by a NMFS-approved observer if requested by the Northeast Regional Administrator. A framework was also established allowing NMFS to further protect sea turtles. The framework allows NMFS to change the restrictions and/or their effective dates on an expedited basis by responding to new information, such as the entanglement of a sea turtle in a pound net leader.

Following the NEFOP's monitoring in 2003 (see section 1.1), NMFS issued a temporary final rule (68 FR 41942; July 16, 2003) pursuant to the framework mechanism of the 2002 interim final rule. The temporary final rule restricted all pound net leaders throughout the Virginia Chesapeake Bay and portions of the tributaries from July 16 to July 30, 2003. The rule was enacted because the framework trigger was met (i.e., one turtle entangled in a leader), and the current restrictions were not protecting sea turtles to the extent intended.

In 2004, NMFS issued a final rule (69 FR 24997; May 5, 2004) prohibiting the use of offshore pound net leaders from May 6 to July 15 in PNRA I (Figure 9). It also retained the mesh size restrictions (less than 12 inches stretched mesh) and stringer prohibitions established by the 2002 interim final rule. However, these restrictions and prohibitions were now only for nearshore pound net leaders in PNRA I and all pound net leaders in PNRA II from May 6 to July 15 (Figure 9). The rule also defined a pound net leader, offshore pound net leader, and nearshore pound net leader. Pound net leader was defined as: *a long straight net that directs the fish offshore towards the pound, an enclosure that captures the fish. Some pound net leaders are all mesh, while others have stringers and mesh. Stringers are vertical lines in a pound net leader that are spaced a certain distance apart and are not crossed by horizontal lines to form mesh.* An offshore pound net leader is *a leader with the inland end set greater than 10 horizontal feet (3 m) from the mean low water line.* A nearshore pound net leader is *a leader with the inland end set 10 horizontal feet (3 m) or less from the mean low water line*. Finally, the 2004 rule also retained the monitoring and reporting provisions and the framework mechanism established in 2002.

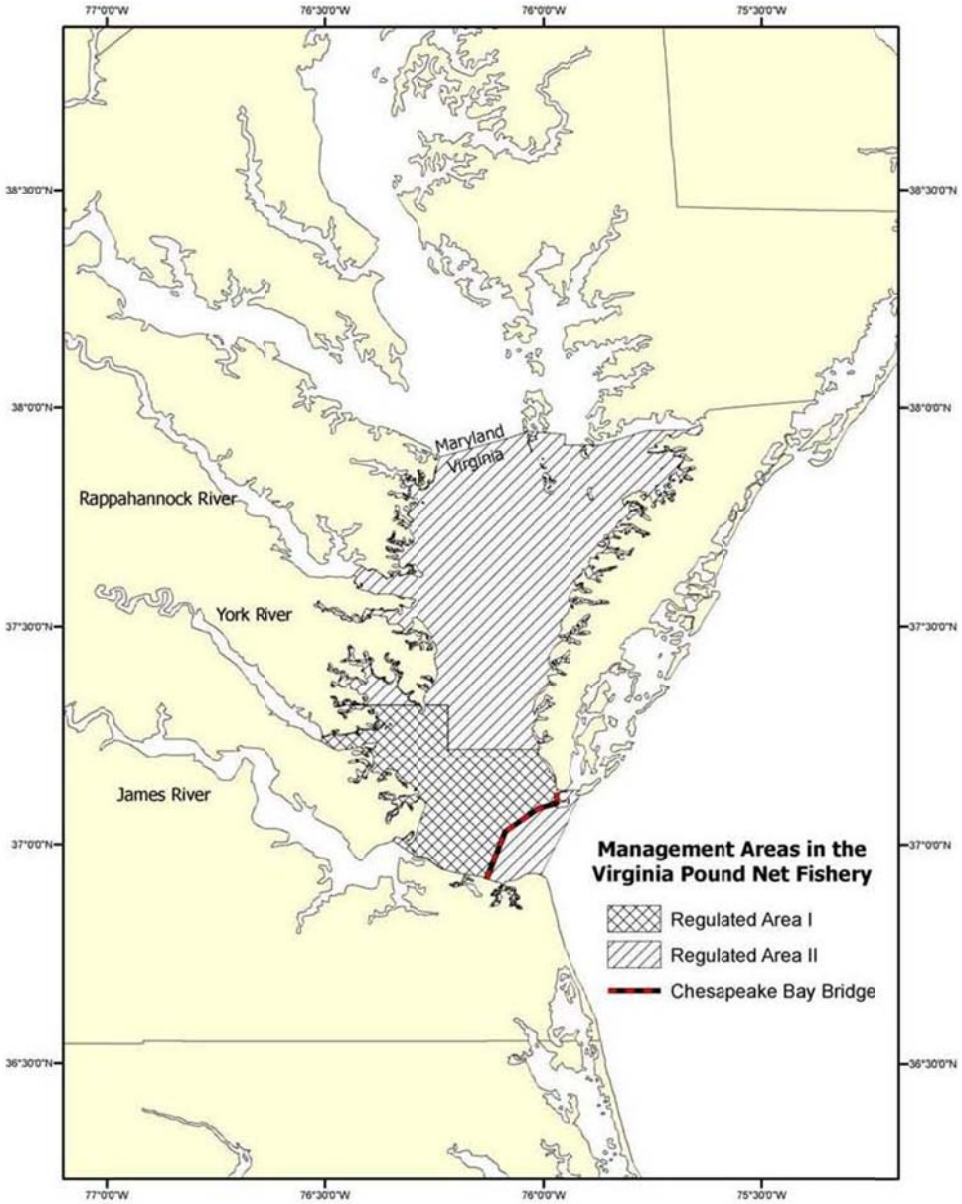


Figure 9. Pound Net Regulated Areas I and II in Chesapeake Bay, Virginia.

Following the 2004 prohibitions on using offshore leaders in PNRA I, NMFS collaborated with pound net fishermen and other interested parties on a modified pound net leader research study. The two year (2004 and 2005) study evaluated if modified leaders used on offshore nets prevented or reduced sea turtle interactions, while retaining catch efficiency (Silva *et al*. 2011).

The modified pound net leader design evaluated in the study was a combination of mesh and stiff vertical lines. The mesh was in the bottom one-third of the leader and vertical lines in the top two-thirds (Figure 10). The mesh size was equal to or less than 8 inches (20.3 cm) stretched. It was positioned at a depth that was no more than one third the depth of mean low water. The vertical lines were 5/16 inches (0.8 cm) in diameter. They were strung vertically at a minimum of every 2 feet (61 cm) and attached to a top line. In the 2004 portion of the study, vertical lines were constructed with 1.0 cm polyproplylene rope coated with paint to stiffen them. However,

in 2005, vertical lines were constructed with 0.8 cm Polysteel rope (e.g., hard lay lines) for increased stiffness. The modified leader design was based on the premise that the sea turtles would pass through the stiff vertical lines in the upper 2/3 of the leader without entangling in or impinging on the leader. It was also supported by a working a hypothesis that: (1) pelagic fish will be herded to the pound by the visual cue of the vertical lines; and (2) demersal fish will be guided into the pound by the webbing (DeAlteris *et al.* 2004; Silva *et al*. 2011).

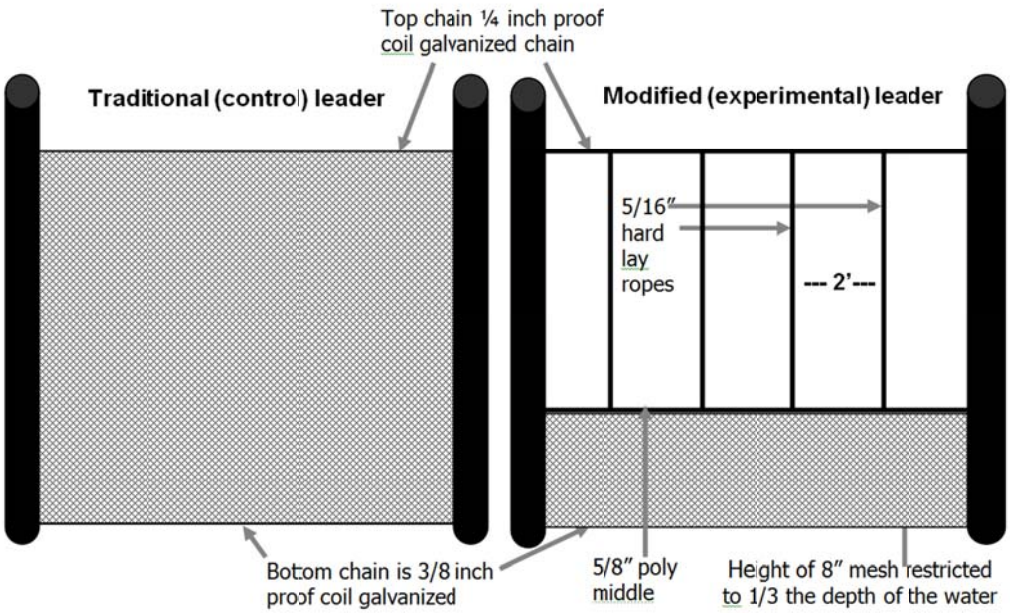


Figure 10. Picture of traditional and modified pound net leaders. Figure from NMFS 2006, pg. 15.

In 2004, the study monitored six pound nets for sea turtle interactions near Cape Charles for 42 days during May and June. Four offshore and two nearshore pound net leaders were used in the study. The four offshore pound net leaders were alternatively rigged with modified and traditional leaders (Figure 10). The traditional leaders were constructed with all mesh measuring 11 inches stretched mesh from seabed to the top line. Pound nets were monitored twice daily for sea turtle interactions using side-scan sonar and visual observations. Overall, there were seven entanglements (three loggerheads, three Kemp's ridleys, one leatherback) and one impingement (loggerhead) during the 2004 study (see Table 3); 7 were in traditional pound net leaders and 1 (leatherback) was in the vertical line of a modified pound net leader. All turtles were found dead except one entangled loggerhead and one impinged loggerhead. The interaction rate in the traditional leader (7 interactions) was sevenfold greater than the rate of interaction in the modified leader (DeAlteris *et al*. 2004; Silva *et al*. 2011).

In 2005, four offshore pound net leaders were tested near Cape Charles for 55 days from May 6 through June 29. There was one change in the construction of the modified leader experimental design from the 2004 to 2005 study year. In 2005, the 1.0 cm polyproplylene coated rope was replaced with hard lay vertical lines because it was thought the 2004 leatherback entanglement was due to a lack of rope stiffness. The nets were rigged alternately with modified and traditional leaders for the first 30 days of the study. They were monitored twice daily for sea

turtle interactions using visual and side scan sonar. During the monitoring period, 15 sea turtles were documented interacting with traditional pound net leaders; 12 entanglements and 3 impingements (Table 3). Of the 12 entanglements, 7 were loggerheads and 5 were Kemp's ridleys. Of the 3 impingements, 2 were loggerheads and 1 was a Kemp's ridley. Interactions occurred with the traditional leader within 2-3 m of the sea surface, which is generally well within the top-two thirds of the water column. For the second 25 days of the study, the traditional nets were replaced with modified leaders because takes of sea turtles in traditional leaders exceeded permit allowances. No sea turtles were entangled in modified leaders for the remainder of the study (DeAlteris *et al.* 2005; Silva *et al*. 2011).

Data for sea turtle entanglements and finfish catch were combined for the 2004 and 2005 field seasons to evaluate if study objectives were met. The modified leader significantly (p=0.003) reduced sea turtle interactions with pound nets when data were pooled for both years. Statistical analyses also found no significant differences between modified and traditional leaders in the harvest weight for the fish species analyzed (e.g., butterfish, croaker, Atlantic thread hearing, and weakfish). Therefore, the modified leader met the study goal of significantly reducing sea turtle interactions with offshore pound net leaders while maintaining catch efficiency (Silva *et al*. 2011).

NMFS believed the 2004 and 2005 study results provided sufficient information to propose the use of modified pound net leaders for offshore nets. Therefore, NMFS issued a final rule on June 23, 2006 (50 CFR 36024) requiring any offshore pound net leader set in PNRA I to use modified leaders from May 6-July 15 each year (see Figure 9). The rule also defined modified pound net leader as: *a pound net leader that is affixed to or resting on the sea floor and made of a lower portion of mesh and an upper portion of only vertical lines that: (a) the mesh size is equal to or less than 8 inches (20.3 cm) stretched mesh; (b) at any particular point along the leader the height of the mesh from the seafloor to the top of the mesh must be no more than one-third the depth of the water at mean lower low water directly above that particular point; (c) the mesh is held in place by vertical lines that extend from the top of the mesh up to a top line, which is a line that forms the uppermost part of the pound net leader; (d) the vertical lines are equal to or greater than 5/16 inch (0.8 cm) in diameter and strung vertically at a minimum of every 2 feet (61 cm); and (e) the vertical lines are hard lay lines with a level of stiffness equivalent to the stiffness of a 5/16 inch (0.8 cm) diameter line composed of polyester wrapped around a blend of polypropylene and polyethylene and containing approximately 42 visible twists of strands per foot of line*.

Following the 2006 final rule, NMFS recognized the need for an inspection program to determine if a modified pound net leader met the regulatory definition prior to deployment. Pre-deployment inspections would help fishermen with compliance, ensure the protection of sea turtles, and limit the difficulties of post-deployment inspections at-sea. On November 18, 2008, NMFS established a land-based inspection program for modified pound net leaders fished in the Virginia Chesapeake Bay waters from May 6 through July 15 (73 FR 68348). The inspection program requires fishermen to notify NMFS at least 72-hours before deploying modified pound net leaders. NMFS then examines modified leaders for compliance with parts of the definition of a modified pound net leader. This also involves collecting information from fishermen on the

depth and physical coordinates of their gear and tagging the leader after it passes inspection to aid enforcement.

In 2008, NMFS funded another research project to implement the BDTRT's 2007 research recommendation for Virginia pound nets (see section 1.1). The study goal was to determine the effect of modified leaders on finfish catch in pound nets near Lynnhaven. Similar to the prior study, researchers worked with fishermen fishing pound nets near Lynnhaven to evaluate their effectiveness. Catch efficiency of finfish was compared between modified and traditional leaders from 24 sampling trips between May-September 2008. Modified leaders were constructed as defined in ESA regulations, except the vertical lines were constructed with soft lay lines (0.8 cm polypropylene) instead of hard lay. The study results showed similar or greater catches of finfish when using modified leaders compared to traditional leaders. Study results also showed modified leaders reduced catch of various rays and skates (Schaffler *et al*. 2011).

The BDTRT provided NMFS with their 2009 regulatory consensus recommendations for the Virginia pound net fishery after hearing the results of the 2008 modified leader study (see section 1.1 and 1.2). The BDTRT felt the modified leader design may also help reduce serious injury and mortality of bottlenose dolphins from entanglement in pound net gear. Therefore, because the study conducted on pound nets near Lynnhaven maintained catch efficiency when compared to traditional leaders, the BDTRT recommended their year-round use in specified areas east and west of the CBBT.

In 2011, researchers conducted a follow-up modified leader study near Lynnhaven. This study compared catch efficiency of modified leaders constructed with the soft lay line that was used in the 2008 study versus the hard lay lines required per ESA regulations. The 2011 study results found no significant effect on catch between line type (soft versus hard lay), and there was no effect from pound net location (Swingle *et al*. 2011). This is consistent with Silva *et al*. (2011) that pooled finfish samples from the 2004 study using soft lay lines with samples from the 2005 study that used the hard lay lines currently required. Data was pooled because there was no expected difference in catch when using hard lay versus soft lay lines (Silva *et al*. 2011) as found by Swingle *et al*. (2011).

State Regulations

There are Virginia state laws and regulations for fixed fishing gear in general and Virginia pound net gear, which both apply to pound net gear fished in the state. State regulation limits the annual number of pound net licenses to 161 that can be applied for and issued in the Virginia waters of the mainstem Chesapeake Bay (4VAC20-600-10 ET SEQ). Any pound net fished in the mainstem waters of the Chesapeake Bay must apply for and receive a license to fish that specific location. State law also prohibits the use of any fixed fishing device with a total length greater than 1,200 ft (365.8 m) (§28.2-307). VMRC further established regulations associated with licensing fixed fishing devices; determining priority rights of licenses for fixed fishing devices; and requirements to reduce entanglements of protected species in pound nets (4VAC20-20-10 ET SEQ).

The VMRC established the requirements to reduce protected species entanglements in pound nets following the BDTRT's 2009 consensus recommendation. Per the BDTRT's recommendations, NMFS informed the VMRC of the BDTRT's consensus recommendations pertaining to the Virginia pound net fishery. NMFS also encouraged the state to adopt the BDTRT's recommendations for pound net gear. In December 2009 and July 2010, the VMRC approved the regulations pertaining to pound net fishing in state waters to help reduce protected species entanglement in the gear. Specifically, any fixed gear fished in Virginia tidal waters east of the CBBT must use a modified leader year-round and be inspected at least 72 hours prior to deployment (4VAC20-20-30). This regulation mirrored the BDTRT's 2009 consensus recommendation. For offshore pound nets fished in PNRA I (e.g., west of the CBBT), the VMRC requires the use modified leaders from May 6-July 31 (4VAC20-20-30). This added two weeks to the seasonal regulations under the ESA for using modified leaders; whereas the BDTRT recommended year-round use of modified leaders. Modified leaders used in both these areas must also be inspected at least 72 hours before deployment (4VAC20-20-30), similar to the inspection program under ESA regulations.

2.0 Purpose and Need

The needs for these actions are to: (1) assist in the recovery or prevent the depletion of strategic bottlenose dolphin stocks interacting with commercial fisheries per section 118(f) of the MMPA (16 U.S.C. 1387 *et seq.*); and (2) further reduce takes of threatened and endangered sea turtles that are prohibited under section 9(a) of the ESA. The purposes of the actions are to: (1) reduce serious injury and mortality of bottlenose dolphins incidental to the Virginia pound net fishery; and (2) amend current definitions and regulations for Virginia pound nets at 50 CFR 222.102 and 223.206(d)(10) to reduce takes of threatened and endangered sea turtles while ensuring consistency with components of the BDTRP regulations that will govern the same fishery.

3.0 Management Alternatives

3.1 Action 1. Amend MMPA and ESA implementing regulations to reduce bottlenose dolphin serious injuries and mortalities and sea turtle takes incidental to Virginia pound nets.

Action 1 consists of four sub-actions with associated alternatives to meet the purpose and need. The MMPA implementing regulations are being amended to reduce serious injury and mortality of bottlenose dolphins from Virginia pound net fishing gear. Conservation benefits to ESA-listed sea turtles are expected from the amended regulations under the MMPA. The ESA implementing regulations for Virginia pound nets are also being amended to provide consistency between the MMPA and ESA implementing regulations for the same fishery. In **Sub-action 1**, alternatives for geographic location (i.e., regulated waters) of proposed Virginia pound net gear requirements are examined. **Sub-action 2** examines alternatives for the timeframe of the proposed gear requirements. **Sub-action 3** examines alternatives defining the type of pound net (e.g., nearshore or offshore pound net/leader) and which of those net leaders must use modified leaders as required in **sub-action 4** and in areas and times under **sub-actions 1 and 2**. **Sub-action 4** examines changes to how modified pound net leaders are made and defined; it newly

defines pound nets and requires all parts of the gear to be fished as the same time in areas of Virginia; and formally defines hard lay lines.

Each of these sub-actions and their alternatives are designed to meet MMPA mandates, while considering new information since ESA regulations were implemented. They also strive for consistency between MMPA and ESA regulatory requirements by amending ESA regulations as necessary. This makes it clearer and easier for fishermen to understand: (1) if they are affected, (2) how they will be affected, and (3) what they will be required to do if they are affected.

3.1.1 Sub-action 1. Geographic area where proposed Virginia pound net gear requirements will be implemented

3.1.1.1 Alternative 1. No Action.

3.1.1.2 Preferred Alternative 2. Implement the BDTRT's 2009 recommendations to expand the area of the proposed Virginia pound net gear requirements.

3.1.1.3 Alternative 3. Expand the area of the Virginia pound net gear requirements to the entire mainstem Virginia Chesapeake Bay and state coastal waters.

Sub-action 1 examines alternatives for geographically identifying regulated waters in Virginia state waters where pound nets will be required to use modified leaders. **Sub-action 1** would be implemented under the MMPA regulations.

There are three alternatives considered under this sub-action. The proposed range of geographic areas where Virginia pound net requirements would be implemented is limited to these alternatives based on where the majority of pound nets are located within Virginia state waters and the known interactions with sea turtles and bottlenose dolphins.

Alternative 1 (no action)
Alternative 1 requires the use of modified leaders for Virginia pound nets using offshore net leaders in specified areas both west and east of the CBBT. Currently, both ESA implementing regulations (50 CFR 223.206) and VMRC state regulations (4VAC20-20-30D) require the seasonal use of modified leaders for offshore pound nets in PNRA I (e.g., west of the CBBT). State regulations further require the year-round use of modified leaders for any pounds fished east of the CBBT and in Virginia state coastal waters. The combined regulated areas under both the ESA and state regulations are the no action (Figure 11). **Alternative 1** maintains the current conservation benefits to sea turtles and bottlenose dolphins in these combined areas.

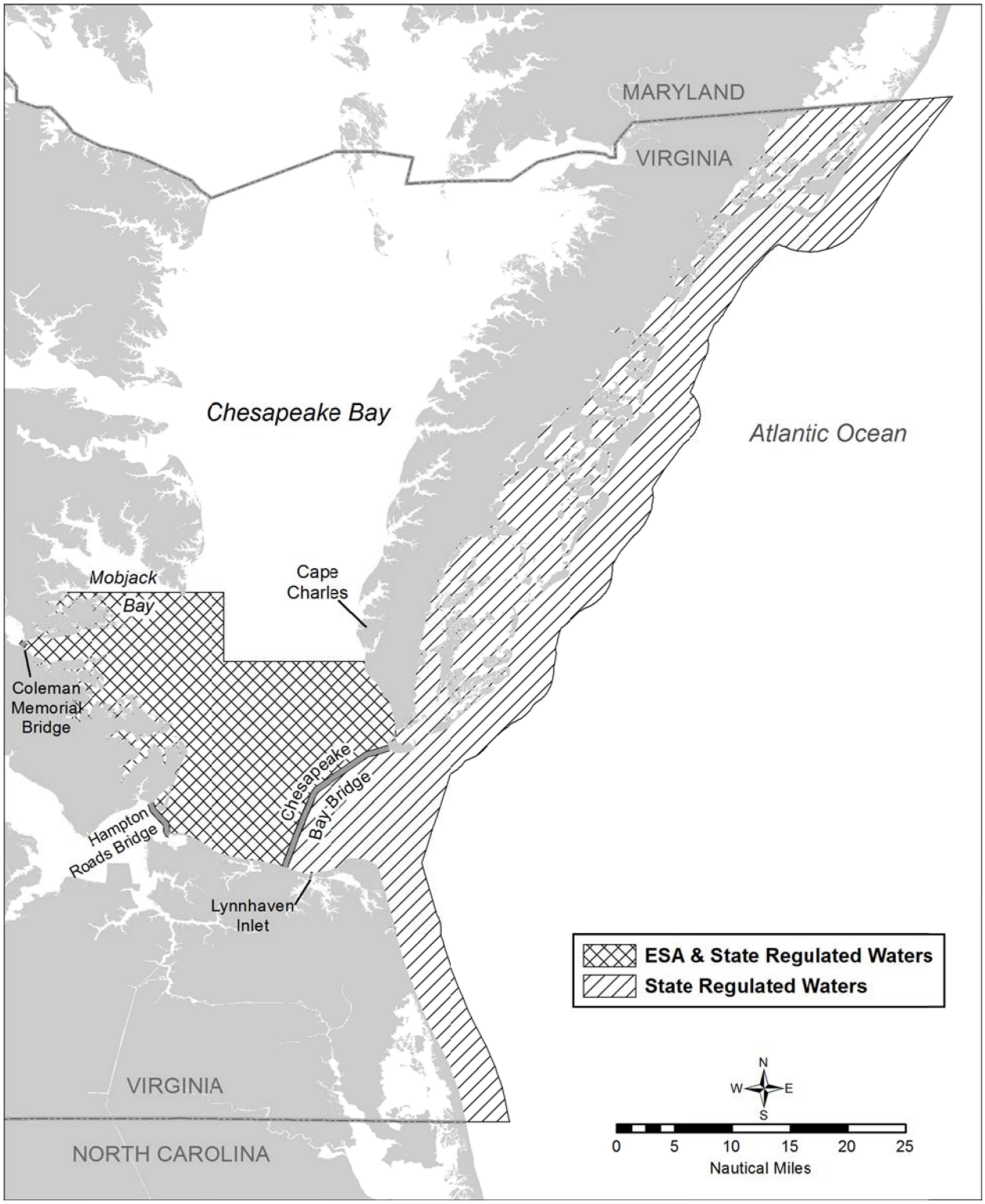


Figure 11. Virginia State waters where modified leaders are currently required by both the ESA and state regulations.

Preferred Alternative 2

Preferred Alternative 2 was a consensus recommendation by the BDTRT. It proposes to maintain the total geographic area described in **Alternative 1** but combines regulated waters into a single, additional regulatory authority (i.e., MMPA). This area is defined as the Bottlenose Dolphin Pound Net Regulated Area (BDPNRA) (see Figure 1). The proposed definition for the BDPNRA is: *all Virginia marine waters of the Atlantic Ocean within 3 nautical miles (5.56 km) of shoreline and all adjacent tidal waters, bounded on the north by 38°01.6'N. (Maryland/Virginia border) and on the south by 36°33'N (Virginia/North Carolina border); and all southern Virginia waters of the mainstem Chesapeake Bay bounded on the south and west by the Hampton Roads Bridge Tunnel across the James River and the Coleman Memorial Bridge across the York River; and north and east by the following points connected by straight lines in the order listed:*

Point	***Area Description***
1	*Where 37°19.0' N. lat. meets the shoreline of the Severn River fork, near Stump Point, Virginia (western portion of Mobjack Bay), which is approximately 76°26.75' W. long.*
2	*37°19.0' N. lat., 76°13.0' W. long.*
3	*37°13.0' N. lat., 76°13.0' W. long.*
4	*Where 37°13.0' N. lat. meets the eastern shoreline of Chesapeake Bay, Virginia, near Elliotts Creek, which is approximately 76°00.75' W. long.*

During their September 2009 meeting, the BDTRT felt it was important to maintain consistency with the existing ESA regulations, while also providing needed bottlenose dolphin conservation benefits. They recommended requiring the use of modified leaders in the areas currently regulated under the ESA [e.g., offshore nets in PNRA I (west of the CBBT)] in the lower mainstem Chesapeake Bay. However, stranding data show bottlenose dolphin entanglements in offshore net leaders set east of the CBBT near Lynnhaven (see Figure 6). There are no ESA regulations requiring modified leaders in this area. Therefore, the BDTRT recommended extending the regulated waters east of the CBBT where these nets are set and into state coastal waters for needed bottlenose dolphin conservation. The BDTRT was proactive by recommending regulated waters extend into coastal state waters, north to the Maryland/Virginia border and south to the Virginia/North Carolina border, should pound nets be licensed there in the future.

