

**May 2020 Revision
to Amendment 3 to the
North Carolina Blue Crab Fishery
Management Plan**

**MASONBORO SOUND AND THE LOWER
CAPE FEAR RIVER DIAMONDBACK
TERRAPIN MANAGEMENT AREAS**



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Executive Summary

In Amendment 2 to the North Carolina Blue Crab Fishery Management Plan (FMP), the North Carolina Marine Fisheries Commission (NCMFC) recognized diamondback terrapins as a wildlife resource in need of protection from crab pot fishing activities under its jurisdiction and sought to proactively implement conservation measures to prevent localized diamondback terrapin depletions or extirpations through incidental bycatch from activity in the blue crab fishery. To implement this selected management strategy, the NCMFC granted proclamation authority to the director of the North Carolina Division of Marine Fisheries (NCDMF) to require terrapin excluder devices be used in crab pots [NCMFC Rule 15A NCAC 03L .0204(b)]. Prior to proclamation authority use, a framework was required outlining criteria the NCDMF would use to identify Diamondback Terrapin Management Areas (DTMAs). With the approval of Amendment 3 to the North Carolina Blue Crab FMP, this framework was adopted by the NCMFC in February 2020. The NCDMF subsequently identified DTMA's in Masonboro Sound and the lower Cape Fear River. The NCMFC approved both DTMA's at its May 2020 business meeting.

I. ISSUE

Designation of DTMA's in Masonboro Sound and the lower Cape Fear River.

II. ORIGINATION

This issue was brought forth by the NCDMF following the criteria approved by the NCMFC in Amendment 3 to the North Carolina Blue Crab FMP.

III. BACKGROUND

Diamondback terrapins are susceptible to substantial population declines or even localized extirpations through incidental bycatch in crab pots and removal of a relatively low number of individuals from the population annually (Dorcas et al. 2007). Diamondback terrapins were moved from "Near Threatened" to the greater risk category "Vulnerable" on the Red List of Threatened Species by the International Union for Conservation of Nature (IUCN) after its most recent assessment in 2018. Ongoing range-wide population declines due to accidental mortality as bycatch in commercial blue crab fisheries and coastal habitat impacts from development were cited as primary justifications for moving this species into the increased risk category. The North Carolina Wildlife Resources Commission (NCWRC) lists diamondback terrapin as a North Carolina species of "Special Concern" statewide and as a Federal "Species of Concern" in Dare, Pamlico, and Carteret counties in North Carolina. The status of "Special Concern" or "Species of Concern" does not specifically provide any special protection under the federal Endangered Species Act, however the federal status may be upgraded to "Threatened" or "Endangered" if natural or human-made factors are affecting its continued existence or there is an inadequacy of existing regulatory mechanisms in place (e.g. unmitigated mortality from bycatch in crab pots). In February 2011, the NCWRC Nongame Wildlife Advisory Committee received a report from the Scientific Council on Amphibians and Reptiles that recommended the diamondback terrapin be listed as "Threatened" (Dorcas et al. 2011). This report, citing a large body of evidence from

numerous studies, concluded incidental bycatch in crab pots is the most serious threat to diamondback terrapins in North Carolina (Seigel and Gibbons 1995; Roosenburg et al. 1997; Butler et al. 2006; Dorcas et al. 2007). Seafood Watch, one of the best-known seafood consumer awareness programs, gives North Carolina blue crab from the pot fishery its lowest rating of “Avoid”, stating that serious concerns about the lack of implementation of any regulations to protect diamondback terrapins from bycatch in crab pots is the primary reason for this poor rating (Seafood Watch 2019).

The NCMFC adopted Amendment 2 of the North Carolina Blue Crab FMP in November 2013 (NCDMF 2013). In this FMP, the NCMFC recognized diamondback terrapins as a wildlife resource in need of protection from crab pot fishing activities under its jurisdiction and sought to proactively implement conservation measures to prevent localized diamondback terrapin depletions or extirpations through incidental bycatch from current or future activity in the blue crab fishery. To implement this selected management strategy, the NCMFC granted proclamation authority to the director of the NCDMF to require terrapin excluder devices be used in crab pots. This proclamation authority was placed in NCMFC Rule 15A NCAC 03L .0204(b), which became effective April 1, 2014. This rule states the Fisheries Director may, by proclamation, require the use of terrapin excluder devices in each funnel entrance in crab pots and impose the following restrictions concerning terrapin excluder devices: (1) specify areas; (2) specify time periods; and (3) specify means and methods. However, prior to this proclamation authority being used, the NCMFC first had to approve use criteria. In February 2020, the NCMFC adopted Amendment 3 of the North Carolina Blue Crab FMP, in which it approved the criteria necessary for the director to use this proclamation authority. Amendment 3 implemented a framework that the NCDMF will use to propose DTMA's where all crab pots fished within would be required to use a NCDMF approved terrapin excluder device or modified pot design. This eight-step framework covers criteria for approved terrapin excluder devices, time period when excluders are required in pots, terrapin interaction zone, terrapin presence, DTMA boundary designation, issue paper development with advisory committee recommendations and public comment, NCMFC action, and implementation by proclamation.

The criteria require proposed DTMA's to have documented populations of diamondback terrapins through capture in NCDMF sampling programs, North Carolina Natural Heritage Program (NCNHP) datasets, and/or through academic research, as well as contain significant waterbody area in which diamondback terrapins are susceptible to incidental capture in crab pots (water less than 3 m (9.8 ft) deep as well as less than 250 m (820.2 ft) from shore). The full criteria and framework that identifies and creates a DTMA is described in the issue paper: Establish a Framework to Implement the Use of Terrapin Excluder Devices in Crab Pots in Amendment 3 to the North Carolina Blue Crab FMP. In an approved DTMA, all crab pots, including peeler pots, fished between March 1 and Oct. 31 are required to have approved terrapin excluder devices constructed out of heavy plastic or wire (no smaller than 10-gauge) properly secured in each funnel opening. Excluder devices would not be required to be used if the maximum inner opening dimensions of all funnel entrances did not exceed those of an approved excluder device (a narrow funnel design), and the funnels were rigid enough to maintain these dimensions.

To be effective, the size of a DTMA should, at a minimum, allow for the protection of the entire possible home range of the local diamondback terrapin population and may include adjacent

unoccupied suitable habitat to allow for population recovery. Home ranges of diamondback terrapins have been observed and measured in North Carolina. Average home range size from tagged diamondback terrapins in Core Sound was calculated to be 3.05 km² (1.18 mi²), with a maximum observed home range of 7.41 km² (2.86 mi²; Spivey 1998). These known dimensions should be taken into account when determining appropriate DTMA boundaries.

IV. AUTHORITY

North Carolina General Statutes

§ 113-134. RULES.

§ 113-182. REGULATION OF FISHING AND FISHERIES.

§ 113-182.1. FISHERY MANAGEMENT PLANS.

§ 113-221.1. PROCLAMATIONS; EMERGENCY REVIEW.

§ 143B-289.52. MARINE FISHERIES COMMISSION – POWERS AND DUTIES.

North Carolina Marine Fisheries Commission Rules

15A NCAC 03H .0103 PROCLAMATIONS, GENERAL

15A NCAC 03J .0301 POTS

15A NCAC 03L .0201 CRAB HARVEST RESTRICTIONS

15A NCAC 03L .0204 CRAB POTS

V. DISCUSSION

The areas behind Masonboro Island and in the lower Cape Fear River behind Bald Head Island have been identified as areas in North Carolina containing populations of diamondback terrapins using NCDMF and NCNHP data sets, as well as meeting the depth and distance from shore criteria, which would identify them as potential areas for diamondback terrapin interactions with crab pots (Figure 1). Both areas have also served as study sites for diamondback terrapin research on abundance as well as documenting diamondback terrapins caught in crab pots (Grant 1997; Thorpe et al. 2005; Thorpe and Likos 2008; Southwood et al. 2009; Alford and Southwood Williard 2010; Southwood Williard and Harden 2010; Harden and Southwood Williard 2012; Chavez and Southwood Williard 2017; Munden 2018).

Summary of Diamondback Terrapin Research Documenting Presence and Interaction with Crab Pots:

Grant (1997) documented diamondback terrapins captured as bycatch in the commercial blue crab fishery pot fishery occurring in the marsh areas behind Masonboro Island. Terrapin excluder devices were tested, and opening heights of 4 cm (1.6 in) resulted in 100% exclusion of diamondback terrapins compared to 5 cm (2 in) height terrapin excluder devices, which still allowed diamondback terrapin capture. Both excluder device dimensions resulted in reductions in blue crab catch.

Thorpe et al. (2005) captured diamondback terrapins in crab pots fished in a typical manner by a commercial fisherman set in a location in the lower Cape Fear River near Bald Head Island. It was commented that the rate of diamondback terrapin capture suggests a high potential for bycatch in the commercial pot fishery.