When the BDTRT made these recommendations, offshore pound nets set in waters east of the CBBT (i.e., around Lynnhaven) were not required to use modified leaders. In 2010, VMRC required fishermen using offshore pound nets in these areas to use modified leaders. Therefore, **Alternative 1** and **Preferred Alternative 2** include the same geographic area but are established under different authorities. The **Preferred Alternative 2** provides more consistency in regulations and easier interpretation for fishermen by regulating the entire area consistently and under one authority.

Alternative 3

Alternative 3 extends the geographic area for regulated waters to include the entire mainstem Virginia Chesapeake Bay and coastal waters. This includes Virginia Chesapeake Bay mainstem waters north of those identified in **Alternatives 1** and **Preferred Alternative 2.** While

Alternative 3 appears to be the most conservation oriented, there are no known conservation benefits from expanding regulated waters north of those in **Alternative 1** and **Preferred Alternative 2**. There are currently no known pound net leader interactions with sea turtles or dolphins in these northern waters based on stranding and NEFOP data. Thus, this additional expansion provides no known conservation benefit to the species and is therefore believed to unnecessarily burden fishermen with additional costs and regulations.

Alternative 1 maintains waters currently regulated under state and federal authorities and associated conservation benefit to bottlenose dolphins and sea turtles. Regulated waters in **Preferred Alternative 2** are geographically the same as **Alternative 1,** but improve consistency of how regulations are applied through regulation under one authority and in one area. Additionally, **Preferred Alternative 2** does not burden a portion of the fishery (northern Virginia Chesapeake Bay) that is not known to interact with sea turtles or dolphins. **Alternative 3** encompasses the largest geographic area of the three alternatives but offers no known greater conservation benefit than **Preferred Alternative 2**. **Alternative 3** would instead place what is currently considered an undue regulatory burden on fishermen in the upper Virginia Chesapeake Bay.

3.1.2 Sub-action 2. Time period for implementing proposed Virginia pound net gear requirements for leaders

3.1.2.1 Alternative 1. No Action.

3.1.2.2 Preferred Alternative 2. Implement the BDTRT's 2009 recommendations to expand the timeframe to year-round for proposed Virginia pound net gear requirements.

3.1.2.3 Alternative 3. Require modified leaders from May 1-September 30 for proposed Virginia pound net gear requirements.

Sub-action 2 examines the time period for requiring the use of modified leaders in Virginia pound nets for identified leaders. **Sub-action 2** would be implemented under the MMPA regulations.

There are three alternatives considered under this sub-action. The proposed range of time periods when Virginia pound net requirements would be implemented is limited to these alternatives based on when all or a majority of interactions with sea turtles and bottlenose dolphins are known to occur. Similar to the range of alternative in **sub-action 1**, alternatives that would have expanded the temporal scope of the restrictions beyond the time periods when interactions are believed to be occurring were not considered reasonable alternatives, and were not included on that basis.

Alternative 1 (no action)
Alternative 1 maintains the timing for requiring modified pound net leaders under the ESA and state regulations. ESA and state regulations and timeframes were developed separately and in response to two issues: (1) the documented seasonal interactions with sea turtles in the fishery during the late spring/early summer, particularly along the Cape Charles area; and (2) year-round

dolphin interactions with pound nets in the lower bay near Lynnhaven. Therefore, the timeframes requiring the use of modified leaders differ for regulated waters described in **sub-action 1, Alternative 1**. For regulated waters west of the CBBT, modified leaders are required for offshore pound nets from May 6-July 15 under ESA regulations, and from May 6-July 31 under state regulations. For waters east of the CBBT including coastal state waters, modified pound net leaders are required year-round under state regulations.

While the regulations appear successful in reducing sea turtle interactions west of the CBBT, both sea turtle strandings (with net marks) and bottlenose dolphin interactions in pound net leaders are documented in months when modified leaders are not required. Conservation benefits to both sea turtles and dolphins are lost when requirements to use modified leaders are lifted west of the CBBT on August 1. Furthermore, the seasonal regulatory timeframes for areas west of the CBBT may not be adequate in the future. The Virginia pound net fishing season typically occurs from April through November. However, this is weather dependent, and fishermen may set pound net gear earlier and keep the gear in the water later in years with mild winters and springs. This increases the potential for interactions with sea turtles and bottlenose dolphins outside the timeframe when modified leaders are currently required.

Preferred Alternative 2
Preferred alternative 2 was a consensus recommendation by the BDTRT. It expands the requirement to use modified pound net leaders to year round in the area under **sub-action 1** and the net leader identified in **sub-action 3** (Table 4). **Preferred Alternative 2** provides the greatest conservation benefit by reducing the possibility of interactions occurring with traditional leaders.

Alternative 3
Alternative 3 requires the use of modified leaders from May 1-September 30. **Alternative 3** covers the timeframe for when the majority of bottlenose dolphin interactions with Virginia pound nets are documented, but interactions occur outside these months. **Alternative 3** therefore allows for the possibility of interactions with traditional leaders outside this timeframe.

Table 4. Required modified leader use for the alternatives of sub-action 2.

Alternative	Timeframes for Using Modified Leaders
Alternative 1 – No Action	West of CBBT: May 6-July 31 East of CBBT: Year round
Alternative 2 – Preferred	Year round
Alternative 3	May 1-September 30

3.1.3 Sub-action 3. *Virginia pound net leaders required to follow gear requirements*

3.1.3.1 Alternative 1. No Action.

3.1.3.2 Preferred Alternative 2. Implement revised BDTRT 2009 recommendations to change nearshore and offshore pound net leader definitions and require modified pound net leaders for offshore pound nets.

3.1.3.3 Alternative 3. Implement the BDTRT's 2009 recommendations to change nearshore and offshore pound net leader definitions and require modified pound net leaders for offshore pound nets.

3.1.3.4 Alternative 4. Remove offshore and nearshore pound net leader definitions and require all pound nets to use a modified leader.

Sub-action 3 requires the use of modified pound net leaders and defines the pound nets required to use them. **Sub-action 3** would be implemented under both the MMPA and ESA regulations.

Pound nets fished in the regulated waters are classified by whether they meet the definition of an offshore or nearshore pound net leader. Virginia pound nets using offshore net leaders in certain areas are currently required to use modified leaders under ESA and state regulations (see Figure 11). The current definitions for nearshore and offshore pound net leaders in the ESA regulations are complex. The current definitions in the ESA use distance from shore [i.e., 10 horizontal feet (3 m)] of the inland end of the leader at mean low water as the only defining factor for both offshore and nearshore pound net leaders. However, a nearshore pound net leader may extend into deeper, more offshore, water where modified leaders are required to reduce the risk of protected species interactions. Each alternative in **sub-action 3**, therefore, proposes various definitions of offshore and nearshore pound net leaders (or offshore or nearshore pound nets) to clarify the way nets are defined. This also identifies the universe of pound nets fished in Virginia that must comply with the modified leader regulations. The purpose of these proposed definition changes are to clarify the intent of the definitions and help fishermen and enforcement consistently determine an offshore versus nearshore pound net.

Alternative 1 (no action)
Alternative 1 (no action) requires offshore pound nets to use modified pound net leaders. It also keeps the current definitions for offshore and nearshore pound net leaders in the ESA implementing regulations at 50 CFR 222.102 and state regulations at 4VAC20-20-30D and E. Offshore pound net leaders are defined as *a net with a leader that has the inland end set greater than 10 horizontal feet (3 m) from the mean low water line*. Nearshore pound net leaders are defined under both ESA and state regulations as *a net with a leader that has the inland end set 10 horizontal feet (3 m) or less from the mean low water line*.

Under **Alternative 1**, leaders meeting the offshore pound net leader definition are required to use modified leaders in the areas and times described in **sub-actions 1 and 2**. Furthermore, the current definition for nearshore pound net leaders may allow the leader to extend into deeper, more offshore waters, where a modified leader should be used. This creates a potentially increased risk of protected species interactions with leaders because nearshore pound nets are not required to use modified leaders.

Preferred Alternative 2
Preferred Alternative 2 is a revised version of the BDTRT consensus recommendation in **Alternative 3**. It requires offshore pound nets to use a modified pound net leader as recommended by the BDTRT but proposes new definitions for both offshore and nearshore pound nets. This alternative adds a water depth point as the only differentiating factor for a

leader. It removes the distance from shore portion of the definition as described in **Alternatives 1 and 3**. **Alternative 1** uses distance from shore at mean low water as the only defining factor. **Alternative 3** uses both distance from shore at mean low water and water depth at the king post as differentiating factors.

Preferred Alternative 2 considers the BDTRT's consensus recommendation in **Alternative 3**, pound net leader characteristics, and depth of the fishing grounds. It was developed in coordination with various NOAA offices and BDTRT members to address concerns with both **Alternatives 1 and 3**. **Preferred Alternative 2** defines an offshore pound net leader or offshore pound net as *a pound net with any part of the leader (from the most offshore pole at the pound end of the leader to the most inshore pole of the leader) in water greater than or equal to 14 feet (4.3 m) at any tidal condition*. Any leaders meeting this definition are required to use the modified leader defined in **sub-action 4** in the times and areas under **sub-actions 1 and 2**. **Preferred Alternative 2** defines nearshore pound net leaders or nearshore pound nets as *a pound net with every part of the leader (from the most offshore pole at the pound end of the leader to the most inshore pole of the leader) in less than 14 feet (4.3 m) of water at any tidal condition*. Leaders meeting this definition are not subject to the requirements for using a modified leader in the times and areas under **sub-actions 1 and 2**. However, fishermen can still choose to use a modified leader on their nearshore pound net if they prefer.

The definitions in **Preferred Alternative 2** use water depth at any tide as the differentiating factor for offshore and nearshore pound nets. Using water depth only is clearer and more consistent for fishermen and enforcement. It reduces environmental variability and interpretation of determining mean low water and distance from shore measurements. The conditions associated with the proposed definitions are more readily documented by all those involved without the need to factor in tidal state and distances, which facilitates compliance with, and enforcement of, the regulatory requirements. It also provides conservation benefits for protected species by ensuring leaders extending into deeper, more offshore waters use modified leaders regardless of the actual distance from shore.

Alternative 3

Alternative 3 was a consensus recommendation by the BDTRT. It requires offshore pound nets to use modified pound net leaders and changes the nearshore pound net leader definition in **Alternative 1** by adding a water depth end point. The definition for an offshore pound net leader remains the same as the no action. Virginia pound nets with leaders meeting the offshore pound net definition are required to use the modified leader defined in **sub-action 4** in the times and areas under **sub-actions 1 and 2**.

The BDTRT recommended changing the nearshore pound net leader definition because the distance from shore portion of the current definition may still allow the leader to extend into deeper, more offshore waters, where a modified leader should be used. Therefore, **Alternative 3** defines a nearshore pound net leader *as any net with a leader starting 10 feet (3 m) horizontally from the mean low water line and ending at the king post at 12 feet (3.7 m) or less mean low water*. This revised definition ensures traditional leaders do not extend into deeper, more offshore waters, where they may pose additional risk to protected species. The distance from shore portion of the definition and references to water depth at "mean low water" may help

define leader type and reduce protected species risk. However, it is more complicated than the **Preferred Alternative 2** and may be overly cumbersome for fishermen and enforcement in that the conditions are more difficult to definitively establish.

Alternative 4
Alternative 4 removes definitions of nearshore and offshore pound net leaders and requires all pound nets in the times and areas under **sub-actions 1 and 2** to use the modified leader defined in **sub-action 4**. This alternative requires all pound nets in the proposed action area to use modified leaders whether they are nearshore or offshore pound nets. Requiring modified leaders on all pound nets is the most conservation oriented; however, the data do not currently suggest this is needed and is therefore believed to unnecessarily burden fishermen. Of the 31 bottlenose dolphins removed dead/alive from net leaders, only 3 were in nearshore pound nets leaders. Additionally, only one sea turtle entanglement in a nearshore pound net leader was documented by the NEFOP. Therefore, **Preferred Alternative 2** provides a high conservation benefit while not imposing the additional burden on fishermen.

3.1.4 Sub-action 4. Virginia pound net gear and leader requirements

3.1.4.1 Alternative 1. No Action.

3.1.4.2 Preferred Alternative 2. Implement revised BDTRT's 2009 recommendations requiring modified pound net leaders with expanded prohibitions.

3.1.4.3 Alternative 3. Change the current modified pound net leader definition requiring hard lay vertical lines for one-third the height of the leader.

3.1.4.4 Alternative 4. Change the current modified pound net leader definition requiring hard lay vertical lines for the entire height and length of the leader.

Sub-action 4 examines changes to construction of and thus definitions of modified pound net leaders; newly defines pound nets and requirements for fishing all components of the gear in areas of Virginia; and formally defines hard lay lines. Leaders defined in **sub-action 3** and in areas and times under **sub-actions 1 and 2** are required to follow these gear requirements. **Sub-action 4** would be implemented under both the MMPA and ESA regulations.

Alternative 1 (no action)
Alternative 1 maintains the current definition of a modified pound net leader and related requirements as defined by the ESA implementing regulations in 50 CFR 222.102 and state regulations at 4VAC2-20-30D and E. ESA regulations at 50 CFR 223.206(d)(10)(i), require fishermen using offshore pound net leaders in PNRA I from May 6 through July 15 to use modified pound net leaders. Modified pound net leaders are defined in 50 CFR 222.102 as *a leader that is affixed to or resting on the sea floor and made of a lower portion of mesh and an upper portion of only vertical lines such that: The mesh size is equal to or less than 8 inches (20.3 cm) stretched mesh; at any particular point along the leader the height of the mesh from the seafloor to the top of the mesh must be no more than one-third the depth of the water at mean lower low water directly above that particular point; the mesh is held in place by vertical lines*

*that extend from the top of the mesh up to a top line, which is a line that forms the uppermost part of the pound net leader; the vertical lines are equal to or greater than 5/16 inch (0.8 cm) in diameter and strung vertically at a minimum of every 2 feet (61 cm); and the vertical lines are hard lay lines with a level of stiffness equivalent to the stiffness of a 5/16 inch (0.8 cm) diameter line composed of polyester wrapped around a blend of poly-propylene and polyethylene and containing approximately 42 visible twists of strands per foot of line***.**

State regulations mirror the ESA definition of a modified pound net leader and require: (1) fishermen using pound nets and fyke net gear east of the CBBT to use modified pound net leaders year-round (4VAC2-20-20-30D); and (2) fishermen using pound nets and fyke net gear, except nearshore pound nets, in PNRA I to use modified pound net leaders from May 6-July 31.

Preferred Alternative 2
Preferred Alternative 2 implements the BDTRT's consensus recommendations to require the use of modified pound net leaders for nets: (a) defined as offshore per **sub-action 3**; and (b) fished in the times and areas under **sub-actions 1 and 2**. It also implements other pound net definitions and prohibitions not considered by the BDTRT.

Specifically, **Preferred Alternative 2** revises and updates the modified pound net leader definition in **Alternative 1**. The purpose of the update is to clarify current practices and requirements for modified leader construction. Under both **Alternative 1** and **Preferred Alternative 2**, the modified pound net leader is made of hard lay vertical lines for the top two-thirds of the leader and mesh for the bottom one-third. However, this alternative adds a phrase to the modified pound net leader definition that the mesh portion of the modified leader be "…*held in place by a bottom chain, which is a line that forms the lowermost part of the pound net leader…*". The purpose of this phrase is to define the bottommost part of the leader for clarity, as the uppermost part is currently defined. It does not change the intent of the BDTRT's consensus recommendations or the configuration of the modified pound net leader as tested and in the no action.

Preferred Alternative 2 also removes the hard lay line description from the modified pound net leader definition and defines it separately. Hard lay lines are required in the construction of modified pound net leaders. They are currently described within the modified leader definition itself but are not formerly defined outside this description. Hard lay lines will therefore be defined separately based on the current description within the modified leader definition as *lines that are at least as stiff as 5/16 inch (0.8 cm) diameter line composed of polyester wrapped around a blend of poly-propylene and polyethylene and 42 visible twists of strands per foot of line*. The definition is clarified that fishermen can use line that is as least as stiff as what is defined. These proposed changes do not change the intent of the definition and what components make vertical lines hard lay. Therefore, the revised and updated modified pound net leader definition with these two updates is: *a pound net leader that is affixed to or resting on the sea floor and made of a lower portion of mesh and an upper portion of only vertical lines such that the mesh size is equal to or less than 8 inches (20.3 cm) stretched mesh; at any particular point along the leader, the height of the mesh from the seafloor to the top of the mesh must be no more than one-third the depth of the water at mean lower low water directly above that particular point; the mesh is held in place by a bottom chain that forms the lowermost part of the*

pound net leader; the vertical lines extend from the top of the mesh up to a top line, which is a line that forms the uppermost part of the pound net leader; the vertical lines are equal to or greater than 5/16 inch (0.8 cm) in diameter and strung vertically at a minimum of every 2 feet (61 cm); and the vertical lines are hard lay lines.

Lastly, **Preferred Alternative 2** implements other pound net gear definitions and prohibitions not considered by the BDTRT. Specifically, this alternative newly defines pound nets as *a fixed entrapment gear attached to posts or stakes with three continuous sections from offshore to inshore consisting of: (1) A pound made of mesh netting that entraps the fish; (2) at least one heart made of a mesh netting that is generally in the shape of a heart and aids in funneling fish into the pound; and (3) a leader, which is a long, straight element consisting of mesh or vertical lines that directs the fish offshore towards the pound.* The purpose of defining a pound net is to define the gear to which requirements pertain in Virginia state waters. This alternative also requires all three sections of pound net gear be set if fishing in the areas and times under **sub-actions 1 and 2**. The exception to this is a continuous 10-day period to deploy, remove, and/or repair gear without all three net sections being set at the same time. The intent of this requirement is to reduce gear in the water that is no longer fishing but still poses a risk of entanglement to protected species. Although not specifically recommended by the BDTRT, this is consistent with their recommendations to reduce the potential for pound net fishing gear interactions with protected species.

Alternative 3
Alternative 3 implements the same definition changes and requirements in **Preferred Alternative 2** but changes the modified leader construction requirements and its definition. It requires modified pound net leaders be constructed with hard lay vertical lines for the top one-third of the leader and mesh for the bottom two-thirds. The mesh portion of the leader creates the most entanglement risk for sea turtles and bottlenose dolphins. Therefore, allowing more mesh in the water under Alternative 3 increases entanglement risk and reduces the conservation benefit.

Alternative 4
Alternative 4 also implements the same definition changes and requirements in **Preferred Alternative 2** but also changes the modified leader construction requirements and its definition. It requires modified pound net leaders be constructed entirely of hard lay vertical lines. **Alternative 4** increases the conservation benefits of modified leaders by removing all mesh from the leader. However, effects on fish catch are unknown and may create undue economic hardship to fishermen. Both **Alternatives 3 and 4** also create a potentially undue burden on the fishermen to reconstruct the leaders. Therefore, **Preferred Alternative 2** offers needed conservation benefits for sea turtles and bottlenose dolphins, does not create a potential undue hardship on fishermen, and provides more clarification within the regulations.

3.2 Action 2. Modify enforcement and outreach program to establish a different means of facilitating compliance with Virginia pound net gear requirements.

3.2.1 Alternative 1. No Action.

3.2.2 Preferred Alternative 2. Implement revised BDTRT 2009 recommendations to remove current inspection program and add pre-deployment outreach and collaborative on-water enforcement for Virginia pound nets using modified leaders.

3.2.3 Alternative 3. Remove current inspection program for Virginia pound nets using modified leaders.

Action 2 considers an enforcement and education program for Virginia pound net fishermen and their gear to ensure compliance with the regulations proposed in **Action 1** and established in 50 CFR 223.206. **Action 2** would be implemented under both the MMPA and ESA regulations.

There are three alternatives considered under this sub-action. The range of alternatives considered includes either additional enforcement only, both outreach and enforcement, or no additional enforcement. Specifically, they encompass maintaining the current inspection program (**Alternative 1**) to removing it completely (**Alternative 3**), while also considering the input of the BDTRT (**Preferred Alternative 2**).

Alternative 1 (no action)
Alternative 1 maintains the existing inspection program established in ESA implementing regulations in 2008.

The inspection program requires any fisherman planning to set or fish with a modified pound net leader in PNRA I or II at any time from May 6 through July 15 to: (1) contact NMFS within 72 hours of deployment to set up an inspection; and (2) make their leader available for inspection and tagging by NMFS according to the specified procedures in 50 CFR 223.206(d)(10(vii). Similarly, VMRC regulations require any leader set east of the CBBT year round and any offshore leader set in the PNRA I from May 6 through July 31 to be inspected at least 72 hours before deployment (4VAC20-20-30D and E).

Alternative 1 is effective in verifying the components of the modified leader configuration that can be determined on land. However, there are components (e.g., mesh height in the water) that are difficult to verify in the current inspection program. Scuba divers were not previously available to inspect the gear when deployed. Therefore, the on-land inspection program was developed to facilitate enforcement and compliance of gear requirements. The program also imposes significant time and resource requirements on NMFS, which may be minimized with the **Preferred Alterative 2**.

Preferred Alternative 2
Preferred Alternative 2 consists of both an education program for Virginia pound net fishermen and collaborative on-water enforcement of deployed gear. This alternative is consistent with the BDTRT's consensus recommendations to either include the same pound net leader inspections as in ESA regulations or help ensure compliance and facilitate enforcement.

Implementing this alternative does three things: (1) removes the current Virginia pound net inspection program at 50 CFR 223.206(d)(10)(vii); (2) requires a one-time educational

compliance training for all fishermen deploying a modified pound net leader at any time in Virginia state waters (with issuance of a certificate verifying completion of the training); and (3) coordinates with VMRC to conduct on-water enforcement and monitoring of the modified leader through a Joint Enforcement Agreement.

The intent of this alternative is to more efficiently and accurately determine compliance with the modified leader requirements. Conducting compliance training for fishermen provides education about gear requirements before the gear is constructed and deployed. It also alleviates the burden of annual on-land inspections for both NMFS and fishermen. Evaluating the gear in the water provides more accurate measurements of some of the gear requirements through techniques previously unavailable (e.g., divers). Use of scuba divers to check the gear alleviates prior challenges that prompted the development of the on-land inspection program, while maintaining protected species conservation.

Alternative 3
Alternative 3 removes the current Virginia pound net inspection program at 50 CFR 223.206(d)(10)(vii), without replacing it with education and/or enforcement. This alternative eliminates the associated burden on NMFS and the Virginia pound net industry compared to **Alternatives 1 and 2**. However, there will be no assurance that the gear is properly configured and deployed, and protected species conservation would be expected to be negatively impacted as a result.

4.0 Affected Environment

4.1 Physical Environment

The Chesapeake Bay is the largest estuary in the United States. It lies off the Atlantic Ocean, surrounded by Maryland and Virginia. The Chesapeake Bay's drainage basin covers 64,299 square miles (166,534 km^2) including the District of Columbia and parts of six states: New York, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia. More than 150 rivers and streams drain into the bay.

The Chesapeake Bay is approximately 200 miles (300 km) long, from the Susquehanna River in the north to the Atlantic Ocean in the south. At its narrowest point between Kent County's Plum Point (near Newtown) and the Hartford County shore near Romney Creek, the bay is 2.8 miles (4.5 km) wide. At its widest point, just south of the mouth of the Potomac River, it is 30 miles (50 km) wide. Total shoreline for the bay and its tributaries is 11,684 miles (18,804 km), and the surface area of the bay and its major tributaries is 4,479 square miles (11,601 km^2). Average depth of the bay is 46 feet (14 m) and the maximum depth is 208 feet (63 m).

The bay is spanned in two places. The Chesapeake Bay Bridge crosses it in Maryland from Sandy Point (near Annapolis) to Kent Island; and the Chesapeake Bay Bridge Tunnel in Virginia connects Virginia Beach to Cape Charles (http://en.wikipedia.org/wiki/Chesapeake_Bay accessed April, 2013).

There are listings in the National Register of Historic Places counties within the Chesapeake Bay. However, none of them are located within the waterways of the proposed action area.

4.2 Biological Environment

4.2.1 Protected Species

There are eight species of marine mammals that may occur in or near Chesapeake Bay and Virginia State waters at various times of the year. All eight species are protected under the MMPA, and three are also listed as endangered under the ESA (i.e., fin, humpback, and North Atlantic right whales). Other species protected under the ESA occurring in the Chesapeake Bay area include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish; and the Atlantic and shortnose sturgeons. The species potentially affected by the Virginia pound net fishery are discussed below.

4.2.1.1 Marine Mammals

The common bottlenose dolphin (*Tursiops truncatus truncatus*) is the marine mammal species most commonly found in coastal Virginia state waters including the mainstem Chesapeake Bay when the pound net fishery is active. The Gulf of Maine/Bay of Fundy stock of harbor porpoise (*Phocoena phocoena*) and Western North Atlantic stock of harbor seal (*Phoca vitulina*) may also occur in Virginia waters, but these occurrences are rare. All marine mammals are protected under the MMPA. Endangered whales, also further protected under the ESA, typically do not occur in the proposed action area during the pound net season.

Bottlenose Dolphin

The common bottlenose dolphin is characterized by a robust body with a short, thick beak and a slightly curved dorsal fin. Bottlenose dolphins in Atlantic inshore and coastal waters are gray in color with a lighter belly. Adult lengths range from 6 to 9 feet (1.8 to 2.8 m) and weights are typically between 300 to 600 pounds (136 to 272 kg). Females and males reach sexual maturity between ages 5 to 13 and 9 to 14, respectively. Once mature, females give birth once every 3 to 6 years. Maximum known lifespan can be 50 years for males and greater than 60 years for females.

Seasonally, there are three bottlenose dolphin stocks in Virginia state waters and the proposed BDPNRA. The three stocks include the NNCES, SM, and NM. The NNCES stock is generally found within Pamlico Sound, North Carolina and nearshore North Carolina state waters year-round. During July through October, the stock expands north to Virginia state waters and the Chesapeake Bay. The minimum population estimate for the NNCES stock is 785 (Waring *et al*. 2012). The NM stock is in Virginia state waters during pound net season from March to June and from September to November. The minimum population estimate for the NM stock is 7,147 (Waring *et al*. 2011). The SM stock is found throughout Virginia state waters from May to October. In the winter and early spring months, this stock moves south and is found in North Carolina state waters. The minimum population estimate for the SM stock is 9,591 (Waring *et al*. 2011).