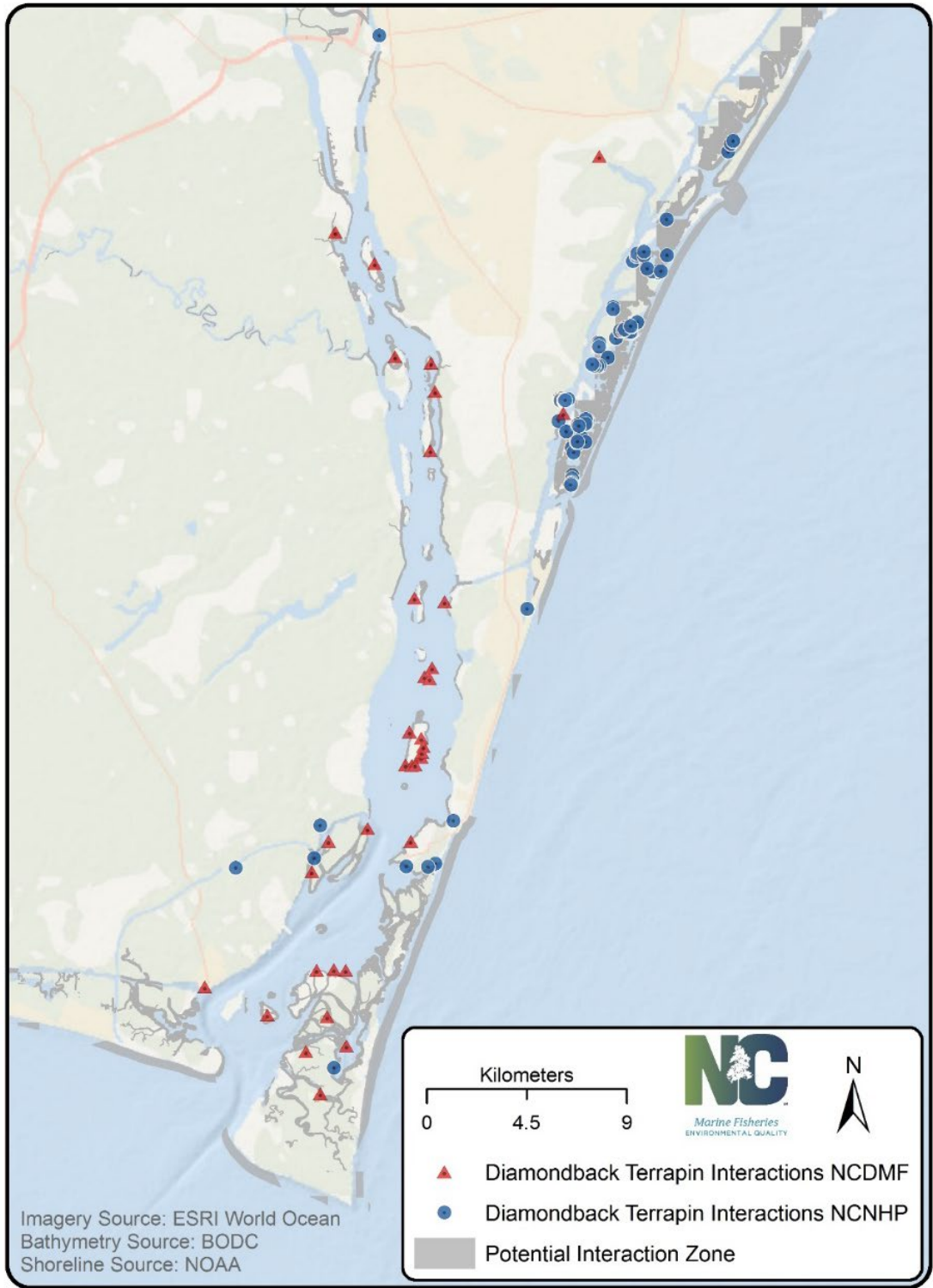


Figure 1. A map of coastal New Hanover and Brunswick counties showing the potential interaction zone (< 3 m (9.8 ft) deep and < 250 m (820.2 ft) from any shoreline) of diamondback terrapins and crab pots, overlaid with NCDMF (1971 – 2017) and NCNHP diamondback terrapin observations.

Thorpe and Likos (2008) evaluated terrapin excluder devices in commercial blue crab pots in the lower Cape Fear River near Bald Head Island. One diamondback terrapin was captured in a crab pot using a 5 x 12 cm (2 x 4.7 in) excluder. Further assessment was recommended based on terrapin size and range in North Carolina. Additionally, recreational and Commercial Gear License crab pots were observed tied to piers and set close to shore in creeks in areas that would likely have diamondback terrapins.