Harbor Porpoise
Harbor porpoise are short, stocky animals with blunt heads, triangular-shaped dorsal fins and short, rounded pectoral flippers. Their back is dark gray while their belly and throat are white, with a patch of dark gray on their chin and various shades of gray along their sides. The lengths of harbor porpoise range from approximately 5 to 5.5 feet (1.5 to 1.7 m) and typical weights are 135 to 170 pounds (61 to 77 kg). Females reach sexual maturity at 3 to 4 years and may give birth every year for several years in a row. The average lifespan of a harbor porpoise is about 24 years.

From 2005-2009, 53 stranded harbor porpoises were documented in Virginia waters (Waring *et al*. 2011). However, the Gulf of Maine/Bay of Fundy stock of harbor porpoises are rarely sighted in Virginia state waters; the majority of the population is found over the continental shelf. Harbor porpoises range widely from New Jersey to Maine during the fall (October-December) and spring (April-June), with lower densities farther north and south (Waring *et al*. 2011). The stock's minimum population stock is estimated at 60,970 animals (Waring *et al*. 2011).

Harbor Seals
Harbor seals have a rounded head with short, rounded snouts and forelimbs. Their coloration is generally a blue/gray back with light and dark speckling. Harbor seals are the most commonly seen seal along the U.S. east coast. Adults are approximately 6 feet (1.8 m) in length and weigh up to 245 pounds (111 kg). They become sexually mature at 3 to 6 years. Their lifespan is unknown.

Harbor seals are found year-round in the coastal waters of eastern Canada and Maine (Waring *et al*. 2011). They occur seasonally along the southern New England to New Jersey coasts from September through late May (Waring *et al*. 2011). Scattered sightings and strandings were recorded as far south as Florida (Waring *et al*. 2011). From 2005 to 2009, nine stranded harbor seals were found in Virginia state waters. However, harbor seals are unlikely to occur in Virginia waters even during the spring. A population estimate is currently unknown for this stock due to a lack of data (Waring *et al*. 2011).

4.2.1.2 Endangered Species

4.2.1.2.1 ESA-Listed Sea Turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the Northwest Atlantic Ocean. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the Mid-Atlantic region. Please see Lutz and Musick (eds.) (1997) and Lutz *et al*. (eds.) (2002) for more detailed information on the biology and ecology of these species.

Green
Green turtles are the largest of all the hard-shelled sea turtles, but have a comparatively small head. Adult green turtles are unique among sea turtles in that they eat only plants; they are

herbivorous, feeding primarily on seagrasses and algae. This diet is thought to give them greenish-colored fat, from which they take their name.

While nesting season varies from location to location, in the southeastern U.S., females generally nest in the summer between June and September; peak nesting occurs in June and July. During the nesting season, females nest at approximately two-week intervals. They lay an average of five nests, or "clutches." In Florida, green turtle nests contain an average of 135 eggs, which will incubate for approximately 2 months before hatching.

The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30° North and 30° South. Nesting occurs in over 80 countries throughout the year (though not throughout the year at each specific location). Green turtles are thought to inhabit coastal areas of more than 140 countries.

In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands, and Puerto Rico. Important feeding areas in Florida include the Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River, Cedar Key, and St. Joseph Bay.

The principal cause of the historical, worldwide decline of the green turtle is long-term harvest of eggs and adults on nesting beaches and juveniles and adults on feeding grounds. These harvests continue in some areas of the world and compromise efforts to recover this species. Incidental capture in fishing gear, primarily in gillnets, but also in trawls, traps and pots, longlines, and dredges is a serious ongoing source of mortality that also adversely affects the species' recovery. Green turtles are also threatened, in some areas of the world, by a disease known as fibropapillomatosis. For more information on green turtles please refer to the green turtle 5-year review, which can be found at:
http://www.nmfs.noaa.gov/pr/pdfs/species/greenturtle_5yearreview.pdf

Hawksbill

The hawksbill turtle is small to medium-sized compared to other sea turtle species. Their head is elongated and tapers to a point, with a beak-like mouth that gives the species its name. The shape of the mouth allows the hawksbill turtle to reach into holes and crevices of coral reefs to find sponges, their primary food source as adults, and other invertebrates. Hawksbill turtles are unique among sea turtles in that they have two pairs of prefrontal scales on the top of the head and each of the flippers usually has two claws.

Male hawksbills mature when they are about 27 inches (70 cm) long. Females mature at about 30 inches (80 cm). The ages at which turtles reach these lengths are unknown. Female hawksbills return to the beaches where they were born (natal beaches) every 2-3 years to nest. They usually nest high up on the beach under or in the beach/dune vegetation. They commonly nest on pocket beaches, with little or no sand. They nest at night, and they nest about every 14-16 days during the nesting season. The nesting season varies with locality, but in most locations nesting occurs sometime between April and November. A female hawksbill generally lays 3-5 nests per season, which contain an average of 130 eggs. Eggs incubate for around 2 months.

Hawksbills face threats on both nesting beaches and in the marine environment. The primary global threat to hawksbills is habitat loss of coral reef communities. Coral reefs are vulnerable to destruction and degradation caused by human activities. Humans can alter coral reefs either gradually (i.e., pollution can degrade habitat quality) or catastrophically (e.g., toxic spills and vessel groundings). Recent evidence suggests that global climate change is negatively impacting coral reefs by causing higher incidences of coral diseases, which can ultimately kill entire coral reef communities. Hawksbill turtles rely on coral reefs for food resources and habitat. As these communities continue to decline in quantity and quality, hawksbills will have reduced foraging opportunities and limited habitat options.

Historically, commercial exploitation was the primary cause of the decline of hawksbill sea turtles. There remains a continuing demand for the hawksbill's shell as well as other products, including leather, oil, perfume, and cosmetics. The British Virgin Islands, Cayman Islands, Cuba, Haiti, and the Turks and Caicos Islands (U.K.) all permit some form of legal take of hawksbill turtles. In the northern Caribbean, hawksbills are directly harvested primarily for their carapace, which is often carved into hair clips, combs, jewelry, and other trinkets. Whole stuffed turtles are sold as curios in the tourist trade. Hawksbill products are openly available in the Dominican Republic and Jamaica despite a prohibition on harvesting hawksbills and eggs (Fleming 2001).

Additionally, hawksbills are harvested for their eggs and meat. In the Pacific, directed harvest of nesting females and eggs on the beach and hawksbills in the water is still widespread. Directed take is a major threat to hawksbills in American Samoa, Guam, the Republic of Palau, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, and the Republic of the Marshall Islands.

In addition to directed harvest, increased human presence is a threat to hawksbills throughout the Pacific. In particular, increased recreational and commercial use of nesting beaches, beach camping and fires, litter and other refuse, general harassment of turtles, and loss of nesting habitat from human activities negatively impact hawksbills. Incidental capture in fishing gear, primarily gillnets, and vessel strikes also adversely affect this species' recovery. For more information on hawksbill turtles please refer to the hawksbill turtle 5-year review, which can be found at: http://www.nmfs.noaa.gov/pr/pdfs/species/hawksbillseaturtle2013_5yearreview.pdf

Kemp's ridley

Adult Kemp's ridleys are considered the smallest marine turtle in the world. Their top shell (carapace) is often as wide as it is long and contains five pairs of costal scutes. Each of the front flippers has one claw while the back flippers may have one or two.

Kemp's ridleys display one of the most unique synchronized nesting habits in the natural world. Large groups of Kemp's ridleys gather off a particular nesting beach near Rancho Nuevo, Mexico, in the state of Tamaulipas. When it is time to nest, wave upon wave of females come ashore and nest in what is known as an "arribada," which means "arrival" in Spanish. There are many theories on what triggers an arribada, including offshore winds, lunar cycles, and the release of pheromones by females. Scientists have yet to conclusively determine the cues for ridley arribadas. Arribada nesting is a behavior found only in the genus *Lepidochelys*. Female

Kemp's ridleys nest from May to July, laying two to three clutches of approximately 100 eggs, which incubate for 50-60 days.

Kemp's ridleys face threats on both nesting beaches and in the marine environment. The greatest cause of decline and the continuing primary threat to Kemp's ridleys is incidental capture in fishing gear, primarily in shrimp trawls, but also in gill nets, longlines, traps and pots, and dredges in the Gulf of Mexico and North Atlantic. Egg collection was an extreme threat to the population, but since nesting beaches were afforded official protection in 1966, this threat no longer poses a major concern. For more information on kemp's ridleys turtles please refer to the kemp's ridleys turtle 5-year review, which can be found at: http://www.nmfs.noaa.gov/pr/pdfs/species/kempsridley_5yearreview.pdf

Leatherbacks

The leatherback is the largest turtle, and one of the largest living reptiles, in the world. The leatherback is the only sea turtle that doesn't have a hard bony shell. A leatherback's top shell (carapace) is about 1.5 inches (4 cm) thick and consists of leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones. Their carapace has seven longitudinal ridges and tapers to a blunt point.

Their front flippers don't have claws or scales and are proportionally longer than in other sea turtles. Their back flippers are paddle-shaped. Both their ridged carapace and their large flippers make the leatherback uniquely equipped for long distance foraging migrations. Female leatherbacks lay clutches of approximately 100 eggs on sandy, tropical beaches. Females nest several times during a nesting season, typically at 8-12 day intervals. After about two months, leatherback hatchlings emerge from the nest and have white striping along the ridges of their backs and on the margins of the flippers.

Leatherbacks don't have the crushing chewing plates characteristic of other sea turtles that feed on hard-bodied prey (Pritchard 1971). Instead, they have pointed tooth-like cusps and sharp-edged jaws that are perfectly adapted for a diet of soft-bodied pelagic (open ocean) prey, such as jellyfish and salps. A leatherback's mouth and throat also have backward-pointing spines that help retain such gelatinous prey.

Leatherback turtles face threats on both nesting beaches and in the marine environment. The greatest causes of decline and the continuing primary threats to leatherbacks worldwide are long-term harvest and incidental capture in fishing gear. Harvest of eggs and adults occurs on nesting beaches while juveniles and adults are harvested on feeding grounds. Incidental capture primarily occurs in gillnets, but also in trawls, traps and pots, longlines, and dredges. Together these threats are serious ongoing sources of mortality that adversely affect the species' recovery. For more information on hawksbill turtles please refer to the hawksbill turtle 5-year review, which can be found at: http://www.nmfs.noaa.gov/pr/pdfs/species/leatherback_5yearreview.pdf

Loggerhead

Loggerheads are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Loggerheads are the most abundant species of sea turtle found in U.S. coastal waters. The loggerhead sea turtle was listed as a threatened species

throughout its global range on July 28, 1978. NMFS and U.S. Fish and Wildlife Service published a final rule designating nine Distinct Population Segments (DPSs) for loggerhead sea turtles (76 FR 58868, September 22, 2011; effective October 24, 2011). The DPSs established by this rule include: (1) Northwest Atlantic Ocean (threatened); (2) Northeast Atlantic Ocean (endangered); (3) South Atlantic Ocean (threatened); (4) Mediterranean Sea (endangered); (5) North Pacific Ocean (endangered); (6) South Pacific Ocean (endangered); (7) North Indian Ocean (endangered); (8) Southeast Indo-Pacific Ocean (endangered); and (9) Southwest Indian Ocean (threatened). The Northwest Atlantic DPS is the only one that occurs within the action area.

In the Atlantic, the loggerhead turtle's range extends from Newfoundland to as far south as Argentina. During the summer, nesting occurs primarily in the subtropics. Although the major nesting concentrations in the U.S. are found from North Carolina through southwest Florida, minimal nesting occurs outside of this range westward to Texas and northward to Virginia. Adult loggerheads are known to make extensive migrations between foraging areas and nesting beaches. During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.

Loggerheads face threats on both nesting beaches and in the marine environment. The greatest cause of decline and the continuing primary threat to loggerhead turtle populations worldwide is incidental capture in fishing gear, primarily in longlines and gillnets, but also in trawls, traps and pots, and dredges. Directed harvest for loggerheads still occurs in many places (e.g., the Bahamas, Cuba, and Mexico) and is a serious and continuing threat to loggerhead recovery. For more information on loggerhead sea turtles please refer to the loggerhead status review, which can be found at: http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/loggerheadturtle2009.pdf

4.2.1.2.2. ESA-Listed Fish

Smalltooth sawfish

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 be smaller than 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 were 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 immature smalltooth sawfish are most common in shallow coastal waters less than 82 feet (25 m) (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters 328 feet (100 m) or deeper (Simpfendorfer pers. comm. 2006). For more information on smalltooth sawfish please refer to the smalltooth sawfish 5-year review, which can be found at:
http://sero.nmfs.noaa.gov/pr/esa/Smallooth%20sawfish/Smalltooth%20Sawfish%205%20Year%20Review%20final%20HQ%20cleared-1.pdf

Atlantic sturgeon

Five separate DPSs of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) were listed under the ESA effective April 6, 2012 (76 FR 5914; February 12, 2012). From north to south, the

DPSs are the Gulf of Maine, New York Bight, Chesapeake Bay, Carolina, and South Atlantic (Figure 12). The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered. The Gulf of Maine DPS is listed as threatened. The five DPSs were listed under the ESA as a result of threats from a combination of habitat reduction and modification, overutilization (i.e., being taken as bycatch) in commercial fisheries, and the inadequacy of regulatory mechanisms in improving these impacts and threats.

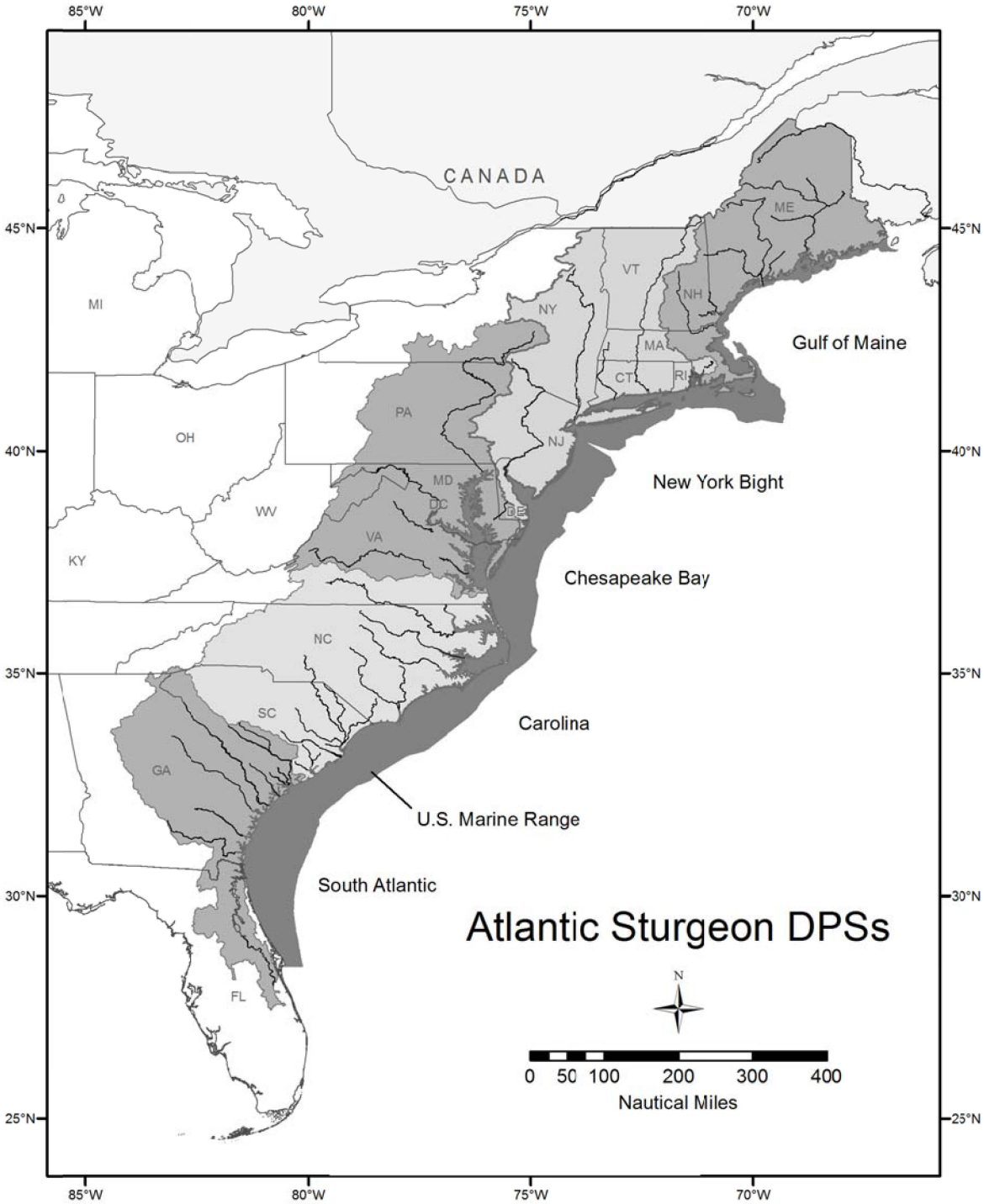


Figure 12. Map depicting the five DPSs of Atlantic sturgeon.

Atlantic sturgeon are long-lived, estuarine dependent, anadromous fish (Bigelow and Schroeder 1953, Vladykov and Greeley 1963, Mangin 1964, Pikitch *et al.* 2005, Dadswell 2006, ASSRT

2007). They historically occurred from Labrador south to the St. Johns River, Florida. Generally, Atlantic sturgeon use coastal bays, sounds, and ocean waters in depths less than 132 feet (40 m) (Vladykov and Greeley 1963, Murawski and Pacheco 1977, Dovel and Berggren 1983, Smith 1985, Collins and Smith 1997, Welsh *et al.* 2002, Savoy and Pacileo 2003, Stein *et al.* 2004, USFWS 2004, Laney *et al.* 2007, Dunton *et al*. 2010, Erickson *et al*. 2011, Wirgin and King 2011), where they feed on a variety of benthic invertebrates and fish (Bigelow and Schroeder 1953, ASSRT 2007, Guilbard *et al*. 2007, Savoy 2007).

Mature Atlantic sturgeon make spawning migrations from estuarine waters to rivers depending on the water temperature. For males, the spawning migrations generally occur as water temperatures reach 43ºF (Smith *et al*. 1982, Dovel and Berggren 1983, Smith 1985, ASMFC 2009) and 54ºF for females (Dovel and Berggren 1983, Smith 1985, Collins *et al*. 2000a), which typically occurs between February (southern systems) and July (northern systems). Individuals spawn at intervals of once every 1-5 years for males and once every 2-5 years for females. Spawning is believed to occur in flowing water between the salt front of estuaries and the fall line of large rivers, when and where optimal flows are 18-30 in/s and depths are 36 to 89 feet (11 to 27 m) (Borodin 1925, Dees 1961, Leland 1968, Scott and Crossman 1973, Crance, 1987, Shirey *et al*. 1999, Bain *et al*. 2000, Collins *et al*. 2000a, Caron *et al*. 2002, Hatin *et al*. 2002, ASMFC 2009). Females may produce 400,000 to 4 million eggs per spawning year (Vladykov and Greeley 1963; Smith *et al*.; 1982; Van Eenennaam *et al*. 1996; Van Eenennaam and Doroshov 1998, Stevenson and Secor 1999, Dadswell 2006) and deposit eggs on hard bottom substrate such as cobble, coarse sand, and bedrock (Dees 1961, Scott and Crossman 1973, Gilbert 1989, Smith and Clugston 1997, Bain *et al*. 2000, Collins *et al*. 2000a; Caron *et al*. 2002, Hatin *et al*. 2002, Mohler; 2003, ASMFC 2009).

When hatched, studies suggest early juvenile Atlantic sturgeon (age-0 [i.e., YOY], age-1 and age-2) remain in low salinity waters of their natal estuaries (Haley 1999, Hatin *et al*. 2007, McCord *et al*. 2007, Munro *et al*. 2007) for months to years before emigrating to open oceans as subadults (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman *et al*. 1996, Dadswell 2006, ASSRT 2007). Growth rates and age at maturity are both influenced by water temperature, as Atlantic sturgeon grow larger and mature faster in warmer waters. Atlantic sturgeon may live up to 60 years, reach lengths up to 14 feet (4.3 m) and weigh over 800 pounds. Tagging studies and genetic analyses (Wirgin *et al*. 2000, King *et al*. 2001, Waldman *et al*. 2002, ASSRT 2007, Grunwald *et al*. 2008) indicate Atlantic sturgeon exhibit ecological separation during spawning throughout their range resulting in multiple, genetically distinct, interbreeding population segments.

The construction of dams, dredging, and modification of water flows reduced the amount and quality of habitat available for Atlantic sturgeon spawning and foraging. Water quality (temperature, salinity, and dissolved oxygen) were also reduced by terrestrial activities, leading to further declines in available spawning and nursery habitat. Although spawning historically occurred within many Atlantic coast rivers, only 16 U.S. rivers are known to currently support spawning based on available evidence (i.e., presence of YOY or gravid Atlantic sturgeon documented within the past 15 years) (ASSRT 2007).

Shortnose Sturgeon

The shortnose sturgeon (*Acipenser brevirostrum)* is the smallest of the three sturgeon species that occur in eastern North America. They attain a maximum length of about six feet (1.8 m), and a weight of about 55 pounds. Shortnose sturgeon inhabit large coastal rivers of eastern North America. Although it is considered an anadromous species (i.e., one that lives primarily in marine waters and breeds in freshwater), shortnose sturgeon are more properly characterized as "freshwater amphidromous," meaning that they move between fresh and salt water during some part of their life cycle, but not necessarily for spawning. Shortnose sturgeon rarely leave the rivers where they were born ("natal river"). Shortnose sturgeon feed opportunistically on benthic insects, crustaceans, mollusks, and polychaetes (Dadswell *et al.* 1984). Shortnose sturgeon were initially listed as an endangered species by USFWS on March 11, 1967, under the Endangered Species Preservation Act (32 FR 4001). Shortnose sturgeon continued to meet the listing criteria as "endangered" under subsequent definitions specified in the 1969 Endangered Species Conservation Act and remained on the list with the inauguration of the ESA in 1973. NMFS assumed jurisdiction for shortnose sturgeon from U.S. Fish and Wildlife Service in 1974 (39 FR 41370). The shortnose sturgeon currently remains listed as an endangered species throughout all of its range along the east coast of the United States and Canada.

Shortnose sturgeon are primarily benthic fish that mainly occupy the deep channel sections of large rivers. They can be found in rivers along the western Atlantic coast from St. Johns River, FL (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998a). New tracking data indicate that shortnose sturgeon are capable of making coastal migrations, and fish have been tracked between several Maine rivers and down to the Merrimack River in Massachusetts. However, even in the Northeast where these coastal migrations have been documented, shortnose sturgeon do not appear to spend significant time in the marine environment.

4.2.2 Fishery Resources

This section focuses on those commercial fishery resources targeted by the Virginia pound net fishery and that are potentially affected by the proposed action. While there may be other non-commercial species affected by pound net leaders, data is not readily available on such species. Data used in this discussion is 2006-2010 trip level landings and revenue data from VMRC.

The VMRC data reports water bodies using numerical codes that do not correspond geographically to the current ESA regulated areas (e.g., PNRA I and II) and proposed regulated areas (i.e., BDPNRA). To ensure that the water bodies more closely align with the proposed areas to be regulated, the data was consolidated by specifying them as areas west and east of the CBBT. The waters west of the CBBT are represented by VMRC water body areas: 336 Mobjack Bay (MOB); 371 York River, Lower (YRL); 306 Ches. Bay, Lower East Side (BCLE); 301 Back River (BR); 347 Poquoson River (POQ); and 391 Severn River (SEV). Although area 307 Ches. Bay, Lower West Side (CBLW) is mostly located west of the CBBT geographically, this water body area is included in analysis under waters east of the CBBT. This is because six of the seven pound nets recording landings under this water body are physically located east of the CBBT. The waters east of the CBBT are represented by VMRC water body areas 307

CBLW; 625 Ocean, E Shore (OES); 631 Ocean, VA Beach (OVB); 300 Back Bay (BB); 390 Chincoteague Bay (CHIN); 318 Hog Island Bay (HOGES); 358 Tangier Sound (TS); 331 Magothy Bay (MAG); and 375 Lynnhaven Bay (LYN). This information was compiled and provided by the NMFS Southeast Fishery Science Center (SEFSC) (Marvasti, pers. comm., SEFSC).

In 2010, pound netters fishing in Virginia waters landed approximately 8 million pounds (mp) of fish (Table 5). Pot traps and gill nets are the two other gear types also most commonly used by these fishermen. When combining all gear types used by pound net fishermen in Virginia, fishery statistics indicate their aggregate landings were approximately 8.6 mp (Table 6). In other words, in 2010, the landings from pound nets made up 92% of pound net fishermen's aggregate (all gears combined) landings.

Table 5. Total annual pound net landings by species group in all Virginia waters (2010) (Source: NMFS SEFSC using VMRC data).

Species Group	Landings (lbs.)
Amberjack	55
Bluefish	32,951
Butterfish	10,848
Carp	1,350
Catfish, Blue	305,206
Catfish, bk	21,471
Cobia	243
Cod	2
Crab Blue	1,131
Crevalle	2,239
Croaker, Atlantic	2,126,342
Dogfish, Smooth	16
Dogfish, Spiny	42
Drum, Red	953
Eel, American	227
Fish, Other Food	6
Flounder, Summer	114,313
Herring Species (Alewife, Blueback Herring, and Atlantic Herring)	10,801
Mackerel, Spanish	8
Mackerel, Spanish	44,260
Menhaden	3,443,222
Permit	1
Pompano, Common	571
Puffer, Northern	3,052
Ray, Cownose	9,461
Redfish	32
Ribbonfish	71,069

Salmon, Atlantic	3
Shad Species (American Shad, Gizzard Shad, and Hickory Shad)	90,705
Seatrout, Grey	11,223
Sheephead	802
Skate	143
Spadefish	4,895
Perch (White, and Yellow)	8,759
Spot	87,215
Seatrout, Spotted	147
Harvestfish	28,173
Bass, Striped	73,821
Tautog	9
Toadfish, Oyster	14
Tripletail	4
Whiting, King	782
Total	7,989,743

Table 6. Pound net fishermen total annual landings by gear type in Virginia waters and in the proposed BDPNRA (January-December, 2010) (Source: NMFS SEFSC using VMRC data).

Gears	**Landings (lbs.) Virginia**	**Landings (lbs.) Proposed BDPNRA***
GILL NET, SINK/ANCHOR, OTHER	107,520	27,667
AQUACULTURE OTHER	4,363	-
BULL RAKE, SHINECOCK	1,771	-
POTS + TRAPS, CONCH	5,947	5,947
GILL NET, DRIFT, OTHER	7,258	7,258
DIP NET, COMMON	5,778	-
POTS + TRAPS, EEL	1,000	810
FYKE NET, FISH	44,880	-
POTS + TRAPS, FISH	6,878	-
HAND LINE, OTHER	1,900	1,446
SCRAPES, OYSTER	1,754	-
DREDGE, OYSTER, COMMON	1,918	-
POUND NET, CRAB	3,077	502
POTS + TRAPS, BLUE CRAB	437,373	49,358
POTS + TRAPS, CRAB, OTHER	12,451	3,631
SCRAPES	680	680

GILL NET, STAKE, OTHER	32,563	-
POUND NET	7,989,743	2,204,137
TOTAL WITHOUT POUND NET	677,111	97,299
GRAND TOTAL	8,666,854	2,301,436

* The figures in the proposed BDPNRA columns are a subset of the values in the Virginia columns. For example, the Virginia grand total revenues of $720,102 include $130,147 the revenues from the proposed BDPNRA area.

Table 7 provides pound net landings by species or species group in the proposed BDPNRA waters both west and east of the CBBT in 2010. This table shows most of the fishing activity took place on the west side of the CBBT within the proposed BDPNRA, which is the Cape Charles area. This area accounted for 94% of the landings of the proposed BDPNRA. Table 7 shows Atlantic croaker, and, to a lesser extent, summer flounder were the most commercially important species in both areas.

Table 7. 2010 landings (January-December) by species for pound net gear fished in the proposed BDPNRA water bodies east and west of the CBBT (Source: NMFS SEFSC using VMRC data).

Species Name	**Landings (lbs) West of CBBT (including Ches. Bay-LES)**	**Landings (lbs) East of CBBT (including Ches. Bay-LWS)***
FISH, OTHER INDUSTRY	233,864	7,867
HERRING SPECIES**	450	0
CRAB, BLUE	120	0
BLUEFISH	10,759	1,409
DRUM, BLACK	780	0
BUTTERFISH	5,600	3,150
COBIA	142	0
COD	2	0
CREVALLE	0	2,239
CROAKER, ATLANTIC	1,400,764	83,466
DOGFISH, SMOOTH	16	0
EEL, AMERICAN	27	0
FISH, OTHER FOOD	6	0
FLOUNDER, SUMMER	50,721	11,200
CRAB, HORSESHOE	44,394	0
MACKEREL, ATLANTIC	3	0
MENHADEN	134,060	0
MULLET	4	0

POMPANO, COMMON	150	52
PUFFER, NORTHERN	1,289	0
RAY, COWNOSE	2,900	0
DRUM, RED	109	161
RIBBONFISHES	55,801	15,068
WHITING, KING	769	0
SALMON, ATLANTIC	3	0
DOGFISH, SPINY	42	0
SHAD SPECIES***	176	0
SHEEPSHEAD	763	24
SPADEFISH	4,824	45
MACKEREL, SPANISH	43,928	195
SPOT	24,540	9,300
SEATROUT, SPOTTED	65	9
HARVESTFISH	24,964	1,792
BASS, STRIPED	20,490	42
TOADFISH, OYSTER	14	0
SEATROUT, GREY	4,988	593
Total	2,067,525	136,612

* The pound nets are physically located east of the CBBT and comprise the majority of these landings. However, one of the nets in this area code is physically located west of the CBBT and comprise some of these landings.
** Herring species include Alewife, Blueback Herring, and Atlantic Herring.
*** Shad species include American Shad, Gizzard Shad, and Hickory Shad.

4.3 Social and Economic Environment

4.3.1. Social Environment

The regulations in this proposed action are expected to affect fishermen using pound net gear in the area defined in section 3 as the proposed BDPNRA. Although numerous fishing communities exist in this area, Virginia Beach, Cape Charles, and Mobjack Bay are the largest fishing communities in this area for which community profiles were developed by NMFS. These are also the communities that would be defined as within the proposed BDPNRA. Therefore, these communities were selected for discussion in this assessment. The following provides a summary of the profiles for these three communities based on the Northeast Fisheries Science Center (NEFSC) Community Profiles. The complete community profiles are available in the NEFSC "Community Profile" series (http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html).

Virginia Beach

In the last fiscal year for which data are available (June 2007), the city experienced "good, steady growth," according to the Department of Economic Development (Lusky 2007). Four military bases in Virginia Beach impact the region economically, with the Department of Defense spending $11 billion in 2002, and increasing in following years due to the war with Iraq. Businesses serving military and civilian personnel, contractors, and their families employ even more area residents. Military Exchanges and PX's (a store on a military base that sells goods to military personnel and their families or other authorized civilians) accounted for $123.8 million in sales in 2002. Thus, the area is dominated by the military and tourist industries.

Hampton Roads is the collective name for the area encompassing Virginia Beach, Norfolk, Newport News, Portsmouth, Suffolk, and Chesapeake in southeastern Virginia. The lowest overall tax rates of any locality in the Hampton Roads on real estate, personal property, and utilities is the City of Virginia Beach. With a large number of military personnel, there is also a large supply of labor, with military spouses numbering over 40,000. A vast majority of these spouses work in full or part time office and customer service positions. Other components of the work force include students (80,000) and active duty personnel (over 10,000) (Lusky 2007).

In 2002, Virginia Beach received $29 million in net direct revenue from tourist activity. Over 3 million visitors spent approximately $700 million on accommodations, meals, entertainment, and other services during their stay in Virginia Beach. This supported approximately 11,000 service jobs.

Approximately one-third of Virginia Beach's labor force in 2002 was employed in retail and wholesale businesses. There were more than 7,800 retail/wholesale businesses in the city, with total taxable sales of over $3.9 billion in 2002, an increase of 4.3 percent from the previous year. According to the 2000 US Census (the most recent data available at the time this profile was developed by the NEFSC), 72.9% (234,257 individuals) of the total population 16 years of age or over were in the labor force, of which 2.6% were unemployed, 9.7% were in the military, and 60.7% were employed.

Cape Charles

In 1999, Bayshore Concrete Products Corporation was the town's largest employer with 360 employees. However, Baymark Construction, developer of the Bay Creek residential community, was quickly becoming the most significant employer. In 2009, the Baymark Corporation laid off a number of employees. The Cape Charles Sustainable Technology Park was one of the country's first eco-industrial parks, designed to keep the town's character and to house environmentally responsible businesses (Cape Charles Planning Commission 1999). However, the technology park had been unsuccessful, attracting only one business. The Town of Cape Charles employed 32 people in 2007 (Town of Cape Charles 2007).

According to the US Census Bureau (2000), 54.6% (471 individuals) of the total population 16 years of age or over were in the labor force. Of these, 3.1% were unemployed, none were in the Armed Forces, and 51.4% were employed.

In 2000, jobs in the census grouping which includes agriculture, forestry, fishing and hunting, and mining accounted for 13 positions or 2.9% of all jobs. Self-employed workers, a category

where fishermen may be included, accounted for 53 positions or 11.9% of jobs. Educational, health and social services (19.1%), manufacturing (15.3%), arts, entertainment, recreation, accommodation and food services (11.4%), and other services (10.8%) were the primary industries.

Median household income in 2000 in Cape Charles was $22,237 (up 28.9% from $17,254 in 1990 [US Census Bureau, 1990, 2000]). Median per capita income was $13,789. For full-time year round workers, males made approximately 6.5% more per year than females.

In 2000, the average family in Cape Charles consisted of 2.91 persons. With respect to poverty, 21.5% of families, down from 23.4% in 1990, and 28.4% of individuals were below the official US Census poverty threshold. This threshold was $8,794 for individuals and ranged from $11,239 - $35,060 for families, depending on number of persons (2-9) (US Census Bureau 2000). In 2000, 57.1% of all families (of any size) earned less than $35,000.

Watermen fishing out of Cape Charles traditionally targeted blue crabs, horseshoe crabs, conch, clams, scallops, sharks, and a variety of fish (Town of Cape Charles 2007). In 1999, there were over 100 shellfish beds available for lease from the VMRC in the vicinity of Cape Charles. The majority of these shellfish beds are used for clam aquaculture (Cape Charles Planning Commission 1999).

The highest average landings in Cape Charles for 1997-2006 were the large mesh groundfish grouping of species, followed by surf clam and ocean quahog. Federal vessel permit data showed few federally permitted vessels were using Cape Charles as their home port in most years, with a high of five vessels in 2000, and no vessels home-ported in Cape Charles in 2004-2006.

Recreational fishermen in Cape Charles traditionally targets cobia, striped bass, spotted drum, spade, flounder, drum, trout, and croaker. The town website listed eight different fishing charters out of Cape Charles in 2007 (Town of Cape Charles 2007). Bailey's Bait and Tackle is located in Cape Charles. There is also a lighted municipal fishing pier, known as Fun Pier, in Cape Charles. The town purchased a fishing license for the pier, allowing anyone to fish from the pier for free (Town of Cape Charles 2007). There is also a fishing pier at Kiptopeke State Park, to the south of Cape Charles.

Mobjack Bay

The community profile for Mobjack Bay consists of two separate profiles, one for Gwynn Island (Matthews County) and one for Gloucester Point.

Gwynn Island

According to the US Census Bureau (2000), 53.4% (256 individuals) of the total population 16 years of age or over were in the labor force. Of these, none were unemployed or in the Armed Forces, and 53.4% were employed.

More than half of all residents in Mathews County who were in the workforce worked outside of the county (Mathews County Planning Commission 2001). The economy of Gwynn's Island is

based on boating and marinas, fishing, and tourism (Virginia Department of Health-Division of Shellfish Sanitation 2006). J&W Seafood operates a crabmeat processing facility at Gwynn's Island, under its division Quality Seafood Direct, employing 40-50 personnel to handpick crabmeat (Quality Seafood Direct 2007). Ocean Products Research, Inc., located approximately 10 miles from Gwynn's Island in Diggs, Virginia, manufactures synthetic net and rope assemblies for commercial fishing and other uses. They also sell commercial fishing supplies out of their Diggs location (Ocean Products Research Inc. 2005).

According to the 2000 Census data, jobs in the census grouping that includes agriculture, forestry, fishing and hunting, and mining accounted for 12 positions or 4.7% of all jobs. Self-employed workers, a category where fishermen may be included, accounted for 22 positions or 8.6% of jobs. Educational, health and social services (18.0%), retail trade (16.0%), and manufacturing (16.0%) were the primary industries.

In 2000, median household income in Gwynn's Island was $55,121, up 190.9% from $18,947 in 1990 (US Census Bureau 1990 and 2000). Median per capita income was $23,028. For full-time year round workers, males made approximately 28.7% more per year than females.

The average family in Gwynn's Island consisted of 2.55 persons in 2000. With respect to poverty, no families, down from 18.4% in 1990, and no individuals were below the official US Census poverty threshold. This threshold was $8,794 for individuals and ranged from $11,239 - $35,060 for families, depending on number of persons (2-9) (US Census Bureau 2000). In 2000, 20.4% of all families (of any size) earned less than $35,000.

In 2000, there was a total of 437 housing units on Gwynn's Island, of which 54.9% were occupied and 86.8% were detached one unit homes. More than one fifth (22.8%) of these homes were built before 1940. Mobile homes, boats, RVs, vans, etc. accounted for 6.5% of the total housing units; 92.2% of detached units were between 2 and 9 rooms. In 2000, the median cost for a home in this area was $103,100. Of vacant housing units, 76.6% were used for seasonal, recreational, or occasional use. Of occupied units, 10.8% were renter occupied.

There is a long tradition of commercial fishing in Gwynn's Island. Fishermen tend to dredge for crabs in the winter, and gillnet to target species like spot and croaker in the summer (Chowning 2007). Generally, seafood harvest declined in Mathews County overall between 1985 and 1999 when measured in pounds. The dollar value of landings increased slightly during this timeframe, but this increase was negated by inflation. In 1999, crab made up 63% of the catch in the county by weight, followed by croaker (13%), spot (8%), quahog (5%), sea trout (3%), and other (8%) (Mathews County Planning Commission 2001).

Between 1997 and 2006, there were as many as four vessels with federal permits (in 1999 and 2000), but no vessels with federal permits in 2005 and 2006. There were no federal landings recorded in Gwynn's Island, and the value of landings to home-ported vessels was variable, with no landings in most years, and more than $100,000 in 1999.

The website of the Virginia Charter Boat Association listed four charter boats that fish seasonally or exclusively from Gwynn's Island. Capt. Hewlett Charters provided both in-shore and off-

shore trips for striped bass, croaker, flounder, trout, and shark. Angling from shore was a popular activity on Gwynn's Island (Gooch 1992). A fly fishing tournament is hosted by The Piedmont chapter of the Coastal Conservation Association out of Gwynn's Island (Coastal Conservation Association Virginia 2008).

Gloucester Point

According to the US Census Bureau (2000), 68.5% (5,054 individuals) of the total population 16 years of age or over were in the labor force. Of these 2.9% were unemployed, 2.1% were in the Armed Forces, and 64.4% were employed.

In 2000, there were 40 employees at York River Seafood in neighboring Hayes, and four employees at King's Seafood also in Hayes. There were 20 employees at Cooks Seafood, down the road in Bena (Virginia Department of Health 2000). In 2006, the top employers in Gloucester County were as follows: Virginia Institute of Marine Science (300-599 employees); Riverside Middle Peninsula Hospital (300-599 employees); Industrial Resource Technologies, Inc. (laser cartridge recycling – 100-299 employees); Rappahannock Community College (100-299 employees); Walter Reed Convalescent Center (100-299 employees); Whitley Peanut Factory, Inc. (50-99 employees); Dominion Virginia Power (50-99 employees); Tidewater Newspapers (20-49 employees); Verizon Communications (20-49 employees) (Gloucester County – Economic Development 2006). In 2008, there were approximately 500 faculty, students, and staff employed by or studying at the Virginia Institute of Marine Science in Gloucester Point (Virginia Institute of Marine Science 2008).

According to the Census data (2000), jobs in the census grouping which includes agriculture, forestry, fishing and hunting, and mining accounted for 109 positions or 2.3% of all jobs. Self-employed workers, a category where fishermen may be included, accounted for 245 positions or 5.2% of jobs. Educational, health and social services (22.1%), manufacturing (11.9%), retail trade (10.4%), arts, entertainment, recreation, accommodation and food services (10.2%), and construction (10.2%) were the primary industries.

In 2000, median household income in Gloucester Point was $45,536, up 49.0% from $30,568 in 1990 (US Census Bureau 1990 and 2000). Median per capita income was $20,536. For full-time year round workers, males made approximately 36.3% more per year than females.

The average family in Gloucester Point consisted of 2.49 persons in 2000. With respect to poverty, 8.6% of families, up from 6.2% in 1990, and 8.9% of individuals were below the official US Census poverty threshold. This threshold was $8,794 for individuals and ranges from $11,239 - $35,060 for families, depending on number of persons (2-9) (US Census Bureau 2000). In 2000, 29.5% of all families (of any size) earned less than $35,000.

York River Seafood is a processing house that processes crab and finfish, and is located in Hayes. When visited in 2000 by the Virginia Division of Shellfish Sanitation, there were thirteen commercial vessels in Hayes/Gloucester Point, two under 26 feet (7.9 m) and eleven longer than 26 feet (Virginia Department of Health 2000). Commercial fishing in Gloucester Point was rapidly declining. In 2007, there were two crab dredge vessels working out of Gloucester Point, and in 2008, there were none (Hamilton 2009).

Traditionally, there were few to no vessels with federal permits in Gloucester Point. There was one vessel with a federal permit listed for 2005, two for 2006, and none for any other year through 2012. Only in one year, 1999, was there a federally-permitted vessel with an owner who listed their residence in Gloucester Point. No federal landings were recorded in Gloucester Point in any year through 2012, and no federal landings associated with the two home-ported vessels.

There is a public fishing pier in Gloucester Point Beach Park, which hosts a croaker tournament in July (Gloucester County 2008). The pier is a popular spot for catching croaker, spot, flounder, grey trout, and striped bass. Gloucester County received $50,000 to expand the pier in 1998. Crown Pointe Marina also hosts an annual flounder tournament and a croaker contest.

4.3.2. Economic Environment

The regulations in this proposed action are expected to affect fishermen using pound net gear in the area defined in section 3 as the proposed BDPNRA. Tables 8-12 contain summary information on fishing revenues by these fishermen. Several data sources were used for this analysis including, but not limited to: (1) pound net survey data collected by the Domestic Fisheries Observer Program of the NEFSC for 2010 and 2011; and (2) 2006-2010 trip level landings and revenue data from the VMRC.

The data collected by NEFSC observers in 2010 and 2011 provide a characterization of all the pound nets in the geographic areas currently requiring modified leaders. The gear characterization contains information on the location of the pound net, tag number (if available), stretched mesh size, length of the leader, depth of the leader at its end and beginning points, location of the leader relative to the shore and how the leader is currently defined by ESA regulations (e.g., offshore or nearshore), and the status of the gear (active or inactive).

The VMRC data reports water bodies using numerical codes, which do not correspond geographically to the current ESA regulated areas (e.g., PNRA I and II) and proposed regulated areas (i.e., BDPNRA). To ensure that the water bodies more closely align with the proposed areas to be regulated, the data was consolidated by specifying them as areas west and east of the CBBT. The waters west of the CBBT are represented by VMRC water body areas: 336 Mobjack Bay (MOB); 371 York River, Lower (YRL); 306 Ches. Bay, Lower East Side (BCLE); 301 Back River (BR); 347 Poquoson River (POQ); and 391 Severn River (SEV). Although area 307 Ches. Bay, Lower West Side (CBLW) is mostly located west of the CBBT geographically, this water body area is included in analysis under waters east of the CBBT. This is because six of the eight pound nets recording landings under this water body are physically located east of the CBBT. The waters east of the CBBT are represented by VMRC water body areas 307 CBLW; 625 Ocean, E Shore (OES); 631 Ocean, VA Beach (OVB); 300 Back Bay (BB); 390 Chincoteague Bay (CHIN); 318 Hog Island Bay (HOGES); 358 Tangier Sound (TS); 331 Magothy Bay (MAG); and 375 Lynnhaven Bay (LYN). This information was compiled and provided by the NMFS SEFSC (Marvasti, pers. comm., SEFSC).

Approximately 8 million pounds of fish (see section 4.2.2 for information on landings) valued at $3.5 million were harvested in 2010 using pound net gear in all Virginia waters (Table 8). While

this is only one year of data, this assessment assumes the 2010 performance of the fishery is representative of normal conditions and operations. Of this total, approximately 2.2 mp of fish valued at approximately $1.9 million dollars were harvested in the proposed BDPNRA (Table 9).

Fishermen who use pound nets also use other gears. Total landings by all gear types used by pound net fishermen in Virginia in 2010 were approximately 8.6 mp valued at approximately $4.2 million, which underscores the economic importance of pound nets to fishermen who use pound nets (Table 9). In other words, in 2010, the landings from pound nets made up approximately 83% of the aggregate (all gears combined) revenue from all fishing by fishermen who used pound nets.

The number of pound net harvesters fluctuated between 11 and 15 between 2006 and 2010. The number of pound net harvesters, however, does not equate to the number of pound nets fished, as individual harvesters may fish several pound nets in various locations. While the distribution of pound nets among the harvesters in the Chesapeake Bay area is unknown, NEFSC observer data found that in 2010 there were 41 pound nets fished in the proposed BDPNRA. Of these 41 pound nets, 21 were identified as nearshore pound net leaders (per definitions under ESA regulations), and 20 pound nets were defined as offshore pound net leaders.

Table 10 contains estimates of the total annual revenue (2010 dollars) from pound net harvests by water body in the proposed BDPNRA for 2004-2010. Most of the fishing activity using pound net gear was centered in the Lower East Side and Lower West Side of Chesapeake Bay, while limited amounts of harvesting were documented from the Mobjack Bay area. Most of the pound nets in the proposed BDPNRA have traditionally been located in the VMRC water body (306) Lower East Side of the Bay.

Table 8. Total annual pound net revenue by species group in all Virginia waters (2010).

Species Group	Revenue ($)
Amberjack	23
Bluefish	21,030
Butterfish	13,175
Carp	540
Catfish, Blue	176,723
Catfish, bk	7,429
Cobia	475
Cod	1
Crab Blue	1,306
Crevalle	2,239
Croaker, Atlantic	2,092,856
Dogfish, Smooth	48
Dogfish, Spiny	84
Drum, Red	1,621
Eel, American	384
Fish, Other Food	3
Flounder, Summer	255,565
Herring Species (Alewife, Blueback Herring, and Atlantic Herring)	2,705
Mackerel, Spanish	14
Mackerel, Spanish	29,537
Menhaden	202,075
Permit	2
Pompano, Common	1,285
Puffer, Northern	4,043
Ray, Cownose	18,922
Redfish	16
Ribbonfish	25,145
Salmon, Atlantic	9
Shad Species (American Shad, Gizzard Shad, and Hickory Shad)	14,916
Seatrout, Grey	
Sheephead	1,624
Skate	14
Spadefish	4,936
Perch (White, and Yellow)	7,342
Spot	94,812
Seatrout, Spotted	219
Harvestfish	32,596
Bass, Striped	155,749
Tautog	16

Toadfish, Oyster	32
Tripletail	2
Whiting, King	1,334
Total	$3,489,886

Source: NMFS SEFSC using VMRC data.

Table 9. Pound net fishermen total annual revenue by gear type in Virginia waters and in the proposed BDPNRA (January-December, 2010).

Gears	Revenue ($) Virginia	Revenue ($) Proposed BDPNRA*
GILL NET, SINK/ANCHOR, OTHER	11,7421	38,247
AQUACULTURE OTHER	9,452	-
BULL RAKE, SHINECOCK	3,914	-
POTS + TRAPS, CONCH	8,168	8,168
GILL NET, DRIFT, OTHER	18,333	18,333
DIP NET, COMMON	6,934	-
POTS + TRAPS, EEL	1,899	1,519
FYKE NET, FISH	46,648	-
POTS + TRAPS, FISH	1,987	-
HAND LINE, OTHER	3,357	3,184
SCRAPES, OYSTER	8,546	-
DREDGE, OYSTER, COMMON	8,886	-
POUND NET, CRAB	2,097	1,152
POTS + TRAPS, BLUE CRAB	436,856	50,177
POTS + TRAPS, CRAB, OTHER	20,346	7,743
SCRAPES	1,624	1,624
GILL NET, STAKE, OTHER	23,634	-
POUND NET	3,489,886	1,894,769
TOTAL WITHOUT POUND NET	720,102	130,147
GRAND TOTAL	4,209,988	2,024,916

* The values in the proposed BDPNRA columns are a subset of the values in the Virginia columns. Source: NMFS SEFSC using VMRC data.

Table 10. Pound net total annual inflation-adjusted revenue (2010 dollars) by water body in the proposed BDPNRA (east and west of the CBBT).

Inflation-adjusted Revenue ($1,000)							
Areas	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
West of CBBT:							
Mobjack Bay	0	0	0	52.52	53.39	63.60	0
York River-L	0	0	0	0	0	0	0
Ches. Bay-LES	0	734.82	1,051.27	1,691.00	866.53	949.02	1767.79
Back River	415.87	0	0	0	0	0	0
Poquoson River	0	1.7	0	0	0	0	0
Severn River	0	0	0	0	0	0	0
Sub-Total	415.87	736.52	1,051.27	1,743.52	919.92	1,012.62	1,767.79
East of CBBT:							
Ches. Bay-LWS*	456.49	492.45	404.17	43.06	40.04	39.37	127
Ocean-ES	0	0	0	0	0	0	0
Ocean-VA Bay	0	0	0	0	0	0	0
Back Bay	0	0	0	0	0	0	0
Chincoteague Bay	0	0	0	0	0	0	0
Hog Island Bay	0	0	0	0	0	0	0
Tangier Sound	0	0	0	0	0	0	0
Magothy Bay	0	0	0	0	0	0	0
Lynnhaven Bay	0	0	0	0	0	0	0
Sub-Total	456.49	492.45	404.17	43.06	40.04	39.37	127
Proposed BDPNRA	867.86	1,228.38	1,455.44	1,786.58	958.93	1,051.99	1,895

Source: NMFS SEFSC using VMRC data.

* The pound nets are physically located east of the CBBT and comprise the majority of these landings. However, two of the nets in this area code are physically located west of the CBBT and comprise some of these landings.

Table 11 contains estimates of pound net revenue by species or species group from the west and east areas of the CBBT in 2010. This table shows most of the fishing activity took place on the west side of the CBBT. The west side of the CBBT area accounted for approximately 93% of the revenue from the entire CBBT area. Table 11 shows Atlantic croaker and, to a lesser extent, summer flounder were the most commercially important species harvested with pound net gear in both areas in the proposed BDPNRA. Table 12 contains estimates of the revenue (2010 dollars) of all harvest with pound net gear by area of the CBBT for 2004-2010. In 2010, pound net harvesters reported harvesting approximately 0.14 mp of fish valued at approximately $ 0.12 million from the proposed BDPNRA.

Table 11. Revenue by species for pound net gear fished in the proposed BDPNRA water bodies east and west of the CBBT in 2010.

Species Name	Revenue ($)West of C. B. Bridge Tunnel (including Ches. Bay-LES)	Revenue ($)East of C. B. Bridge Tunnel (including Ches. Bay-LWS)*
FISH, OTHER INDUSTRY	66,544	2,990
HERRING SPECIES**	113	0
CRAB, BLUE	54	0
BLUEFISH	5,772	887
DRUM, BLACK	2,469	0
BUTTERFISH	7,713	2,860
COBIA	284	0
COD	1	0
CREVALLE	0	2,239
CROAKER, ATLANTIC	1,399,570	84,591
DOGFISH, SMOOTH	48	0
EEL, AMERICAN	54	0
FISH, OTHER FOOD	3	0
FLOUNDER, SUMMER	84,044	16,796
CRAB, HORSESHOE	22,938	0
MACKEREL, ATLANTIC	5	0
MENHADEN	4,293	0
MULLET	1	0
POMPANO, COMMON	338	117
PUFFER, NORTHERN	2,055	0
RAY, COWNOSE	5,800	0
DRUM, RED	204	362
RIBBONFISHES	21,913	3,134
WHITING, KING	1,308	0
SALMON, ATLANTIC	9	0
DOGFISH, SPINY	84	0
SHAD SPECIES***	70	0
SHEEPSHEAD	1,568	51
SPADEFISH	4,872	28
MACKEREL, SPANISH	29,231	148

SPOT	27,119	9,776
SEATROUT, SPOTTED	95	14
HARVESTFISH	28,691	2,186
BASS, STRIPED	46,467	100
TOADFISH, OYSTER	32	0
SEATROUT, GREY	4,033	702
Total	1,767,791	126,978

Source: NMFS SEFSC using VMRC data.

Table 12. Pound net annual inflation-adjusted revenue (2010 dollars) by water body in the proposed BDPNRA (east and west of the CBBT).

Areas	**Inflation-adjusted Revenues ($1,000)**						
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
West of C. B. Bridge:							
Mobjack Bay	0	0	0	53	53	64	0
York River-L	0	0	0	0	0	0	0
Ches. Bay-LES	83	123	88	188	79	79	136
Back River	0	0	0	0	0	0	0
Poquoson River	0	0.17	0	0	0	0	0
Severn River	0	0	0	0	0	0	0
Sub-total	83	105	88	174	92	101	136
East of C. B. Bridge:	0	0	0	0	0	0	0
Ches. Bay-LWS*	114	123	202	43	40	13	42
Ocean-ES	0	0	0	0	0	0	0
Ocean-VA Bay	0	0	0	0	0	0	0
Back Bay	0	0	0	0	0	0	0
Chincoteague Bay	0	0	0	0	0	0	0
Hog Island Bay	0	0	0	0	0	0	0
Tangier Sound	0	0	0	0	0	0	0
Magothy Bay	0	0	0	0	0	0	0
Lynnhaven Bay	0	0	0	0	0	0	0
Sub-total	114	123	202	43	40	13	42
Proposed BDPNRA							
No. of Harvesters	9	10	14	11	13	16	16
Average Landings	96	123	104	162	74	66	118

Source: NMFS SEFSC using VMRC data.

4.4 Environmental Justice Considerations

Executive Order 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of Executive Order 12898 is to consider "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories…" This executive order is generally referred to as environmental justice (EJ).

The proposed actions are expected to reduce serious injury and mortality of strategic bottlenose dolphin stocks and takes of listed sea turtles, meeting requirements under both the MMPA and ESA. Thus, both actions are expected to result in positive impacts to the social environment as discussed in sections 5.1.3 and 5.2.3. and not result in impacts to any EJ population. Among the communities identified in section 4.3.1, no EJ issues were identified or are expected to arise. However, the absence of potential EJ concerns cannot be assumed. Information on the race and income status for groups at the different participation levels (charter crew and employees of associated support industries, etc.) is not available.

4.5 Administrative Environment

For a description of the administrative environment see the background section on pages 1-6 and 20-26. Pages 1-6 describe the laws under which the proposed action was developed and within which the administrative environment must operate. Pages 20-26 provide a description of the current laws under state and federal authority. The relevant state administrators include the Virginia Marine Resources Commission and their law enforcement. The relevant federal administrators include the National Marine Fisheries Service and NOAA's Office of Law enforcement.

5.0 Environmental Consequences

5.1 Action 1. Amend MMPA and ESA implementing regulations to reduce bottlenose dolphin serious injuries and mortalities and sea turtle takes incidental to Virginia pound nets.

The purpose of **Action 1** is to reduce serious injury and mortality to bottlenose dolphins and takes of sea turtles by using modified pound net leaders in the proposed action area.

5.1.1 Direct and Indirect Effects on the Physical, Biological, and Ecological Environment

The physical environment of this action is the proposed BDPNRA as described in section 1. This includes the benthic habitats and water column of the Chesapeake Bay. The biological and ecological environment of the action area includes sea turtles, bottlenose dolphins, and finfish captured in the Virginia Pound Net Fishery. The preferred alternatives are expected to have beneficial effects on the physical, biological, and ecological environment for all sub-actions of **Action 1**. The intent of the actions in this Environmental Assessment is to reduce serious injury and mortality of bottlenose dolphins and take of sea turtles. All preferred alternatives are designed to achieve this goal, thus all actions are expected to benefit the physical, biological, and ecological environment.

Sub-action 1

Sub-action 1 defines the area for the proposed pound net gear regulations to achieve the goal of **Action 1**. Impacts on the physical environment are expected from all three alternatives in **sub-action 1**. As mentioned above, the physical environment is defined as the proposed BDPNRA, including the benthic habitats and water column. Normal pound net fishing practices are to deploy, remove, and maintain the nets fished. The routine practice of deploying, removing, and maintaining modified leaders causes temporary, minor disruption to the benthic habitat and water column, but potential continued negative effects are not expected regardless of the geographic area delineated.

There are potential effects on the biological and ecological environment from **Alternative 1** (no action) and **Preferred Alternative 2**. Delineating a geographic boundary within which regulations would apply is primarily administrative; however, choosing the boundary may have the effect of including or excluding species that may benefit from the regulations. If interactions with bottlenose dolphins and sea turtles were to occur in areas outside of the selected geographic area, the biological and ecological environment of those animals would be negatively affected. If, on the other hand, interactions only occurred within the chosen geographic boundary and it reduced interactions, the biological and ecological environment would benefit. The data discussed in section 1 indicates that the geographic area delineated by the no action and **Preferred Alternative 2** is the area where interactions occur. **Preferred Alternative 2** maintains the geographic area of the no action by combining the separate areas currently regulated under the no action into one area and under one statutory authority. Therefore, the no action and **Preferred Alternative 2** are expected to provide more benefits when compared to **Alternative 3** because of the known protected species interactions with the fishery in the area. However, concentrated fishery effort still occurs within the geographic area and impacts on protected species from the fishery are still expected at some degree that is not expected to be significant.

There are potential effects on the biological and ecological environment from **Alternative 3**. **Alternative 3** expands the geographic scope of the proposed action area to northern mainstem waters of the Chesapeake Bay compared to the no action and **Preferred Alternative 2**. Expanding the area may affect the biological and ecological environment. Potential effects are additional decreases in bottlenose dolphin and sea turtle interactions with pound net gear compared to the no action and **Preferred Alternative 2**. However, based on stranding and NEFOP monitoring data, there are little to no known gear interactions between protected species

and pound nets fishing in the northern Virginia Chesapeake Bay. Thus, this expansion likely provides no conservation benefit to the species.

Effects on finfish catch are expected to be the same for all alternatives under **sub-action 1**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action. The modified leader design in the no action is the same design used in all alternatives under **sub-action 1**. The modified leader design did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, potential adverse effects on finfish populations are not expected to be significant whether modified leaders are required in the current geographic area or expanded to the northern mainstem waters of the Chesapeake Bay.

Sub-action 2

Sub-action 2 defines the timeframe for the proposed regulations to achieve the purpose of **Action 1**. Impacts on the physical environment are not expected from all three alternatives in **sub-action 2** because this sub-action only addresses the temporal aspect of the proposed requirements. As mentioned above, the physical environment is defined as the proposed BDPNRA, including the benthic habitats and water column. The proposed timeframes do not affect the benthos or water column within the proposed BDPNRA, thus there is no effect to the physical environment.

There are continued potential negative effects on the biological and ecological environment from **Alterative 1** (no action). The data discussed in section 1 indicates that bottlenose dolphin interactions occur outside of the timeframe when some pound nets are currently required to use modified leaders. If these pound nets continued to only use the modified leader seasonally, interactions with bottlenose dolphins are expected to continue, which negatively affects the biological and ecological environment. Although continued interactions would still be expected to occur under the no action, they are not expected to occur at a level that would significantly affect populations of bottlenose dolphins.

Effects may also occur from **Preferred Alternative 2** and **Alternative 3**. The proposed modified leader gear modifications are required year-round under **Preferred Alternative 2** compared to seasonally under the no action. Potential positive effects are likely for sea turtles and dolphins. These potential effects are the additional decreases in bottlenose dolphin and sea turtle interactions with pound net gear compared to the no action. **Alternative 3** also expands the timeframe of the proposed gear requirements beyond the no action. Therefore, **Alternative 3** may also affect the biological and ecological environment by further reducing sea turtle and dolphin interactions in pound nets when compared to the no action. However, **Alternative 3** does not require year round use of the proposed modified gear as in **Preferred Alternative 2**. Therefore, the potential benefits to bottlenose dolphins and sea turtles are expected to be the highest under **Preferred Alternative 2**.

Effects on finfish catch are expected to be the same for all alternatives under **sub-action 2**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action. The modified leader design in the no action is the same design used in all alternatives under **sub-action 2**. The modified leader design did not significantly

affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, potential adverse effects on finfish are not expected whether modified leaders are required seasonally or year-round.

Sub-action 3

Sub-action 3 requires the use of modified pound net leaders and defines the pound nets required to use them to achieve the purpose of **Action 1**. Impacts on the physical environment are expected from all four alternatives in **sub-action 3**. As mentioned above, the physical environment is defined as the proposed BDPNRA, including the benthic habitats and water column. Normal pound net fishing practices are to deploy, remove, and maintain the nets fished, including modified leaders, which occurs in all four alternatives of **sub-action 3**. The routine practice of deploying, removing, and maintaining modified leaders causes temporary, minor disruption to the benthic habitat and water column, but potential continued negative effects are not expected.

Potential effects on the biological and ecological environment are expected from all alternatives. The design of modified leaders reduces interactions of sea turtles and dolphins in the pound net leader. Modified pound net leaders are required for nets defined as offshore because there is likely a higher potential for interactions in offshore pound nets. Therefore, **Alternative 1** (no action) will likely provide the continued status quo effects for the biological and ecological environment. The status quo effects are generally positive (reduced interactions with protected species); however, potential negative effects may occur because the current definition of a nearshore leader in the no action may allow the leader to extend into deeper, more offshore waters where a modified leader should be used. This creates a potential increased risk of protected species interactions with leaders because nearshore nets are not required to use a modified leader.

Preferred Alternative 2 and **Alternative 3** both require offshore nets to use modified leaders but would also revise the definitions of nearshore and offshore pound net leaders. Definition revisions may affect the biological and ecological environment by preventing the nearshore leader from extending into deeper, more offshore waters where a modified leader should be used to prevent risk of protected species interactions. Compared to the no action, these definition revisions may provide additional positive effects for protected species. Definition revisions under both **Preferred Alternative 2** and **Alternative 3** may also alter which nets are required to use modified leaders. For example, a pound net currently defined as nearshore may change to offshore, requiring the use of a modified leader. If more nets are required to use modified leaders, an additional decrease in interactions of protected species in leaders may occur. The opposite may also occur if a pound net was no longer required to use modified leaders. Based on 2010 and 2011 NEFOP data characterizing these pound nets and their locations relative to current and proposed definitions, no existing pound nets are currently expected to change whether they are defined as offshore or nearshore from definition revisions in **Preferred Alternative 2** and **Alternative 3**. However, new entrants into the fishery may be affected by proposed definition revisions. Fishermen may choose to change net location and placement based on new definitions to avoid gear modification requirements. Therefore, potential effects on new nets may occur under **Preferred Alternative 2** and **Alternative 3**. The potential outcome of that effect on protected species may be viewed in the context of the discussions

above. For example, if a new entrant sets the pound net where it will be defined as offshore and is required to use a modified leader, a reduction in protected species interactions is expected, providing positive effects to the biological and ecological environment. A new entrant may alternatively choose to set the pound net in a location where it will be defined as nearshore and is not required to use modified leaders. However, the revised definition of a nearshore pound net leader will help prevent the potential negative effects described in the no action (a nearshore net extending into deeper water).

Alternative 4 removes definitions of nearshore and offshore pound net leaders and requires all pound nets in the proposed action area to use the modified leader. Based on 2010 and 2011 NEFOP data, there are 41 pound nets located in the proposed action area; 21 are nearshore and 20 are offshore. This alternative requires all pound nets in the proposed action area to use modified leaders whether they are nearshore or offshore pound nets. Therefore, more modified leaders and less traditional leaders are expected to be used under **Alternative 4**. This is expected to reduce protected species interactions in the gear and provide the greatest conservation benefit compared to all other alternatives. However, stranding and observer data does not currently support a need to require modified leaders for nets defined as nearshore.

Minor effects on finfish catch may result from all alternatives under **sub-action 3**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action. The modified leader design in the no action is the same design used in all alternatives under **sub-action 3**. The modified leader used on offshore nets did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, potential adverse effects on finfish are not expected from use of modified leaders on offshore nets in the no action, **Preferred Alternative 2**, **Alternative 3, and Alternative 4 (**for offshore nets). **Alternative 4** requires the modified leader be used on both offshore and nearshore nets. Existing research studied finfish catch is on offshore nets only. One of the four offshore nets studied was set closer to shore than the other three and had significantly less catch, which may be a result of its positioning closer to shore in more shallow waters (Silva *et al*. 2011; DeAlteris *et al.* 2005). Therefore, use of modified leaders on nearshore nets in **Alternative 4** may result in less finfish catch when used on nearshore nets and is also not expected to cause potential adverse effects on finfish. Although similar studies are not available to compare finfish catch for modified leaders used on nearshore nets, exact effects are not needed to make reasoned inferences on effects based on existing information.

Sub-action 4

Sub-action 4 examines changes to construction of, and thus definitions of, modified pound net leaders; newly defines "pound net"; requirements for fishing all components of the gear in areas of Virginia; and formally defines hard lay lines. Newly defining pound net gear and formally defining hard lay lines are not expected to cause effects on the physical or biological and ecological environment. The definition of hard lay lines is currently described within the definition of a modified leader under the no action. **Preferred Alternative 2** and **Alternatives 3** and **4** remove it from the modified leader definition and define it separately for ease in interpretation of definitions. This does not otherwise change the modified leader or hard lay line definitions, how the gear fishes, and its potential risk reduction of protected species interactions compared to the no action. Therefore, no additional burden or effects are expected on the

physical or biological and ecological environment. Pound net gear is also being newly defined under the **Preferred Alternative 2** and **Alternatives 3** and **4**. Defining pound net gear clarifies who must follow gear modification requirements and does not change how the gear fishes or its potential risk reduction with protected species. Therefore, no additional effects are expected to be placed on the physical or biological and ecological environment. Effects are expected from the other aspects of **sub-action 4**, however.

Physical environment effects from **Alternative 1** (no action) are expected. The no action maintains the current definitions of a modified pound net leader and related state and federal requirements to use them. As mentioned above, the physical environment is defined as the proposed BDPNRA, including the benthic habitats and water column. Normal pound net fishing practices are to deploy, remove, and maintain the nets fished, including modified leaders used in portions of the proposed BDPNRA. The routine practice of deploying, removing, and maintaining modified leaders causes temporary, minor disruption to the benthic habitat and water column, but potential continued negative effects are not expected.

Potential physical effects are expected from **Preferred Alternative 2** and **Alternatives 3** and **4**. Effects are only expected for the part of **sub-action 4** requiring fishermen to fish all three sections of the pound net fishing gear at the same time. Deploying and fishing gear in the water likely affects the physical environment of the Chesapeake Bay, particularly the water column. Under the no action, fishermen sometimes leave portions (e.g., only the leader) of the gear in the water that is not actively catching fish. Therefore, **Preferred Alternative 2** and **Alternatives 3** and **4** may cause greater effects on the physical environment than the no action because they require all parts of the pound net to be used at the same time if fishing in the proposed action area. However, because they prevent fishermen from leaving portions of the pound net in the water for extended periods while the net is not actually being fished, they will also likely reduce gear in the water that is no longer fishing, but still poses a risk of entanglement to protected species. Therefore, this part of **sub-action 4** may also directly benefit the biological and ecological environment by reducing the potential for protected species entanglement compared to the no action. The no action may cause direct negative effects to the biological and ecological environment, because leaving only parts of the gear in the water for extended periods, during which the gear is not being fished, may increase entanglement risk to protected species.

Effects on the biological and ecological environment from the part of sub-action 4 that examines changes to the modified leader construction and its definition are not expected under the no action and **Preferred Alternative 2**. Under both the no action and **Preferred Alternative 2**, the modified pound net leader is made of hard lay vertical lines for the top two-thirds of the leader and mesh for the bottom one-third. **Preferred Alternative 2** clarifies and updates the modified pound net leader definition of the no action alternative. The construction of the modified pound net leader, how it fishes, and its potential risk reduction of protected species compared to the no action is not expected to change. Therefore, for this part of sub-action 4, **Preferred Alternative 2** is not expected to affect the biological or ecological environment because it is more of an administrative action to clarify the modified leader definition under the no action.

Effects on the biological and ecological environment from examining changes to modified leader construction and its definition are expected from **Alternatives 3** and **4**. Under **Alternative 3**, the

modified pound net leader is made with hard lay vertical lines for the top one-third of the leader and mesh for the bottom two-thirds. The mesh portion of the leader creates the most entanglement risk for sea turtles and bottlenose dolphins. Therefore, allowing more mesh in the water under **Alternative 3** likely increases entanglement risk of protected species compared to the no action and **Preferred Alternative 2**. Under **Alternative 4**, the modified pound net leader is made entirely of hard lay vertical lines. Compared to all alternatives, **Alternative 4** likely increases the conservation benefits to protected species the most by removing all mesh from the modified leader. An effect on finfish catch are expected to be the same for the no action, **Preferred Alternative 2**, and **Alternative 3** but is expected to be lower for **Alternative 4**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action and **Preferred Alterative 2**. This design did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). There are no research studies comparing catch of finfish for the modified leader construction designs in **Alternatives 3** and **4**. **Alternative 3** allows more mesh in the water column, which is closer to a traditional leader design, and is therefore expected to fish more like a traditional leader. **Alternative 4** allows only vertical lines and no mesh, and is therefore expected to result in lower finfish catch. Although similar studies are not available to compare finfish catch for **Alternatives 3** and **4**, exact effects are not needed to make a reasoned inferences on effects based on existing information. Therefore, **Preferred Alternative 2** offers needed conservation benefits for sea turtles and bottlenose dolphins and provides more clarification within the regulations without causing potential adverse effects to finfish catch.

5.1.2 Direct and Indirect Effects on the Economic Environment

There are two general potential economic effects on fishermen or associated businesses and communities from requiring gear changes. The first is an increase or imposition of new costs. Modifying or requiring new gear costs fishermen money and labor to meet the new gear requirements. In response to current requirements, fishermen are expected to already use modified leaders for the entire fishing season when fishing with pound net gear in the proposed action area, even if not required. This is true for two main reasons: (1) research on the catch efficiency of modified pound net leaders within the proposed BDPNRA showed no significant differences in harvest weight for the species analyzed when compared to using traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011); and (2) the costs associated with maintaining two types of leaders and switching the gear when modified leaders are not required would not make rational economic sense given the absence of improvements in catch efficiency. Please also see the Final Environmental Assessment, Regulatory Impact Review, and Flexibility Act Analysis of Sea Turtle Conservation Measures for the Pound Net Fishery in Virginia Waters of the Chesapeake Bay dated June 2006 for similar assumptions and discussion on gear use. This can be found at: http://www.nero.noaa.gov/prot_res/seaturtles/doc/FINAL%20EA%20web.pdf.

The effect of new gear requirements is the potential reduction in total and/or net revenue if the new gear is less efficient and decreases net revenue. If the new gear is less effective in catching fish, fishermen may fish the same amount of time that they normally fish but harvest fewer fish. Their fishing costs then remain the same, but their revenue is lower from reduced catch, causing overall lower net revenue.

In general, any alternative expected to result in increased fishing costs, either through increased gear or labor costs, or decreased revenue as a result of reduced harvest, is also expected to result in decreased economic benefits in the short term to affected fishermen, and associated businesses and communities. However, the effect of doing nothing (i.e., no action) is likely to result in continued excessive takes of protected species. Society values (economically) a healthy resource. Continued excessive takes of protected resources is therefore, expected to result in lower economic benefits. Because society values healthy bottlenose dolphin and sea turtle populations, the economic benefits associated with the proposed alternatives are expected to increase or decrease commensurate with the expected change in improved or diminished conservation of these species under the respective alternatives considered. Finally, although some of the proposed actions and alternatives may result in short-term increased costs or reduced revenue, in the long term, the enhanced protection of bottlenose dolphins and sea turtles are expected to accrue due to these alternatives and result in a net increase in social and economic benefits to society. Additionally, the sooner these interactions (takes) can be reduced, the greater the likelihood that more severe restrictions, with associated increased adverse economic effects, can be avoided in the future.

Sub-action 1

Sub-action 1 defines the geographic area for proposed regulations. **Alternative 1** (no action) and **Preferred Alternative 2** are not expected to cause direct or indirect economic effects on fishermen. **Preferred Alternative 2** maintains the geographic area of the no action. However, it combines the separate areas currently regulated in the no action into one area and under one statutory authority. Therefore, no economic effects on fishermen are expected if modified leaders are required in this area because fishermen are expected to already use modified leaders when fishing with pound net gear.

Alternative 3 may cause direct economic effects to fishermen. It expands the area requiring the use of modified pound net leaders to the entire mainstem waters of the Virginia Chesapeake Bay compared to the no action and **Preferred Alternative 2**. Fishermen using pound nets in the northern areas of the mainstem Chesapeake Bay are currently not required to use modified pound net leaders. Estimating the potential economic impact of requiring modified leaders on nets under **Alternative 3** is difficult. The state allows a maximum of 161 total pound net licenses to be issued in the Virginia mainstem waters of the Chesapeake Bay. Each net location requires a license. In 2010, 41 of these licenses were held in the **Preferred Alternative 2** action area. This leaves 105 pound net licenses available in the northern mainstem waters of the Chesapeake Bay that may be required to use modified pound net leaders under **Alternative 3**. However, it is unknown if these nets are offshore or nearshore. Traditional leaders for offshore nets cost $5,418 to manufacture and install/remove (Table 13). Modified leaders for offshore nets cost $7,068 to manufacture and install/remove (Table 13). Therefore, assuming the worst case scenario that all the 105 nets are offshore nets required to use modified pound net leaders, the expected increase in cost per leader is $1,650. Thus, **Alternative 3** is expected to cause negative effects on affected fishermen compared to the no action and **Preferred Alternative 2** because it would increase the cost per leader. However, this potential increase in costs would not be expected to significantly affect the economic environment.

Effects on finfish catch and thus revenue cost from harvests are expected to be the same for all alternatives under **sub-action 1**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action. The modified leader design in the no action is the same design used in all alternatives under **sub-action 1**. The modified leader design did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, potential negative effects on finfish catch and thus revenue costs are not expected whether modified leaders are required in the current geographic area or expanded to the northern mainstem waters of the Chesapeake Bay.

Table 13. Cost to Make and Install/Remove Modified vs. Traditional Leaders on Offshore Pound Nets.

		Traditional Leader		Modified Leader	
Description	**Cost Per Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**
Fabrication:					
1. Material					
5/16" poly-steel rope (hard lay line)	5 spools; 1800 ft per spool; 275 lbs of rope	not used	0	8000 ft	$700
hog rings	$40/bag	not used	0	1 bag	$40
3/8"chain (bottom chain)	$1.50/ft	900 ft	$1,350	900 ft	$1,350
1/4" chain (top chain)	$0.90/ft	not used	0	900 ft	$810
8" mesh	$6.50/lb	250 lbs	$1,625	150 lbs	$975
5/8" poly rope (mid-line)	1.5 spools, $80 per spool; 600 ft per spool	900 ft	$120	900 ft	$120
copper paint	$1200 per drum, 50 gallons per drum	25 gallons	$600	25 gallons	$600
hanging twine	$5.50/lb	25 lbs	$163	25 lbs	$163
1/2" rope	60/spool	1 spool	$60	1 spool	$60
Buoys	$3.50 each	100	$350	not used	0
Sub-total: Material cost for fabrication			$4,268		$4,818
2. Fabrication labor and other direct costs	$15/hr	24 hrs (2 workers, 1.5 days)	$400	96 hrs (3 workers, 4 days)	$1,500
Total fabrication cost			$4,668		$6,318
Subtotal Material			$4,268		$4,818
Subtotal Labor			$400		$1,500
Installation/Removal:					
Labor and other direct costs- to install leader	$15/hr	8 hrs (4 workers, 2 hrs each), boat and fuel	$200	8 hrs (4 workers, 2 hrs each), boat and fuel	$200
Labor- for diver to set leader	$150/hr	1 hr	$150	1 hr	$150
Labor and other direct costs- to take out existing leader	$15/hr	8 hrs (4 workers, 2 hrs each), boat and fuel	$400	8 hrs (4 workers, 2 hrs each), boat and fuel	$400
Total installation/removal cost			$750		$750
Total Costs			$5,418		$7,068

Source: NMFS SEFSC using information from a major Virginia pound net harvester in the proposed action area.

Sub-action 2
Sub-action 2 defines the timeframe for the proposed use of modified pound net leaders. No direct or indirect economic effects on fishermen are expected under all alternatives. Fishermen using offshore pound nets are currently required to use modified leaders seasonally or year-round in the proposed action area under all alternatives. Therefore, if they are fishing in these areas, they are expected to already use modified leaders.

Sub-action 3
Sub-action 3 requires the use of modified pound net leaders and defines the pound net leaders (physical characteristics) that fishermen are required to use. No economic effects on fishermen are expected from **Alternatives 1** (no action), **Preferred Alternative 2**, and **Alternative 3**. They are, however, expected from **Alternative 4**.

The no action requires offshore pound nets to use modified pound net leaders seasonally or year round in parts of the lower mainstem Chesapeake Bay waters and defines offshore and nearshore pound net leaders. **Preferred Alternatives 2** and **3** revise the current definitions of offshore and nearshore pound net leaders compared to the no action and also require modified leaders for offshore pound nets. As discussed in section 5.1.1, the proposed definitions are not expected to change the classification of existing pound nets as offshore or nearshore compared to the no action. If fishermen use offshore pound nets in the proposed action area, they likely already use modified leaders when fishing. Therefore, no economic effects are expected to result from the proposed requirement under these two alternatives.

Alternative 4 removes the definitions of offshore and nearshore pound net leaders and requires all pound nets to use a modified leader. Fishermen using nearshore pound nets are currently not required to use modified leaders under the no action. Therefore, they may incur costs to construct new leaders that meet the modified pound net leader definition if they want to continue to fish with pound nets. Traditional leaders on nearshore pound nets cost $4,518 to manufacture and install/remove, while modified leaders on nearshore nets are expected to cost $6,496 (Table 14). In 2010, 21 fishermen used nearshore nets in the proposed action area. If nearshore net owners construct and install modified leaders, the expected increase in cost per leader is $1,978.

Effects on finfish catch and thus revenue costs may also occur under **Alternative 4**. Prior research compared finfish catch in offshore nets between the traditional leader and modified leader design in the no action. The modified leader design in the no action is the same design used in all alternatives under **sub-action 3**. The modified leader used on offshore nets did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, potential negative effects on finfish catch and thus revenue are not expected from use of modified leaders on offshore nets in the no action, **Preferred Alternative 2**, **Alternative 3**, and **Alternative 4** for offshore nets. **Alternative 4** requires the modified leader be used on both offshore and nearshore nets. Existing research studied finfish catch is on offshore nets only. One of the four offshore nets studied was set closer to shore than the other three and had significantly less catch, which may be a result of its positioning closer to shore in more shallow waters (Silva *et al*. 2011; DeAlteris *et al.* 2005). Therefore, use of modified leaders on nearshore nets in **Alternative 4** may result in less finfish catch and thus revenue costs

for fishermen using them on nearshore nets. Although similar studies are not available to compare finfish catch for modified leaders used on nearshore nets, exact effects are not needed to make reasoned choice among alternatives.

In summary, because of the increase in leader cost and potential revenue loss from reduced harvest, **Alternative 4** is expected to result in greater economic effects than the no action, **Preferred Alternative 2**, and **Alternative 3**.

Table 14. Cost to Make and Install/Remove Modified vs. Traditional Leaders on Nearshore Pound Nets.

		Traditional Leader		Modified Leader	
Description	**Cost Per Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**
Fabrication:					
1. Material					
5/16" poly-steel rope (hard lay line)	5 spools; 1800 ft per spool; 275 lbs of rope	not used	0	8000 ft	$700
hog rings	$40/bag	not used	0	1 bag	$40
3/8"chain (bottom chain)	$1.50/ft	900 ft	$1,350	900 ft	$1,350
1/4" chain (top chain)	$0.90/ft	not used	0	900 ft	$810
8" mesh	$6.50/lb	150 lbs	$975	100 lbs	$650
5/8" poly rope (mid-line)	1.5 spools, $80 per spool; 600 ft per spool	900 ft	$120	900 ft	$120
copper paint	$1200 per drum, 50 gallons per drum	25 gallons	$600	25 gallons	$600
hanging twine	$5.50/lb	25 lbs	$163	25 lbs	$163
1/2" rope	60/spool	1 spool	$60	1 spool	$60
buoys	$3.50 each	100	$350	not used	0
Sub-total: Material cost for fabrication			$3,618		$4,496
2. Fabrication labor and other direct costs	$15/hr	24 hrs (2 workers, 1.5 days)	$400	96 hrs (3 workers, 4 days)	$1,500
Total fabrication cost			$4,018		$5,996
Subtotal Material			$3,618		$4,496
Subtotal Labor			$400		$1,500
Installation/Removal:					
Labor and other direct costs- to install leader	$15/hr	4 hrs (2 workers, 2 hrs each), boat and fuel	$100	4 hrs (2 workers, 2 hrs each), boat and fuel	$100
Labor and other direct costs- to take out existing leader	$15/hr	8 hrs (4 workers, 2 hrs each), boat and fuel	$400	8 hrs (4 workers, 2 hrs each), boat and fuel	$400
Total installation/removal cost			$500		$500
Total Costs			$4,518		$6,496

Source: NMFS SEFSC using information from a major Virginia pound net harvester in the proposed action area.

Sub-action 4

Sub-action 4 examines changes to construction of and thus definitions of modified pound net leaders; newly defines "pound net"; requirements for fishing all components of the gear in Virginia; and formally defines hard lay lines. Newly defining pound net gear and formally defining hard lay lines are not expected to cause direct economic effects to fishermen because they are administrative actions. However, indirect economic effects are expected to accrue to fishermen required to use modified pound net leaders if the new definitions increase the leader cost or result in reduced harvest and associated revenue.

Alternatives 1 (no action) and **Preferred Alternative 2** are not expected to cause economic effects to fishermen. Under both the no action and **Preferred Alternative 2**, the modified pound net leader is made of hard lay vertical lines for the top two-thirds of the leader and mesh for the bottom one-third. **Preferred Alternative 2** clarifies and updates the modified pound net leader definition in the no action. The construction of the modified pound net leader and how it fishes compared to the no action is not expected to change. Therefore, **Preferred Alternative 2** is not expected to affect the economic environment.

Alternatives 3 and **4** may cause economic effects to fishermen. Both alternatives propose changes to how modified leaders are made. Requiring gear construction changes is expected to cause fishermen to incur costs from reconstructing the leader and may affect revenue. Under **Alternative 3**, modified leaders are made of hard lay vertical lines in the top one-third of leader compared to the top two-thirds in the no action and **Preferred Alternative 2**. The expected cost to make and install/remove a modified leader on an offshore net under the no action and **Preferred Alternative 2** is $7,068 (Table 13). The expected cost under **Alternative 3** is $7,693 (Table 15), or an increase in cost of $625 compared to the no action and **Preferred Alternative 2**.

Table 15. Cost to Make and Install/Remove Modified Leaders on Offshore Pound Nets for Sub-action 4, Alternative 3.

Description	Cost Per Unit	Quantity	Cost
Fabrication:			
1. Material			
5/16" poly-steel rope (hard lay)	2.5 spools; 1800 ft per spool	4,000 ft	$350
hog rings	$40/bag	1 bag	$40
3/8"chain (bottom chain)	$1.50/ft	900 ft	$1,350
1/4" chain (top chain)	$0.90/ft	900 ft	$810
8" mesh	$6.50/lb	300 lbs	$1,950
5/8" poly rope (mid-line)	1.5 spools, $80 per spool; 600 ft per spool	900 ft	$120
copper paint	$1200 per drum, 50 gallons per drum	25 gallons	$600
hanging twine	$5.50/lb	25 lbs	$163
1/2" rope	60/spool	1 spool	$60
buoys	$3.50 each	not used	$0
Sub-total: Material cost for fabrication			$5,443
2. Fabrication labor and other direct costs	$15/hr	3 people 4 days = 96 hrs	$1,500
Total fabrication cost			$6,943
Subtotal Material			$5,443
Subtotal Labor			$1,500
Installation/Removal:			
Labor and other direct costs- to install leader	$15/hr	8 hrs (4 workers, 2 hrs each) boat and fuel	$200
Labor- for diver to set leader	$150/hr	1 hrs	$150
Labor and other direct costs- to take out existing leader	$15/hr	8 hrs (4 workers, 2 hrs each) boat and fuel	$400
Total installation/removal cost			$750
Total Costs			$7,693

Source: NMFS SEFSC using information from a major Virginia pound net harvester in the proposed action area.

Under **Alternative 4**, modified leaders are made of all hard lay vertical lines, removing the mesh portion of the leader. **Alternative 4** is expected to cost $6,090 (Table 16) to make and install/remove the modified leader on an offshore net compared to a cost of $7,068 (Table 13) under the no action. Therefore, **Alternative 4** is anticipated to decrease the cost per leader by $978 to use the redefined modified leaders on offshore nets compared to the no action and **Preferred Alternative 2**. While **Alternative 4** may reduce construction costs compared to all alternatives, the potential impact on finfish catch and thus revenue from using leaders with all vertical lines is likely to be lower compared to all alternatives. Prior research compared finfish catch in offshore nets using either traditional leaders or the modified leader design under the no action and **Preferred Alterative 2**. This design did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). There are no research studies comparing catch of finfish for the modified leader construction designs in **Alternatives 3** and **4**. **Alternative 3** allows more mesh in the water column, which is closer to a traditional leader design, and is therefore expected to fish more like a traditional leader. **Alternative 4** allows only vertical lines and no mesh, and is therefore expected to result in lower finfish catch. Although similar studies are not available to compare finfish catch for **Alternatives 3** and **4**, exact effects are not needed to make a reasoned choice among alternatives

In summary, under **Alternative 3**, the modified pound net leader is made with hard lay vertical lines for the top one-third of the leader and mesh for the bottom two-thirds. The mesh portion of the leader creates the most entanglement risk for sea turtles and bottlenose dolphins. Allowing more mesh in the water under **Alternative 3** likely increases entanglement risk of protected species compared to the no action and **Preferred Alternative 2**, as well as causes expected economic effects on fishermen from increased costs to make the new gear. Increased entanglement risk of protected species may cause the need for additional future regulations to further prevent gear interactions, which may cause additional economic effects to fishermen. Under **Alternative 4**, the modified pound net leader is made entirely of hard lay vertical lines. **Alternative 4** likely increases the conservation benefits to protected species the most by removing all mesh from the modified leader. However, as stated above, potential affects to finfish catch and revenue losses may decrease because there is no mesh in the leader. The mesh is thought to help the fish detect the net and turn them toward the heart and pound ends of the net where they are caught. No mesh in the leader may cause the greatest potential reduction in fish catch, thus, total revenue decreases. Therefore, **Preferred Alternative 2** offers needed conservation benefits for sea turtles and bottlenose dolphins without causing potential economic effects on fishermen from gear construction costs and/or revenue losses from reduced catch. Reducing these interactions should limit the amount of further restrictions on the fishery and allow fishermen to continue to use pound net gear without negatively affecting catch and revenue.

Table 16. Cost to Make and Install/Remove Modified Leaders on Offshore Pound Nets for Sub-action 4, Alternative 4.

Description	Cost Per Unit	Quantity	Cost
Fabrication:			
1. Material			
5/16" poly-steel rope (hard lay)	7 spools; 1800 ft per spool	11,000 ft	$980
hog rings	$40/bag	1 bag	$40
3/8"chain (bottom chain)	$1.50/ft	900 ft	$1,350
1/4" chain (top chain)	$0.90/ft	900 ft	$810
8" mesh	$6.50/lb	not used	$0
5/8" poly rope (mid-line)	1.5 spools, $80 per spool; 600 ft per spool	not used	$0
copper paint	$1200 per drum, 50 gallons per drum	25 gallons	$600
hanging twine	$5.50/lb	not used	$0
1/2" rope	60/spool	1 spool	$60
buoys	$3.50 each	not used	$0
Sub-total: Material cost for fabrication			$3,840
2. Labor			
Fabrication labor	$15/hr	3 people 4 days = 96 hrs	$1,500
Total fabrication cost			$5,340
Subtotal Material			$3,840
Subtotal Labor			$1,500
Installation/Removal:			
Labor and other direct costs- to install leader	$15/hr	8 hrs (4 workers, 2 hrs each) boat and fuel	$200
Labor- for diver to set leader	$150/hr	1 hrs	$150
Labor and other direct costs- to take out existing leader	$15/hr	8 hrs (4 workers, 2 hrs each) boat and fuel	$400
Total installation/removal cost			$750
Total Costs			$6,090

Source: NMFS SEFSC using information from a major Virginia pound net harvester in the proposed action area.

5.1.3 Direct and Indirect Effects on the Social Environment

Social effects are consequences to human populations of any action that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. Overall, the preferred alternatives in **Action 1** are expected to benefit the social environment. The proposed measures in the preferred alternatives were developed in coordination with many stakeholders, including constituents of the Virginia pound net fishery. This coordination occurred under two separate actions. The first involved research in 2003 and 2004 with fishermen that led to the development of the modified leader, which is currently required seasonally or year-round under ESA and state regulations. The second included two recommendations by the BDTRT, which includes fishing industry representatives. The first recommendation, in 2007, was to conduct research on the effectiveness of modified leaders in the part of the proposed action area experiencing the highest levels of dolphin interactions with the gear. Virginia pound net fishermen also participated in this research study. The second recommendation, in 2009, was to implement the use of modified leaders year round.

Involving fishermen in the research process for the proposed gear modification allows them to continue their participation in the fishery with minimal to no negative social effects. Similarly, as representatives on the BDTRT, fishermen are involved in the decision-making process. This helps ensure conservation measures do not unduly affect their ability to continue fishing and negatively affect catch and revenue. Additionally, because of the cooperative development of the gear and proposed regulations, compliance with the proposed requirements will likely be higher and societal benefits will increase.

As discussed in section 5.1.2, in general, any alternative expected to result in increased fishing costs, either through increased gear or labor costs, or decreased revenue as a result of reduced harvest, is also expected to result in decreased social benefits in the short term to affected fishermen, and associated businesses and communities. However, the effect of doing nothing (i.e., some of the no actions) is likely to result in continued excessive takes of protected species. Society values (socially) a healthy resource. Continued excessive takes of protected resources is therefore, expected to result in lower economic benefits. Because society values healthy bottlenose dolphin and sea turtle populations, the social benefits associated with the proposed alternatives is expected to increase or decrease commensurate with the expected change in improved or diminished conservation of these species under the respective alternatives considered. Finally, although some of the proposed actions and alternatives may result in short-term increased costs or reduced revenue, in the long term, the enhanced protection of bottlenose dolphins and sea turtles are expected to accrue due to these alternatives and result in a net increase in social and economic benefits to society. Additionally, the sooner these interactions (takes) can be reduced, the greater the likelihood that more severe restrictions, with associated decreased social benefits, can be avoided in the future.

Sub-action 1

The same societal benefits described above are expected for **Alternative 1** (no action) and **Preferred Alternative 2**. **Preferred Alternative 2** maintains the geographic area of the no action. However, it combines the separate areas currently regulated under the no action into one geographic area. Both alternatives are considered beneficial as discussed above because they

both encompass the geographic areas where sea turtle and bottlenose dolphin interactions with pound nets are documented, and there are no changes to current fishing practices.

Negative effects may occur on the social environment from **Alternative 3**. **Alternative 3** expands the requirements for using modified pound net leaders to all of the Virginia mainstem Chesapeake Bay waters. Fishermen using pound nets in the northern Virginia mainstem waters (i.e., north of the proposed action area) were not previously included in the gear research studies mentioned above. Expanding the geographic range to include these fishermen and nets may alter their fishing practices, gear and operational costs, and revenues. There are also currently no documented interactions of bottlenose dolphins and sea turtles in pound nets in these northern mainstem waters, and no such interactions are believed to be occurring, so no positive social effects would be expected. However, if protected species interactions were to occur in this area, positive social effects would be expected by offering entanglement risk reduction. If fishing practices and revenue are affected, fishermen's livelihood may also be unnecessarily affected. Therefore, negative social effects may occur with **Alternative 3** compared to the no action and **Preferred Alternative 2**.

Sub-action 2
There are expected effects on the social environment from **Alternative 1** (no action) because it maintains the current seasonal fishing requirements, which may result in continued takes of protected species. Because society values a healthy ecosystem, continued takes of protected resources may cause lower economic benefits as discussed above.

Short-term negative effects may occur under **Preferred Alternatives 2**, which requires the year-round use of modified leaders in the proposed action area. These short-term effects may alter normal fishing practices for fishermen who are only currently required to use modified leaders seasonally in parts of the proposed action area. However, fishermen fishing in this area were involved in the development and testing of the proposed gear modifications. This research showed no significant difference in finfish catch. Therefore, if normal fishing practices are altered, they are not likely to affect finfish catch and revenue. Furthermore, fishing industry representatives on the BDTRT agreed to these year-round gear modifications in the proposed action area to reduce dolphin interactions with the gear. Reducing these interactions should limit the amount of further restrictions on the fishery and allow fishermen to continue to use pound net gear without negatively affecting catch and revenue, thus not altering their livelihood. If interactions are not reduced, potential future and more severe restrictions may occur, which may affect fishermen's livelihood. Although short-term negative effects from changed fishing practices may occur under **Preferred Alternative 2**, the long-term benefits of reduced protected species interactions is expected to outweigh these short-term negative effects.

Alternative 3 may cause either short-term negative social effects on the environment or no effects depending on where fishermen are using pound nets in the proposed action area. **Alternative 3** requires the use of modified leaders in the proposed action area from May 1 – September 30. The same short-term negative effects on the social environment may occur as under **Preferred Alternative 2** for part of the proposed action area where fishermen are only required to use modified leaders from May 6-July 31. Alternatively, no social effects may occur for fishermen using pound nets in areas currently required to use modified leaders year-round.

The perception exists among some fishermen that modified leaders reduce finfish catch. Thus, fishermen may perceive a beneficial effect on their livelihood if they are not required to use them year-round. However, research documented no significant change in catch between modified leaders and traditional leaders. Further, using traditional leaders increases the likelihood of protected species interactions with the gear occurring. Increased interactions could lead to further, and possibly severe, restrictions, which would negatively affect the social environment. Therefore, any perceived potential benefits to their livelihood are not likely.

Sub-action 3

There are expected effects on the social environment from **Alternative 1** (no action) because it maintains the current fishing requirements and related definitions of offshore and nearshore pound net leaders. Existing definitions may allow the pound net leader to extend into deeper, more offshore waters, where a modified leader should be used to reduce potential takes of protected species. Because society values a healthy ecosystem, takes of protected resources may cause lower economic benefits as discussed above.

The same social effects on the environment are likely from both **Preferred Alternative 2** and **Alternative 3**. Both alternatives require offshore pound nets to use modified pound net leaders and revise the current definition of offshore and nearshore pound net leaders. No effects are likely from changing the definition itself unless the new definitions change which nets are required to use modified leaders. This may cause either negative or positive effects on the social environment. If, under the new definitions, an offshore pound net becomes a nearshore pound net, a modified leader would no longer be required. This may be seen as a positive effect to the social environment because of the perception that modified leaders reduce catch despite research showing otherwise. Thus, fishermen may perceive a beneficial effect on their livelihood if they are not required to use them. However, using traditional leaders increases the likelihood of protected species interactions with the gear occurring, causing negative social effects to the environment. Increased interactions could also lead to further, and possibly severe, restrictions, which would also negatively affect the social environment. Therefore, any perceived potential benefits to their livelihood are not likely. Conversely, if a nearshore pound net becomes an offshore pound net, a modified leader would be required. This may also both positively and negatively affect the social environment. A fisherman using a pound net newly defined as offshore may incur additional costs of building and installing a modified leader, causing potential negative effects. Alternatively, using modified leaders on nearshore nets provides the most conservation benefit to protected species, resulting in positive effects to the social environment. However, the revised definitions under **Preferred Alternative 2** and **Alternative 3** are not expected to change if a pound net is defined as nearshore or offshore for nets currently fishing in the proposed action area. Both alternatives were developed to prevent the leader from extending into deeper, more offshore waters, where a modified leader should be used. Although **Alternative 3** was recommended by the BDTRT, it may still contain some parts of the definition that are difficult to interpret. **Preferred alternative 2** eases interpretation and is easier and more consistent for fishermen and enforcement, while accomplishing the BDTRT's intent under **Alternative 3**. Therefore, a positive or no effect on the social environment is expected from **Preferred Alternative 2** when compared to the no action and **Alternative 3**.

Effects to the social environment may occur from **Alternative 4**. This alternative removes the definition of nearshore and offshore pound net leaders and requires all pound nets in the proposed action area to use modified leaders. The same potential negative effects for fishermen under **Preferred Alternative 2** and **Alternative 3** may occur if a nearshore net is required to use a modified leader. However, potential beneficial effects may occur by offering a precautionary approach to conservation management by reducing the future potential entanglement risk of protected species. No effects are expected for nets currently meeting the offshore pound net leader definition because they are currently required to use modified leaders in the proposed action area either seasonally or year-round. Therefore, **Preferred Alternative 2** is likely more beneficial to the social environment than all alternatives.

Sub-action 4

Sub-action 4 examines changes to construction of and thus definitions of modified pound net leaders; newly defines "pound net"; requirements for fishing all components of the gear in areas of Virginia; and formally defines hard lay lines. Newly defining pound net gear and formally defining hard lay lines are not expected to cause social effects to any alternative because these are administrative actions.

There are expected negative effects on the social environment from **Alternative 1** (no action) because it maintains the current fishing requirements without requirements to fish all components of the gear at the same time, which may result in takes of protected species. Because society values a healthy ecosystem, takes of protected resources may cause lower economic benefits as discussed above. Moreover, leaving gear in the water that has bycatch and no target retention is socially undesirable.

Preferred Alternative 2 is expected to benefit the social environment. This alternative implements the BDTRT's recommendation to use the same modified pound net leader design in the no action but with the expanded prohibitions and definitions. Using the same modified pound net leader design in the no action ensures no changes to current fishing practices, finfish catch, and revenue. These gear modifications and regulations were developed in cooperation with the fishermen and other constituents and are therefore generally viewed in good favor with the fishing community. Implementing these regulations also allows fishermen to continue their livelihood largely unaffected with little to no changes in fishing operations. The portion of **sub-action 4** that requires all parts of the pound net be fished at the same time is also expected to be beneficial because all three parts of the net are needed to actively catch fish. Therefore, this likely helps fishermen maximize their ability to harvest fish and revenues. Leaving only portions of the net in water that is not actively fishing, poses an entanglement risk to protected species and may cause increased damage and fouling to the gear compared to the no action.

Social effects are expected under both **Alternatives 3** and **4**. Both alternatives propose changes to the requirements for constructing modified leaders compared to the no action and **Preferred Alternative 2** but with the same prohibitions and definitions in the **Preferred Alternative 2**. Gear modification changes are expected to both negatively and positively affect the social environment. Affects to fishermen occur by changing the gear configuration, which may cause additional costs of building a new modified leader and affect current fishing practices. Affects to catch and revenue may also occur because the proposed modified leader designs in both

Alternatives 3 and **4** were not previously studied. **Alternative 3** allows more mesh in the water column, which is closer to a traditional leader design and is therefore expected to fish more like a traditional leader. Prior research compared catch of offshore nets using either traditional leaders or the modified pound net leader design under the no action and **Preferred Alterative 2**. The modified leader design did not significantly affect finfish catch when compared to traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011). Therefore, catch is expected to be the same for the no action, **Preferred Alternative** 2, and **Alternative 3** with no potential adverse effects on catch and thus revenue. **Alternative 4** removes the mesh entirely and allows only vertical lines. The mesh is thought to help the fish detect the net and turn them toward the heart and pound ends of the net where they are caught. It is, therefore, expected to result in lower finfish catch and thus revenue for fishermen. Conversely, **Alternative 4** offers beneficial effects on the social environment by offering the most conservation oriented approach to reducing risk of protected species entanglement when compared to all alternatives under **sub-action 4**. Whereas, **Alternative 3** negatively affects the social environment because it allows more mesh in the water column, which increases entanglement risk to protected species and reduces conservation benefits.

The portion of **sub-action 4** that requires all parts of the pound net be fished at the same time is expected to be beneficial, however, and in the same manner as the **Preferred Alternative 2**. Therefore, **Preferred Alternative 2** is expected to be more beneficial to the social environment than all alternatives.

5.1.4 Direct and Indirect Effects on the Administrative Environment

Implementing proposed gear modifications and related definitions to help reduce protected species interactions with pound nets is an administrative function and is expected to directly affect this environment. These modifications must be explained, evaluated, and codified under the appropriate authority. While implementing the preferred alternatives in **Action 1** may place an initial burden on the administrative environment, the long-term effects are expected to be more beneficial than the status quo.

Sub-action 1
Alternative 1 (no action) may negatively affect the administrative environment. The no action contains multiple regulated areas with differing requirements under state and federal authorities. This may be difficult for all parties to interpret and understand, which affects the ability to effectively implement and manage requirements.

Beneficial effects to the administrative environment are expected under **Preferred Alternative 2**. This alternative combines regulated waters that are managed separately in the no action into one regulated area. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process, and additional outreach to stakeholders on the new regulated area. The long-term effects, however, are expected to be beneficial because of greater ease in implementing and managing the area.

Negative effects to the administrative environment are likely under **Alternative 3**. This alternative expands the geographic scope of the proposed action area to areas that currently do not require the use of modified leaders either seasonally or year-round. Expanding the scope of

the regulations places additional burden on the administrative environment through the rulemaking process and requires additional outreach to fishermen. It also requires enforcement of a larger geographic area. Therefore, **Preferred Alternative 2** is likely more beneficial to the administrative environment than all alternatives.

Sub-action 2
Alternative 1 (no action) may negatively affect the administrative environment for the same reasons identified in **sub-action 1**. Additional negative effects may occur in enforcing the regulations because gear modifications are required at different times of the year for different regulated areas. This may cause enforcement to be more cumbersome and confusing.

Beneficial effects to the administrative environment are expected under **Preferred Alternative 2**. This alternative requires the year-round use of modified leaders in the proposed action area. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process and additional outreach to stakeholders on the new regulated area. The long-term effects, however, are expected to be beneficial because of greater ease in implementing and managing the area. A year-round requirement is likely the most beneficial. The regulations are easier to interpret, implement, and enforce. This ultimately makes implementation of the regulations more effective at meeting their intended goal.

Negative effects to the administrative environment are expected under **Alternative 3**. This alternative requires using modified leaders seasonally from May 1-September 30. Developing the regulations for this timeframe likely causes a short-term burden on the administrative environment. However, enforcing the regulations may be more burdensome than **Preferred Alternative 2**. While only a minor inconvenience, enforcement officers will likely need to periodically recheck the modified leader use requirement dates as opposed to knowing a regulation is implemented year-round. Therefore, P**referred Alternative 2** is likely more beneficial to the administrative environment than all alternatives.

Sub-action 3
Negative effects to the administrative environment may continue to occur under **Alternative 1** (no action). The current definitions of offshore and nearshore net leaders are more complicated than the **Preferred Alternative 2** and **Alternative 3**. Negative effects may occur because these may be overly cumbersome for fishermen and enforcement in comparison to the other alternatives.

Beneficial effects to the administrative environment are expected from **Preferred Alternative 2**. This alternative requires offshore pound nets to use modified leaders and revises the definitions of offshore and nearshore pound net leader from the no action. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. However, long-term beneficial effects are expected because revising the no action definitions for offshore and nearshore pound nets make it easier and more consistent for fishermen and enforcement. This ultimately makes implementation of the regulations more effective at meeting their intended goal.

Negative to no effects to the administrative environment may occur under **Alternative 3**. It requires offshore pound nets to use modified leaders and revises the definitions of offshore and nearshore pound net leaders from both the no action and **Preferred Alternative 2**. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. Similar to **Preferred Alternative 2**, definition revisions under **Alternative 3** ensure traditional pound net leaders do not extend into deeper waters, benefitting protected species. However, the revised definition is still more complicated and overly cumbersome for fishermen and enforcement when compared to the **Preferred Alternative 2** but likely less so compared to the no action.

Beneficial effects to the administrative environment are expected under **Alternative 4**. It removes the definitions for nearshore and offshore pound net leaders and requires all nets to use modified leaders. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. However, the long-term effects are likely the most beneficial when compared to all alternatives because it simplifies requirements, implementation, and enforcement. While this alternative is the least burdensome to the administrative environment in the long-term, no effects to the biological environment are expected and negative consequences to the economic environment are likely.

Sub-action 4

Sub-action 4 examines changes to construction of and thus definitions of modified pound net leaders; newly defines "pound net"; requirements for fishing all components of the gear in areas of Virginia; and formally defines hard lay lines.

No effects on the administrative environment are expected under **Alternative 1** (no action). The no action maintains the current modified leader construction and does not change or add any related definitions and prohibitions. Therefore, a rulemaking process is not needed and no changes in implementation or enforcement are required.

Effects to the administrative environment are expected under **Preferred Alternative 2**. This alternative maintains the same modified leader construction requirements as the no action but clarifies a portion of its definition. It also newly defines related terms and requires all parts of the pound net to fish at the same time. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. Requiring all parts of the pound net to be fished at the same time may also cause negative effects from additional enforcement needs and outreach to the fishermen on requirements. However, clarifying the modified leader definition and newly defining related terms may ultimately benefit the administrative environment. Clarifying and defining terms related to proposed gear restrictions helps in the implementation, compliance, and enforcement of the requirements. This helps make the regulations more effective in meeting their intended purpose.

Effects to the administrative environment are expected under both **Alternatives 3** and **4**. Both alternatives change the construction of modified leader from the no action, newly define related terms, and require all parts of the pound net to fish at the same time. Newly defining terms and requiring all parts of the pound net to fish at the same time likely causes the same effects on the administrative environment as under the **Preferred Alternative 2**. However, changing how

modified leaders are constructed from the no action and **Preferred Alternative 2** may cause negative economic effects. A change to gear construction also requires additional outreach and training to fishermen and enforcement on gear construction. **Preferred alternative 2** is, therefore, expected to be the most beneficial to the administrative environment compared to all alternatives.

5.2 Action 2. Modify enforcement and education program to establish a different means of facilitating compliance with Virginia pound net gear requirements

5.2.1 Direct and Indirect Effects on the Physical, Biological, and Ecological Environment

The purpose of **Action 2** is to facilitate compliance with the regulations in **Action 1**. No direct or indirect effects on the physical environment are expected from all alternatives under **Action 2** because they are not changing the gear or the fishing methods so as to alter their effects on the water column or benthic habitat. Effects on the biological and ecological environment are expected from all of the alternatives, however.

Both **Alternative 1** (no action) and **Preferred Alternative 2** likely benefit the biological and ecological environment indirectly. The no action maintains the current land-based inspection program for modified pound net leaders. This alternative requires any fisherman planning to set or fish with a modified pound net leader in PNRA I or II at any time from May 6 through July 15 to: (1) contact NMFS within 72 hours of deployment to set up an inspection; and (2) make their leader available for inspection and tagging by NMFS. **Preferred Alternative 2** removes the current inspection program and replaces it with both an education program and collaborative on-water enforcement of modified pound net leaders. Both the no action and **Preferred Alternative 2** help facilitate compliance with regulations. Facilitating compliance increases the likelihood of the regulations reducing protected species interactions with the gear, thus indirectly benefitting the biological and ecological environment.

Potential negative effects on the biological and ecological environment may occur from **Alternative 3**. **Alternative 3** removes the inspection program under the no action without replacing it with education and/or collaborative on-water enforcement. Traditional enforcement will still occur as it does for all regulations. However, the collaborative on-water enforcement meant to target aspects of the pound net gear fished in Virginia to ensure it meets the definition of a modified pound net leader would not occur. This minimizes the burden on NMFS and the Virginia pound net industry compared to the no action and **Preferred Alternative 2**. However, there will be no assurance the gear is properly configured. This may negatively impact protected species conservation if gear is not in compliance with regulations.

5.2.2 Direct and Indirect Effects on the Economic Environment

Negative economic effects may continue to occur under **Alternative 1** (no action). The inspection program requires NMFS to provide resources and staff time to inspect nets on an annual basis. Additionally, fishermen cannot deploy their gear until the inspection is

successfully completed. Although unlikely, this could delay them from fishing, which may create an economic burden on the fishermen.

Short-term positive economic effects may occur under **Preferred Alternative 2**. This alternative removes the inspection program under the no action and replaces it with an educational program and collaborative on-water enforcement. The educational program requires fishermen setting modified leaders in the proposed action area to attend a one-time compliance training. After a fisherman completes the one-time training, gear can be deployed at the fisherman's discretion. This likely removes any potential economic burden on the fishermen from not being able to deploy gear until the inspection is successfully completed compared to the no action. NMFS will incur initial costs to conduct the compliance training and enforcement, but it will likely not be an annualized cost compared to the no action. The collaborative on-water enforcement provides opportunities for the most efficient use of state and federal resources and expertise to check compliance with gear requirements.

Economic effects are expected to be beneficial under **Alternative 3**. This alternative removes the inspection program under the no action but does not replace it with education and/or collaborative on-water enforcement. Removing the program likely reduces any potential costs to NMFS and fishermen when compared to the no action and **Preferred Alternative** 2. However, no provisions exist to ensure modified leaders are used and built to the proper specification, which will likely cause reduced compliance. Collaborative on-water enforcement without an educational compliance program may also be insufficient to ensure compliance. Therefore, removing the inspection program without replacing it with education and collaborative on-water enforcement is likely less effective and the full benefits of expanded gear requirements to achieve the purpose of **Action 1** may not be realized.

5.2.3 Direct and Indirect Effects on the Social Environment

Social effects are consequences to human populations of any action that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. All alternatives under **Action 2** are expected to affect the social environment.

In general, the social effects of the proposed actions and alternatives are expected to mirror, in direction and magnitude, the expected economic effects discussed in section 5.2.2. Any alternative expected to result in decreased compliance is also expected to result in decreased social benefits to affected fishermen and associated businesses and communities. Similarly, society values a protected and healthy bottlenose dolphin and sea turtle population. Therefore, the social benefit associated with these protected species is expected to increase or decrease equal to the expected changes in conservation of these species under the respective alternatives considered. Although some of the proposed actions and alternatives may result in short-term increased costs or reduced revenue, the enhanced protection of protected species is expected to result in a net increase in social and economic benefits to society in the long term.

Negative effects to the social environment may occur under **Alternative 1** (no action). The inspection program requires scheduling a time for the inspection that works for both the fishermen and NMFS. The fishermen must also successfully pass the inspection before they can

deploy their gear. This could delay fishermen from deploying their gear sooner, which may alter their ability to work and negatively affect the social environment. However, the inspection program's purpose is to ensure the gear is in compliance with requirements to benefit protected species, which also increases societal benefits.

Potential beneficial effects to the social environment are likely under **Preferred Alternative 2**. This alternative removes the inspection program in the no action and replaces it with an educational program and collaborative on-water enforcement. While attending the one-time education training may initially be burdensome to fishermen in the short-term, it alleviates the long-term burden of yearly inspections. The on-water enforcement is non-intrusive to compliant fishermen and fishing activity, which benefits the social environment relative to the no action while ensuring gear is properly configured. Ensuring the gear is in compliance with requirements benefits protected species, which also increases societal benefits.

Effects to the social environment may occur under **Alternative 3**. This alternative removes the inspection program under the no action without replacing it with education and/or collaborative enforcement. Therefore, there will be no assurance the gear is properly constructed and in compliance with requirements. This could negatively affect the social environment. Removing the inspection program without replacing it with education and collaborative on-water enforcement is likely less effective and the full benefits of expanded gear requirements to achieve the purpose of **Action 1** may not be realized. Improperly constructed and deployed gear likely causes an increased risk of interaction with protected species. Increased interactions could lead to further, and possibly more severe, regulations in the future. This may ultimately affect the fishermen's livelihood compared to the no action and **Preferred Alternative 2**. Conversely, potential short-term positive effects may occur, as the fishermen may have the perception that compliance with gear requirements is no longer necessary.

5.2.4 Direct and Indirect Effects on the Administrative Environment

All alternatives under **Action 2** are expected to affect the administrative environment.

Alternative 1 (no action) places a considerable long-term burden on the administrative environment. The inspection program requires NMFS resources and staff time to plan and conduct. Regulations under the ESA currently require an inspection of the modified leader for any fisherman planning to set or fish with a modified pound net leader in PNRA I or II at any time from May 6 through July 15. Per state regulations, up to 161 pound net licenses are available in PNRA I and II, which are issued per pound net location. Therefore, if all or even half of these pound net licenses are issued and fishermen set pound nets using modified pound net leaders, they need to be inspected. This may require driving long distances and significant time to conduct all requested inspections, placing a large annual burden on time and resources needed to carry out any requested inspections.

Preferred Alternative 2 likely causes a short-term burden to the administrative environment. This alternative removes the inspection program and replaces it with an educational training and collaborative on-water enforcement. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. Despite this initial

burden, **Preferred Alternative 2** is expected to reduce the burden in the long-term compared to the no action. Planning and conducting the compliance trainings will take staff time and resources, as well as developing related outreach and educational materials. Fishermen using modified leaders in the proposed action area will only need to take the educational compliance training one-time under the **Preferred Alternative 2**. Initial trainings conducted by NMFS staff will likely include many of the fishermen currently using pound nets in the proposed action area, reducing the need for annual trainings. Any long-term burden will likely be limited to new entrants to the fishery. The on-water enforcement portion of **Preferred Alternative 2** may also be an additional burden to the administrative environment initially. However, the collaborative nature of the enforcement includes state law enforcement. This will likely reduce the administrative burden over time as it does not rely only on federal enforcement time and resources.

Alternative 3 removes the inspection program, but does not replace it with anything to facilitate compliance with the regulations. Implementing these changes likely causes a short-term burden on the administrative environment through the rulemaking process. Although removing the inspection program without replacing it with other compliance measures likely reduces any potential short or long-term burdens on the administrative environment compared to the no action and **Preferred Alternative 2**. However, this may change if compliance is reduced. Improperly constructed and deployed gear may cause an increased risk of interacting with protected species. Increased interactions could lead to further, and possibly more severe, regulations in the future and increased burden on the administrative environment. Therefore, **Preferred Alternative 2** is likely more beneficial to the administrative environment in the long-term than all alternatives.

5.3 Cumulative Effects

As directed by NEPA, federal agencies are mandated to assess the indirect and direct impacts, as well as the cumulative impacts, from a proposed action. NEPA defines a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7). They can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects. The analysis of impacts focuses on the proposed action area described in section 3.0, which is the Virginia mainstem waters of the Chesapeake Bay and coastal state waters.

Past regulatory actions affecting bottlenose dolphins, sea turtles, and the Virginia pound net fishery are detailed in sections 1.0 and 4.0. As described in section 1.2, there are existing regulations under the ESA and by the state of Virginia related to the Virginia pound net fishery and protected species interactions. The proposed actions described in section 4.0 in this EA are consistent with these existing regulations. Therefore, the other regulatory actions affecting the resources, ecosystems, and human communities identified in this EA add no additional cumulative impacts. Furthermore, the cumulative effects on the human communities may also be slightly reduced because of the proposed removal of the annual Virginia pound net inspection

program and proposed addition of a one-time education and compliance training. However, the effects of the proposed action are, and will continue to be, monitored through collection of data and information by NMFS, states, observer programs, stranding networks, stock assessments, life history studies, and other scientific observations.

Cumulative Effects on Bottlenose Dolphins

Section 1.0 describes some actions that cause serious injuries or mortalities to bottlenose dolphins, establishing the baseline. Below are additional past and present actions that are likely to continue to affect bottlenose dolphins in the foreseeable future.

Fishery interactions

The three stocks of bottlenose dolphins affected by this proposed action also interact with several other fisheries. These gear types include gillnets, trap/pot gear, beach seines, trawls, and hook and line fisheries. The BDTRP includes and considers all of these fisheries because of these documented interactions, except the recreational hook and line fishery. As discussed in section 1.1, gillnets are known significant contributors to estimated serious injury and mortality for these bottlenose dolphin stocks. Regulations currently exist under the BDTRP for various gillnet fisheries along the Atlantic Coast of the U.S. to reduce serious injury and mortality. Non-regulatory gear modifications are also included in the BDTRP to help reduce dolphin interactions with blue crab pot/trap gear. Future regulations in the BDTRP for other fisheries interacting with strategic stocks of bottlenose dolphins along the Atlantic coast of the U.S. may be considered to further reduce documented interactions with dolphins.

Vessel operations

Harassment to bottlenose dolphins by recreational and commercial boats and boat strikes are possible in estuarine and coastal habits. There are currently no documented strandings indicating boat strikes for the three bottlenose dolphin stocks affected by this proposed action (Waring *et al*. 2012).

Oil and gas exploration

The Bureau of Ocean Energy and Management (BOEM) released a Draft Environmental Impact Statement (DEIS) on March 30, 2012 (77 FR 19321). The DEIS evaluates potential environmental effects of multiple geological and geophysical activities in the Mid- and South Atlantic Planning areas of the Outer Continental Shelf. Within the DEIS, BOEM identified events associated with these activities that may impact marine mammals, including bottlenose dolphins. The routine events that may impact marine mammals during oil and gas exploration include: (1) active acoustic sound sources (i.e., airguns; electromechanical sources including boomer and chirp subbottom profilers, multibeam depth sounders, and side-scan sonars); (2) vessel and equipment noise; (3) vessel traffic (i.e., physical disturbance to and risk of collisions with marine mammals); (4) aircraft traffic and noise; and (5) trash and debris (i.e., potential for entanglement and ingestion).

The effects analysis as it relates to marine mammals, including bottlenose dolphins, in BOEM's Programmatic DEIS is incorporated here by reference. For a complete review of the potential impacts from oil and gas exploration, please see Section 4 of the Programmatic DEIS (http://www.boem.gov/oil-and-gas-energy-program/GOMR/GandG.aspx).

Marine pollution and water quality issues
The coastal and estuarine habitats of the three bottlenose dolphin stocks affected by this proposed action are near areas of high human population, some of which are very industrialized. The NMFS stock assessment reports for these three dolphin stocks document studies showing high concentrations of persistent organic pollutants in the dolphin's blubber (Waring *et al*. 2012). Although some of these toxic values may cause adverse effects on health or reproductive rates, there are currently no direct measurements of adverse effects of pollutants on estuarine dolphins and few studies of pollutant loads on migratory dolphins (Waring *et al*. 2012). Active research is ongoing to determine potential population health effects from exposure to environmental contaminants (Waring *et al*. 2012).

Climate change
Climate change will likely impact the marine and estuarine environment through numerous direct and indirect effects. However, the uncertainties about the nature and degree of climate change make it impossible to know exactly when and how these effects will occur. When effects of climate change do begin to cause significant environmental and ecological changes, species will either face extinction or adapt in one of two ways: (1) change distribution; or (2) remain in home range and adapt to the changing environment through behavior modifications or genetic response (IPCC 2001).

For bottlenose dolphins, the most likely significant impacts from climate change will be indirect through changes in prey availability and distribution. These prey changes will lead to changes in dolphin community structure, migration and abundance patterns, and targeted prey species (Learmonth *et al*. 2006, Simmonds and Isaac 2007). Climate change effects to ocean circulation, water temperatures, and availability of planktonic food will likely cause significant variations in fish recruitment (Walther *et al*. 2002, Learmonth *et al.* 2006). Changes in fish recruitment will change the dynamics of food webs and likely affect marine mammal prey species (Walther et al. 2002, Learmonth et al 2006). To account for these changes, its predicted dolphins will expand their range or enhance foraging by feeding on other less desirable prey species (Learmonth *et al.* 2006, Simmonds and Isaac 2007). These adaptations also cause other potential impacts, such as "competitive exclusion" of other species or competition with other predators (Learmonth *et al*. 2006).

Bottlenose dolphin calf survival rate may also decrease from climate change. Calves are less tolerant of changes in water temperature (Learmonth *et al.* 2006). Furthermore, environmental changes may cause the timing of calf birth to become disconnected from the timing of greatest prey abundance (Learmonth *et al.* 2006, Simmonds and Elliot 2009). Reduced prey or changes in prey species or location could lead to a decrease in lactation by nursing females, causing further declines in calf survival rates (Simmonds and Elliott 2009).

Climate change will cause changes in weather patterns including increased rainfall. Increased rainfall means increases in runoff from rivers and land. This may lead to an increased frequency of toxic algal blooms and pollutant exposure for coastal and estuarine dolphins (Learmonth *et al.* 2006).

Overall, the ability of bottlenose dolphins to adapt to the indirect effects of climate change is largely unknown. This is because environmental conditions are changing at an unusually fast rate (Learmonth *et al*. 2006, Simmonds and Isaac 2007, Simmonds and Elliott 2009).

Cumulative Effects on ESA-listed Species

There are documented takes of listed sea turtles in the Virginia pound net fishery. Cumulative effects to these listed turtles were detailed in Final Environmental Assessment and Regulatory Impact Review, Regulatory Flexibility Analysis of Sea Turtle Conservation Measures for the Pound Net Fishery in Virginia Waters of the Chesapeake Bay (NMFS 2006). This is incorporated here by reference and can be found at:
http://www.nero.noaa.gov/prot_res/seaturtles/doc/FINAL%20EA%20web.pdf
The preferred alternatives to implement additional gear requirements for the Virginia pound net fishery are expected to benefit listed sea turtles by decreasing the likelihood of interacting with the gear.

There are no documented takes of Atlantic or shortnose sturgeon in the Virginia pound net fishery. However, if there are undocumented takes, beneficial effects on these and other marine species may occur from the preferred alternatives in section 3.0. The preferred alternatives implement gear restrictions known to decrease interactions of bottlenose dolphins and sea turtles, while maintaining catch of targeted finfish species. Shortnose sturgeon can grow up to 6 feet (1.8 m) and weigh 55 pounds, while Atlantic sturgeon can grow to 14 feet (4.3 m) and weigh up to 800 pounds. Based on their size and the design of the modified pound net leader, the proposed gear requirements are also expected to benefit both species by decreasing the likelihood of interactions with the gear.

There are many other fisheries beside the Virginia pound net fishery that may impact listed fish and marine species within the Atlantic Ocean. Some listed fish species may be especially vulnerable to incremental effects due to constricting habitat availability. However, it is expected that the preferred alternatives considered in this EA would be beneficial in light of cumulative effects and mitigate other actions in the region impacting these species as discussed in section 5.0.

Cumulative Effects on EFH

EFH is in the area of the proposed action. Therefore, an EFH consultation was conducted on January 16, 2013. No further assessment was necessary because this proposed action is extending current fishing practices already in place seasonally or year-round in the action area. Since any direct or indirect impacts to EFH under the preferred alternative are expected to be minimal and temporary, significant cumulative effects on habitat are unlikely.

*Cumulative Effects on the Catch of the Virginia Pound Net Fi*shery

Section 4.2.2 provides a summary of the landings of the Virginia pound net fishery. Section 5.0 discusses the expected economic effects of the proposed action. Under the preferred alternatives and relative to 2010 landings and revenues, revenues for affected fishermen in the pound net fishery are not expected to be reduced. Negative cumulative effects on the pound net fishery are therefore unlikely.

6.0 Regulatory Impact Review (RIR)

6.1 Introduction

NMFS requires a RIR for all regulatory actions that are of public interest. The RIR does three things: (1) Provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; (2) provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and, (3) ensures the regulatory agency systematically and comprehensively considers all available alternatives so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the proposed regulations are a "significant regulatory action" under the criteria provided in Executive Order (E.O.) 12866 and provides some information that may be used in conducting an analysis of impacts on small business entities pursuant to the Regulatory Flexibility Act.

6.2 Problems and Objectives

The problems and objectives addressed by this proposed action are discussed in Sections 1 and 2 of this document.

6.3 Description of the Fishery

A description of the Virginia pound net fishery is provided in Section 1.1 of this document.

6.4 Impacts of Management Measures

A detailed analysis of the expected economic impacts of all alternatives considered for this action is in section 5.0. The following information summarizes the expected economic effects of the proposed alternatives.

This proposed rule contains two actions with related sub-actions and alternatives. The first action requires the year-round use of modified pound net leaders for offshore pound nets fished within the proposed BDPNRA. This action also includes revisions to existing pound net-related definitions and adds new definitions and related gear prohibitions. The second action implements an education and collaborative on-water enforcement program for measures proposed in the first action. The second action is administrative in nature, and therefore, would not be expected to result in any economic impacts.

The proposed revision to the pound net requirements, if implemented, is expected to result in continued normal fishing practices, harvests, prices, and revenues. This proposed action is not expected to result in any change in the economic performance of the fishery because of existing Federal and state regulations requiring the seasonal and year-round use of modified pound net leaders in areas of the proposed BDPNRA. Even though the proposed action requires the year-round use of modified pound net leaders in the entire proposed BDPNRA, which would be more restrictive than current requirements, no economic effects on fishermen are expected. In response to current requirements, fishermen are expected to already use modified leaders for the

entire fishing season when fishing with pound net gear in these areas even if not required, for two main reasons: (1) research on the catch efficiency of modified pound net leaders within the proposed BDPNRA showed no significant differences in harvest weight for the species analyzed when compared to using traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011); and (2) the costs associated with maintaining two types of leaders and switching the gear when modified leaders are not required would not make rational economic sense given the absence of improvements in catch efficiency. In summary, no economic impacts are expected to result from the proposed action.

6.5 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources that can be expressed as costs associated with the regulations. Costs associated with this specific action include:

NOAA Fisheries Service administrative costs of document preparation, meetings, and review …….$136,081

Federal management costs through education and enforcement…….$60,000

TOTAL……..…….$196,081

The federal costs of document preparation are based on staff time, travel, printing, and any other relevant items where funds were expended directly for this specific action. Implementing an education and collaborative on-water enforcement program will require some initial costs to conduct the compliance training and enforcement, but these will not be annualized costs. Quantitative estimates to conduct the educational trainings are not currently available but will include staff time and travel. The costs included are those directly expended for collaborative on-water enforcement to date. Although some increased enforcement costs are expected, quantitative estimates are not available at this time.

6.6 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is likely to result in: (1) An annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order. This proposed action was determined to not be economically significant for purposes of E.O. 12866 based on the information provided above.

7.0 Regulatory Flexibility Analysis

7.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency and the public of the expected economic impacts of various alternatives in the proposed amendment and ensure the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the amendment and applicable statutes.

The RFA requires agencies to conduct a Regulatory Flexibility Act Analysis (RFAA) for each proposed rule. The RFAA is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. An RFAA is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." The RFAA provides: (1) A description of the reasons why action by the agency is being considered; (2) a succinct statement of the objectives of, and legal basis for, the proposed rule; (3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; (4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; (5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule; (6) a description and estimate of the expected economic impacts on small entities; and (7) an explanation of the criteria used to evaluate whether the rule would impose "significant economic impacts".

7.2 Statement of the need for, objective of, and legal basis for the rule

The problems and objective of this proposed action are provided in sections 1 and 2. In summary, the objectives of this proposed rule are to: (1) amend the BDTRP under the MMPA to reduce serious injury and mortality of strategic stocks of bottlenose dolphins from unsustainable interactions with the Virginia pound net fishery; and (2) amend sea turtle conservation regulations in the ESA related to the Virginia pound net fishery for consistency. The MMPA and ESA provide the statutory basis for this proposed action.

7.3 Description and estimate of the number of small entities to which the proposed action would apply

This proposed action would be expected to directly affect fishermen who use pound nets in the proposed BDPNRA (i.e., the proposed action area described in section 3). In 2010, Virginia sold 41 licenses to 16 entities who fished with pound nets within the proposed BDPNRA. The average annual dockside revenue from all fishing activities for these entities in 2010 was approximately $126,557.25 (2010 dollars). More recent data are not available.

No other entities that would be expected to be directly affected by this proposed rule have been identified.

The Small Business Administration (SBA) has established size criteria for all major industry sectors in the U.S. including fish harvesters. A business involved in fish harvesting is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $19.0 million (NAICS code 114111, Finfish Fishing) for all its affiliated operations worldwide. This receipts threshold is the result of a final rule issued by the SBA on June 20, 2013, that increased the size standard for the Finfish Fishing from $4.0 to $19.0 million (78 FR 37398). The new threshold became effective July 22, 2013. Based on the average revenue estimates provided above, all entities expected to be directly affected by this proposed rule are determined for the purpose of this analysis to be small business entities.

7.4 Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records

This proposed rule would remove existing documentation and reporting provisions associated with the current annual gear inspection requirements. The proposed rule would replace these requirements with a proposed one-time educational compliance training. This educational compliance training does not include any reporting or record-keeping requirements and, as a result, would reduce the overall burden associated with these tasks on the fishermen expected to be directly affected by this proposed rule. Otherwise, this proposed rule would simply expand the circumstances under which fishermen would have to use a specific type of leader when using pound nets in the proposed action area. All affected fishermen are expected to currently have experience using this type of leader and this experience is consistent with the professional skill necessary for the use of pound nets. As a result, no change in the professional skills necessary to meet this compliance requirement would be expected. This proposed action would not establish any other new reporting, record-keeping, or other compliance requirements.

7.5 Identification of all relevant federal rules, which may duplicate, overlap or conflict with the proposed rule

As discussed in sections 1.2 and 3.0 of the EA, this proposed rule would result in duplicative and overlapping regulations for fishermen using pound nets in a portion of the proposed action area. This duplication and overlap would result from current restrictions promulgated under a separate regulatory authority. In essence, this proposed rule would expand the area and

timeframe currently subject to restrictions on the use of pound nets in which the regulations would apply. Both the current regulations and the regulations proposed by this rule would be established under NOAA's own authority, and this proposed rule has been carefully developed to create consistency with the current regulations. As a result, no conflicting or duplicative burden has been identified that would result from this duplication and overlap. No other duplicative, overlapping, or conflicting federal rules have been identified.

7.6 Significance of economic impacts on a substantial number of small entities

Substantial number criterion

As previously discussed, this proposed action would be expected to directly affect approximately 16 entities who fish with pound net gear within the proposed BDPNRA, if implemented. Within the Virginia waters of the mainstem Chesapeake Bay, a pound net license is required to use pound nets. In 2010, Virginia sold 41 licenses to 16 entities who fished with pound nets within the proposed BDPNRA. Excluding oysters, clams, and shellfish licenses, over 3,000 commercial fishing licenses were sold to Virginia commercial fishermen in 2010. Therefore, this proposed action would be expected to affect less than one percent of commercial fishermen in Virginia and, as a result, would not be expected to affect a significant number of small entities.

Significant economic impacts

The outcome of "significant economic impact" can be ascertained by examining two factors: disproportionality and profitability.

Disproportionality: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities expected to be directly affected by the measures in this proposed action are determined for the purpose of this analysis to be small business entities, so the issue of disproportionality does not arise.

Profitability: Do the regulations significantly reduce profits for a substantial number of small entities?

A discussion of the expected economic effects of the different actions and all alternatives considered for this proposed action is provided in section 5. This proposed rulemaking contains two actions. Action 1 requires the year-round use of modified pound net leaders for offshore pound nets fished within the proposed BDPNRA, revises the pound net definitions, and adds new gear prohibitions. Action 2 implements an outreach and enforcement program for measures proposed in the first action. Action 2 is an administrative action with no anticipated effects economics on the affected fishermen.

The proposed changes to the pound net leader requirements would be expected to result in continued normal fishing practices, harvests, prices, and revenues. Even though the proposed

action requires the year-round use of modified pound net leaders in the entire proposed BDPNRA, which would be more restrictive than current requirements, no economic effects on fishermen are expected. In response to current requirements, fishermen are expected to already use modified leaders for the entire fishing season when fishing with pound net gear in these areas even if not required, for two main reasons: (1) research on the catch efficiency of modified pound net leaders within the proposed BDPNRA showed no significant differences in harvest weight for the species analyzed when compared to using traditional leaders (Silva *et al*. 2011; Swingle *et al*. 2011); and (2) the costs associated with maintaining two types of leaders and switching the gear when modified leaders are not required would not make rational economic sense given the absence of improvements in catch efficiency. Traditional leaders installed on offshore nets cost $5,418 to make and install/remove. Maintaining and using both types of leaders (i.e., traditional and modified) would require expenditure of this cost, in addition to the cost of making a modified leader, as well as labor costs of switching leaders. If harvest and revenue is not increased by switching to the traditional leader, as demonstrated by available research, then bearing these additional gear and labor costs would be unjustified. Thus, even though this proposed action would change the pound net leader requirements, all fishermen who would be potentially affected are expected to currently use modified leaders when using pound nets in the area and time specified by this proposed action. Therefore, no economic impacts are expected to result from the proposed action.

7.7 Description of the significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities

This proposed action, if implemented, would not be expected to have any economic effect on the associated business entities. As a result, the issue of significant alternatives is not relevant.

8.0 Other Applicable Laws

Marine Mammal Protection Act (MMPA)
NMFS determined this action is consistent with the requirements of the MMPA. NMFS is taking this action to reduce risk of serious injury and mortality of strategic stocks of bottlenose dolphins in Virginia pound nets. The continued conservation provided by the proposed action will further NMFS' ability to accomplish the short- and long-term goals of the BDTRP, as required under section 118 of the MMPA.

Regulatory Flexibility Act (RFA), E.O. 12866, and Congressional Review Act
This proposed rule will not have a significant economic impact on a substantial number of small entities because: (1) it is expected to affect less than one percent of commercial fishermen in Virginia; and (2) all fishermen who would be potentially affected are expected to currently use modified leaders when using offshore pound nets in the area and time specified by this proposed rule.

E.O. 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are likely to be "significant". Pursuant to the procedures established to implement section 6 of E.O. 12866, OMB determined this action is not significant.

The Small Business Regulatory Enforcement Fairness Act of 1996 added Chapter 8 to Title 5, United States Code, to provide for congressional review, and potential disapproval, of agency rulemaking. Agencies are required to certify to OMB whether actions are "major" for purposes of these provisions, which may delay publication of rules. This action was determined as "not major" for purposes of 5 U.S.C. 801 et seq because it does not meet the significance thresholds.

Endangered Species Act (ESA)

The ESA requires all federal agencies to ensure agency actions do not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the Critical Habitat of such species. The "action" agency must consult with the "expert" agency to evaluate potential effects on listed species from the proposed agency action. Formal consultation is not required if the expert agency concurs with the action agency's determination that the proposed action is "not likely to adversely affect" listed species. If new information shows additional effects to listed species or their Critical Habitat in a manner or extent not previously considered, NMFS must reinitiate consultation under the ESA.

Two Section 7 analyses were conducted for the proposed action. The first was an ESA Section 7 analysis on the effects of the BDTRP and the modifications to the Plan via this proposed action. The second analysis was an ESA section 7(a)(2) analysis on the continued authorization of the Virginia pound net fishery. The Section 7 analysis of the BDTRP and the modifications proposed in this action concluded that the BDTRP may affect, but not likely adversely affect threatened or endangered species. The Section 7(a)(2) analysis on the continued authorization of the Virginia pound net fishery concluded that this action is not likely to jeopardize threatened and endangered species. Additionally, a Section 7(d) analysis found no irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2). Furthermore, the only impacts are likely to be beneficial to listed species because the proposed action requires the year-round use of beneficial gear modifications rather than the current seasonal use.

Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the CZMA requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. NMFS determined this action is consistent, to the maximum extent practicable, with the enforceable policies of the Virginia Coastal Zone Management Program. This determination will be submitted for review with the proposed rule and Environmental Assessment by the responsible state agencies under section 307 of the CZMA.

Paperwork Reduction Act (PRA)

The purpose of the PRA is to minimize the paperwork burden for individuals, small businesses, educational and nonprofit institutions, and other persons resulting from the collection of information by or for the federal Government. This action does not contain a collection-of-information requirement for purposes of the PRA.

Information Quality Act

A pre-dissemination review was completed for the proposed action by the Protected Resources Division of the Southeast Regional Office on February 12, 2013, which determined this information product complies with applicable information quality guidelines implementing the Information Quality Act (Section 515 of Public Law 106-554).

Essential Fish Habitat (EFH)
Pursuant to the Magnuson-Stevens Act, federal agencies must undergo a consultation process regarding any of their actions authorized, funded, or undertaken; or proposed to be authorized, funded, or undertaken that may adversely affect EFH. The area affected by the proposed rule was identified as EFH. The Greater Atlantic Regional Office's Habitat Conservation Division conducted an EFH review under the Magnuson-Stevens Act on January 16, 2013, and determined and EFH assessment is not necessary. Therefore, further coordination on this matter was not deemed necessary unless future modifications are proposed which may affect EFH.

Executive Order 13132 (Federalism)
E.O. 13132 requires that federal actions ensure for the division of governmental responsibilities between the national government and the states that was intended by the Framers of the Constitution, to ensure the principles of Federalism established by the Framers guide the executive departments and agencies in the formulation and implementation of policies, and to further the policies of the Unfunded Mandates Reform Act. This Executive Order, to the extent practicable and permitted by law, ensures no agency will promulgate any regulation with Federalism implications that imposes substantial direct compliance costs on state and local governments and is not required by statute. The proposed action contained policies with federalism implications that were sufficient to warrant preparation of a federalism summary impact statement under E.O. 13132 and a federalism consultation with officials in the state of Virginia. Accordingly, the Assistant Secretary for Legislative and Intergovernmental Affairs will provide notice of the proposed action to the appropriate officials in Virginia.

9.0 References

Adams, W.F., and C. Wilson. 1995. The status of the smalltooth sawfish, *Pristis pectinata* Latham 1794 (Pristiformes: Pristidae) in the United States. Chondros 6(4):1-5.

ASMFC. 2009. Atlantic Sturgeon. In: Atlantic Coast Diadromous Fish Habitat: A review of utilization, threats, recommendations for conservation and research needs. Habitat Management Series No. 9. Pp. 195-253.

ASSRT (Atlantic Sturgeon Status Review Team). 2007. Status review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). National Marine Fisheries Service. February 23, 2007. 188 pp.

Bain, M.B., N. Haley, D. Peterson, J. R. Waldman, and K. Arend. 2000. Harvest and habitats of Atlantic sturgeon *Acipenser oxyrinchus* Mitchill, 1815, in the Hudson River Estuary: Lessons for Sturgeon Conservation. Instituto Espanol de Oceanografia. Boletin 16:43-53.

Bellmund, S.A., J.A. Musick, R.C. Klinger, R.A. Byles, J.A. Keinath, and D.E. Barnard. 1987. Ecology of sea turtles in Virginia. Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA. 48 pp.

Bigelow, H.B., and W.C. Schroeder. 1953. Sawfishes, guitarfishes, skates and rays, pp. 1-514. *In:* Tee-Van, J., C.M Breder, A.E. Parr, W.C. Schroeder and L.P. Schultz (eds). Fishes of the Western North Atlantic, Part Two. Mem. Sears Found. Mar. Res. I.

Boreman, J. 1997. Sensitivity of North American sturgeons and paddlefish to fishing mortality. Environmental Biology of Fishes 48(1-4): 399-405.
Borodin, N. 1925. Biological observations on the Atlantic sturgeon, *Acipenser sturio.* Transactions of the American Fisheries Society 55: 184-190.

Cape Charles Planning Commission. 1999. Cape Charles, Virginia Comprehensive Plan [cited December 2008]. Available from: http://www.capecharles.org/pdf/compplan/plan99.pdf

Coastal Conservation Association Virginia. 2008. About CCA [cited December 2008]. Available from: http://www.ccavirginia.org/cca_va_html/about.html

Collins, M.R. and T.I.J. Smith. 1997. Distribution of shortnose and Atlantic sturgeons in South Carolina. North American Journal of Fisheries Management. 17: 995-1000.

Collins, M.R., T.I.J. Smith, W.C. Post, and O. Pashuk. 2000. Habitat Utilization and Biological Characteristics of Adult Atlantic Sturgeon in Two South Carolina Rivers. Transactions of the American Fisheries Society 129:982–988.

Crance, J.H. 1987. Habitat suitability index curves for anadromous fishes. In: Common Strategies of Anadromous and Catadromous Fishes, M. J. Dadswell (ed.). Bethesda, Maryland, American Fisheries Society. Symposium 1:554.

Dadswell, M. 2006. A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. Fisheries 31: 218-229.

Dadswell, M. J., B. D. Taubert, T. S. Squiers, D. Marchette, and J. Buckley. 1984. Synopsis of biological data on shortnose sturgeon, Acipenser brevirostrum LeSueur 1818. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, [Seattle, Wash.].

DeAlteris, J., D. Chosi, R. Silva, and P. Politis. 2004. Evaluation of the Performance of an Alternative Leader Design on the Bycatch of Sea Turtles and the Catch of Finfish in Chesapeake Bay Pound Nets, Offshore Kiptopeake, VA. Final Report submitted to the National Marine Fisheries Service, Northeast Fishery Science Center.

DeAlteris, J., R. Silva, E. Estey, K. Tesla, and T. Newcomb. 2005. Performance in 2005 of an Alternative Leader Design on the Bycatch of Sea Turtles and the Catch of Finfish in Chesapeake Bay Pound Nets, Offshore Kiptopeake, VA: Data and Results of Preliminary Analysis. Final Report submitted to the National Marine Fisheries Service, Northeast Fishery Science Center.

DeAlteris, J. and R. Silva. 2007. Performance in 2004 and 2005 of an Alternative Leader Design on the Bycatch of Sea Turtles and the Catch of Finfish in Chesapeake Bay Pound Nets, Offshore Kiptopeake, VA. Final Report submitted to the National Marine Fisheries Service, Northeast Fishery Science Center.

Dees, L.T. 1961. Sturgeons. United States Department of the Interior Fish and Wildlife Service, Bureau of Commercial Fisheries, Washington, D.C.

Dovel, W.L. and T.J. Berggren. 1983. Atlantic sturgeon of the Hudson River Estuary, New York. New York Fish and Game Journal 30: 140-172.

Dunton, K.J., A. Jordaan, K.A. McKown, D.O. Conover, and M.J. Frisk. 2010. Abundance and distribution of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) within the Northwest Atlantic Ocean, determined from five fishery-independent surveys. Fishery Bulletin 108:450-465.

Erickson D. L., A. Kahnle, M. J. Millard, E. A. Mora, M. Bryja, A. Higgs, J. Mohler, M. DuFour, G. Kenney, J. Sweka, and E. K. Pikitch. 2011. Use of pop-up satellite archival tags to identify oceanic-migratory patterns for adult Atlantic Sturgeon, Acipenser oxyrinchus oxyrinchus Mitchell, 1815. J. Appl. Ichthyol. 27 (2011), 356–365.

Fleming, E.H. 2001. Swimming Against the Tide: Recent surveys of exploitation, trade, and management of marine turtles in the Northern Caribbean. TRAFFIC North America. Washington, D.C.

Gilbert, C.R. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic Bight): Atlantic and shortnose sturgeons. United States Fish and Wildlife Service Biological Report-Report Number-82 (11.91).

Gloucester County. 2008. Home page [cited January 2009]. Available from http://www.gloucesterva.info/

Gooch, B. 1992. Virginia Fishing Guide. University of Virginia Press [cited December 2008]. Available from: http://books.google.com/

Grunwald, C., L. Maceda, J. Waldman, J. Stabile, I. Wirgin. 2008. Conservation of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus*: delineation of stock structure and distinct population segments. Conserv. Genet 9:1111–1124.

Guilbard, F., J. Munro, P. Dumont, D. Hatin, and R. Fortin. 2007. Feeding ecology of Atlantic sturgeon and Lake sturgeon co-occurring in the St. Lawrence Estuarine Transition Zone. American Fisheries Society Symposium. 56: 85-104.

Hamilton, S. 2009. Waterman-turned-scientist working for Bay restoration. Gloucester-Mathews Gazette-Journal, January 1, 2009 [cited January 2009]. Available from:

http://www.gazettejournal.net/articles.php?artid=1424

Hatin, D., R. Fortin, and F. Caron. 2002. Movements and aggregation areas of adult Atlantic sturgeon (*Acipenser oxyrinchus*) in the St. Lawrence River estuary, Québec, Canada. Journal of Applied Ichthyology 18: 586-594.

Holland, B.F., Jr. and G.F. Yelverton. 1973. Distribution and biological studies of anadromous fishes offshore North Carolina. Division of Commercial and Sports Fisheries, North Carolina Dept. of Natural and Economic Resources, Special Scientific Report No. 24. 130pp.

IPCC. 2001. Climate Change 2011: Impacts, Adaptation and Vulnerability. Cambridge: Cambridge University Press, 1032 pp.

King, T.L., B.A. Lubinski, and A.P. Spidle. 2001. Microsatellite DNA variation in Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and cross-species amplification in the Acipenseridae. Conservation Genetics 2: 103-119.

Kuiken, T. (ed). 1996. Diagnosis of by-catch in cetaceans: Proceedings of the second European Cetacean Society workshop on cetacean pathology, Montpellier, France, 2 March 1994. University of Saskatchewan, 52 Campus Drive, Saskatoon, SK S7N 5B4, Canada. 43 p.

Laney, R. W., J. E. Hightower, B. R. Versak, M. F. Mangold, W. W. Cole Jr., and S. E. Winslow. 2007. Distribution, habitat use, and size of Atlantic sturgeon captured during cooperative winter tagging cruises, 1988–2006. In: Anadromous sturgeons: habitats, threats, and management (J. Munro, D. Hatin, J. E. Hightower, K. McKown, K. J. Sulak, A. W. Kahnle, and F. Caron, eds.) p. 167–182. Am. Fish. Soc. Symp. 56, Bethesda, MD.

Learmonth, J.A., C.D., Macleod, M.B. Santoas, G.J. Pierce, H.Q.O. Crick, and R.A. Robinson. 2006. Potential effects of climate change on marine mammals. Oceanography and marine biology: An annual review. 44, 431-464.

Leland, J.G., III. 1968. A survey of the sturgeon fishery of South Carolina. Bears Bluff Labs. No. 47, 27 pp.

Lutcavage, M.E. and J.A. Musick. 1985. Aspects of the biology of sea turtles in Virginia. Copeia 1985(2): 449-456.

Lutz, P.L., and J.A., Musick (eds.). 1997. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Lutz, P.L., J.A., Musick, and J. Wyneken. 2002. The Biology of Sea Turtles, Volume II. CRC Press, Boca Raton, Florida.

Lynott, Margaret and Sue Barco. 2012. Personal Communication. Virginia Aquarium and Marine Science Center Stranding Response Program.

Mangin, E. 1964. Croissance en Longueur de Trois Esturgeons d'Amerique du Nord: *Acipenser oxyrhynchus*, Mitchill, *Acipenser fulvescens*, Rafinesque, et *Acipenser brevirostris* LeSueur. Verh. Int. Ver. Limnology 15: 968-974.

Mansfield, K.L. 2006. Sources of mortality, movements and behavior of sea turtles in Virginia. Unpublished Ph.D. dissertation. Virginia Institute of Marine Science, Gloucester Point, Virginia. 343 pages.

Mansfield, K.L., J.A. Musick, and R.A. Pemberton. 2001. Characterization of the Chesapeake Bay Pound Net and Whelk Pot Fisheries and Their Potential Interactions with Marine Sea Turtle Species. Final Report submitted to the National Marine Fisheries Service, Northeast Regional Office.

Mansfield, K.L., V.S. Saba, J.A. Keinath, and J.A. Musick. 2009. Satellite tracking reveals a dichotomy in migration strategies among juvenile loggerhead turtles in the Northwest Atlantic. Marine Biology 156:2555–2570.

Mathews County Planning Commission. 2001. 2000 Comprehensive Plan [cited January 2009]. Available from: http://www.co.mathews.va.us/Modules/ShowDocument.aspx?documentid=53

McCord, J.W., M.R. Collins, W.C. Post, and T.J. Smith. 2007. Attempts to develop an index of abundance for age-1 Atlantic sturgeon in South Carolina, USA. Am. Fisheries Society Symposium 56: 397-403.

Mohler, J. W. 2003. Culture manual for the Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*. U.S. Fish and Wildlife Service, Hadley, Massachusetts. 70 pp.

Munro, J. and D. Hatin, J. E. Hightower, K. McKown, K. J. Sulak, A. W. Kahnle, and F. Caron, eds. 2007. Anadromous Sturgeon: Habitats, Threats, Management, Synthesis and Summary. American Fisheries Society Symposium, 56: 1-15.

Murawski, S.A. and A.L. Pacheco. 1977. Biological and fisheries data on Atlantic sturgeon, *Acipenser oxyrhynchus* (Mitchill). National Marine Fisheries Service, Sandy Hook Lab., Sandy Hook. Tech. Report No. 10. 78 pp.

Musick, J.A. and C.J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pages 137–163 *in* Lutz, P.L. and J.A. Musick (editors). The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Nédélec, C. and J. Prado. 1990. Definition and Classification of Fishing gear Categories. FAO Fisheries Technical Paper . No. 222. Revision 1. Rome, FAO. 92 pp.

NMFS. 1998a. Final Recovery Plan for the Shortnose Sturgeon *Acipenser brevirostrum*. Pages 104 *in* Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, editor, Silver Spring, Maryland.

NMFS. 2004. Final Environmental Assessment and Regulatory Impact Review Regulatory Flexibility Act Analysis of Sea Turtle Conservation Measures for the Pound Net Fishery in Virginia Waters of the Chesapeake Bay. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce.

NMFS. 2006. Final Environmental Assessment and Regulatory Impact Review Regulatory Flexibility Act Analysis of Sea Turtle Conservation Measures for the Pound Net Fishery in Virginia Waters of the Chesapeake Bay. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce.

Norman, J. R., and F. C.. Fraser. 1938. Giant Fishes, Whales and Dolphins. W. W. Norton and Company, Inc, New York, NY. 361 pp.

Ocean Products Research Inc. 2005. Home page [cited December 2008]. Available from: http://www.opr-rope.com/comf.htm

Pikitch, E.K., P. Doukakis, L. Lauck, P. Chakrabarty, and D.L. Erickson. 2005. Status, trends and management of sturgeon and paddlefish fisheries. Fish and Fisheries 6: 233–265.

Pritchard, P.C.H. 1973. International migrations of South American sea turtles (Cheloniidae and Dermochelyidae). Animal Behaviour 21:18-27.

Quality Seafood Direct. 2007. Home page [cited January 2009]. Available from: http://www.qualityseafooddirect.net/default.asp

Read, Andrew J., and Kimberly T. Murray. 2000. Gross Evidence of Human-Induced Mortality in Small Cetaceans. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-15, 21 p.

Savoy, T. 2007. Prey eaten by Atlantic sturgeon in Connecticut waters. Am. Fisheries Society Symposium 56: 157-165.

Savoy, T. and D. Pacileo. 2003. Movements and important habitats of subadult Atlantic sturgeon in Connecticut waters. Transactions of the American Fisheries Society. 132: 1-8.
Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada Bulletin 184: 966 pp.

Schaffler, J.J., S.G. Barco, L.R. D'Erin, W.M. Single, and C.M. Jones. 2011. Do Alternative Leaders Affect Fish Catch in Pound Nets at the Mouth of Chesapeake Bay? North American Journal of Fisheries Management 31:88-95.

Shirey, C., C.C. Martin, and E.D. Stetzar. 1999. Atlantic sturgeon abundance and movement in the lower Delaware River. DE Division of Fish and Wildlife, Dover, DE, USA. Final Report to the National Marine Fisheries Service, Northeast Region, State, Federal & Constituent Programs Office. Project No. AFC-9, Grant No. NA86FA0315. 34 pp.

Silva, R.D., J.T. DeAlteris, and H.O. Milliken. 2011. Evaluation of a Pound Net Leader Designed to Reduce Sea Turtle Bycatch. Marine Fisheries Review 73:3.

Simmonds, M. and Isaac, S. 2007. The impacts of climate change on marine mammals: early signs of significant problems. Oryx 41, 1-8.

Simmonds, M.P. and Elliott, W.J. 2009. Climate change and cetaceans: concerns and recent developments. Journal of the Marine Biological Association of the United Kingdom 89(1), 203-210.

Swingle, W.M., J.J. Schaffler, K.M. Phillips, and C.N. Larkin. 2011. 2011 Pound Net Leader Study. Final Report to NC Sea Grant Bycatch of Marine Mammals Grant Program, Sub-Award #2008-0314-03; NC Sea Grant #08-DMM-03-A. VAQF Scientific Report 2011-06. Virginia Beach, VA. 15pp.

Simpfendorfer, CA. 2001. Essential habitat of the smalltooth sawfish, *Pristis pectinata*. Report to the National Fisheries Service's Protected Resources Division. Mote Marine Laboratory, Technical Report (786) 21pp.

Simpfendorfer, C.A., and T.R., Wiley. 2004. Determination of the distribution of Florida's remnant sawfish population, and identification of areas critical to their conservation. Mote Marine Laboratory, Technical Report July 2, 2004, 37 pp.

Smith, T.I.J. 1985. The fishery, biology, and management of Atlantic sturgeon, *Acipenser oxyrhynchus*, in North America. Environmental Biology of Fishes 14(1): 61-72.

Smith, T.I.J. and J.P. Clugston. 1997. Status and management of Atlantic sturgeon, *Acipenser oxyrinchus*, in North America. Environmental Biology of Fishes 48: 335-346.

Smith, T.I.J., D.E. Marchette and R.A. Smiley. 1982. Life history, ecology, culture and management of Atlantic sturgeon, *Acipenser oxyrhynchus oxyrhynchus*, Mitchill, in South Carolina. South Carolina Wildlife Marine Resources. Resources Department, Final Report to U.S. Fish and Wildlife Service Project AFS-9. 75 pp.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transactions of the American Fisheries Society 133: 527-537.

Stevenson, J. T. and D. H. Secor. 1999. Age determination and growth of Hudson River Atlantic sturgeon, *Acipenser oxyrinchus*. Fishery Bulletin 97: 153-166.

Thomas, M.D., G.G. Lockhart, S.J. Davis, C.M. Trapani, and S.G. Barco. 2012. Eastern Shore Sea Turtle Stranding Surveys and Western Shore Sea Turtle Stranding Response. Virginia Aquarium and Marine Science Center Scientific Report 2012-03; Final contract report to NOAA Fisheries Service. 18 pp.

Town of Cape Charles. 2008. Cape Charles Gazette: February 12, 2008 [cited December 2008].

Available from: http://www.capecharles.org/gazette/2008/20080212gazette.htm

Trapani, C., S. Barco, G. Lockhart, L. D'Eri, M. Lynott, W. Walton, L. Wright, S. Davis, M. Swingle, and B. Stacy. 2009. Sea turtle unusual mortality event, Northampton County Virginia (July through September 2009): Report of stranding activity and necropsy findings.

US Census Bureau. 1990. 1990 Decennial Census STF 1, Table DP-1 [cited November 2008]. Available from: http://factfinder.census.gov/

US Census Bureau. 2000. United States Census 2000 [cited July 2007]. Available from: http://www.census.gov/

Van Eenennaam, J. P. and S. I. Doroshov. 1998. Effects of age and body size on gonadal development of Atlantic sturgeon. Journal of Fish Biology 53: 624-637.

Van Eenennaam, J.P., S.I. Doroshov, G.P. Moerg, J.G. Watson, D.S. Moore and J. Linares. 1996. Reproductive conditions of the Atlantic sturgeon (*Acipenser oxyrhynchus*) in the Hudson River. Estuaries 19: 769-777.

Virginia Department of Health – Division of Shellfish Sanitation. 2000. Shellfish Closure and Shoreline Survey Documents – Sarah Creek and Perrin River [cited January 2009]. Available from:
www.vdh.state.va.us/EnvironmentalHealth/Shellfish/closureSurvey/shoreline/survey046.pdf

Virginia Department of Health – Division of Shellfish Sanitation. 2006. Gwynn Island [cited January 2009]. Available from:
http://www.vdh.state.va.us/EnvironmentalHealth/Shellfish/closureSurvey/shoreline/survey036.pdf

Virginia Institute of Marine Science. 2008. About [cited January 2009]. Available from http://www.vims.edu/about/index.php

Vladykov, V.D. and J.R. Greeley. 1963. Order Acipenseroidei. In: Fishes of Western North Atlantic. Sears Foundation. Marine Research, Yale Univ. 1 630 pp.

Waldman, J.R., J.T. Hart, and I.I. Wirgin. 1996. Stock composition of the New York Bight Atlantic sturgeon fishery based on analysis of mitochondrial DNA. Transactions of the American Fisheries Society 125: 364-371.

Waldman, J.R., C. Grunwald, J. Stabile, and I. Wirgin. 2002. Impacts of life history and biogeography on the genetic stock structure of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus*, Gulf sturgeon *A. oxyrinchus desotoi*, and shortnose sturgeon *A. brevirostrum*. Journal of Applied Ichthyology 18: 509-518.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, editors. 2011. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2010. NOAA Tech Memo NMFS NE 219; 598 pp.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, editors. 2012. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2011. NOAA Tech Memo NMFS NE 219; 598 pp.

Walther, G.R., Post, E., Convey, P., Menzel, A., Parmesan, C., Beebee T.J.C., Fromentin, J.M., Hoegh-Guldberg, O. & Bairlein, F. 2002. Ecological responses to recent climate change. Nature 416, 389-395.

Welsh, S.A., S.M. Eyler, M.F. Mangold, and A. J. Spells. 2002. Capture locations and growth rates of Atlantic sturgeon in the Chesapeake Bay. Pages 183-194 In: W. Van Winkle, P. J. Anders, D. H. Secor, and D. A. Dixon, (eds), Biology, management, and protection of North American sturgeon. American Fisheries Society Symposium 28, Bethesda, Maryland.

Wirgin, I. and T.L. King. 2011. Mixed stock analysis of Atlantic sturgeon from coastal locales and a non-spawning river. Presentation of the 2011 Sturgeon Workshop, Alexandria, VA, February 8-10.

Wirgin, I., J.R. Waldman, J. Rosko, R. Gross, M. Collins, S.G. Rogers, and J. Stabile. 2000. Genetic structure of Atlantic sturgeon populations based on mitochondrial DNA control region sequences. Transactions of the American Fisheries Society 129: 476-486.

10.0 List of Agencies and Persons Consulted

Stacey Horstman, Fishery Biologist, NMFS, Southeast Region, Protected Resources Division, 263 13th Avenue South, St. Petersburg, FL 33701

Jason Rueter, Fishery Biologist, NMFS, Southeast Region, Protected Resources Division, 263 13th Avenue South, St. Petersburg, FL 33701

Carrie Upite, Fishery Biologist, NMFS, Northeast Region, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930

Jessica Powell, Fishery Biologist, NMFS, Southeast Region, Protected Resources Division, 263 13th Avenue South, St. Petersburg, FL 33701

Marjorie Lyssikatos, Research Fishery Biologist, NMFS, Northeast Fishery Science Center, Protected Species Branch, 166 Water Street, Woods Hole, MA 02543-1026

Barbie Byrd, Cetacean and Sea Turtle Team, NMFS, Southeast Fishery Science Center, 101 Pivers Island, Beaufort, NC 28516

Akbar Marvasti, Ph.D., Analyst, NMFS, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149

Members of the Bottlenose Dolphin Take Reduction Team. A list of members can be found at: http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp_members.htm

Virginia Marine Resources Commission, 2600 Washington Avenue, 3rd Floor, Newport News, VA 23607

Virginia Aquarium and Marine Science Center, 717 General Booth Blvd., Virginia Beach, VA. 23451