Southwood et al. (2009) used radio telemetry to document diamondback terrapin distribution and habitat use in the lower Cape Fear River and near Masonboro Island. Diamondback terrapins were documented in these areas, and when found swimming they were typically in shallow water less than 3 m (9.8 ft). Both alive and dead diamondback terrapins were observed entrapped in a crab pot that was exposed during low tide. It was suggested that placing crab pots in deeper water and further from the marsh edge would help reduce diamondback terrapin bycatch.

Alford and Southwood Williard (2010) used tall crab pots (which prevented bycatch mortality) to capture diamondback terrapins and monitor their population between May and October in the areas behind Masonboro Island. Diamondback terrapins were captured at the highest frequency in May, and 65% of all captured diamondback terrapins were male. As males were more likely to be captured in crab pots, due to their smaller size, it was suggested there was the potential to cause a skewed sex ratio in the population due to bycatch mortality.

Southwood Williard and Harden (2010) used a postcard survey to investigate potential interactions between blue crab fisheries and diamondback terrapins. Results of this survey were incorporated into the NCNHP dataset, which include occurrences near Bald Head Island and behind Masonboro Island.

Harden and Southwood Williard (2012) evaluated the seasonal bycatch risk of diamondback terrapins in crab pots. Diamondback terrapins were captured and monitored by radio telemetry behind Masonboro and Figure Eight islands, New Hanover County, North Carolina. Diamondback terrapins were observed to be active and out of dormancy between April 1 and Sept. 30. Crab pots were documented in these areas during the diamondback terrapin active season and were found to typically be located between 15 and 30 m (49 and 98 ft) from the marsh edge and in water ranging from 0 to 2.8 m (0 to 9.8 ft) deep at low tide. Between June 2008 and May 2009, four of the 29 monitored diamondback terrapins were captured as bycatch in crab pots. Results indicate crab pots and diamondback terrapins co-occur with a patchy distribution, resulting in a greater than expected potential for interaction than if both were uniformly distributed. In coastal New Hanover County, the maximum straight-line travel distance of radio tagged diamondback terrapins observed was 1.20 km (0.75 mi) for individuals captured in Masonboro Sound and 1.05 km (0.65 mi) for Figure Eight Island marshes.

Chavez and Southwood Williard (2017) assessed the impact of two terrapin excluder device sizes, 5.1 x 15.2 cm and 3.8 x 15.2 cm (2 x 6 in and 1.5 x 6 in), in crab pots on blue crab catch at sites in Masonboro and Bogue sounds, North Carolina. Areas behind Masonboro Island had the highest rates of diamondback terrapin capture in crab pots. It was concluded the larger size terrapin excluder device allowed male diamondback terrapins to enter traps, while the smaller size would have prevented their capture. Neither terrapin excluder device had a statistically

significant impact on blue crab size or catch. However, the smaller excluder did show a non-significant downward trend.

Munden (2018) examined the population change of diamondback terrapins around Masonboro Island between 2009 and 2017, along with numbers of crab pots fished in this area. Diamondback terrapin head count and crab pot survey data collected as part of a fixed kayak route citizen science project during this period were analyzed. Mean number of diamondback terrapins observed per kilometer in 2017 decreased to a low of 0.016 from a high of 0.938 in 2014, while the mean number of crab pots observed per kilometer increased to 2.435 in 2017 from 0.804 in 2014.

Existing Ecological Areas:

Both Masonboro Island and the region in the lower Cape Fear River north of Bald Head Island are comprised of lands designated as North Carolina Natural Heritage Natural Areas (hereinafter referred to as Natural Areas) as well as designated National Estuarine Research Reserves (NERRs; Figure 2). Natural Areas are designated by the North Carolina Division of Parks and Recreation to protect areas sensitive to human activities and preserve and protect areas of scientific, aesthetic, or ecological value. The NERR system is a network of protected areas across the United States that protects coastal and estuarine habitats for long-term research, education, and coastal conservation. The overarching goal of the NERR system is to provide a foundation for effective coastal management through site research. Masonboro Island Reserve contains the largest undisturbed barrier island in the southern part of the North Carolina coast and is considered an intact barrier island and estuarine ecosystem. Zeke's Island Reserve contains a complex of salt marshes, tidal flats, and barrier islands. The rules governing the North Carolina Coastal Reserves provide a provision to accommodate traditional activities, such as commercial fishing, as long as this activity does not disturb the Reserve environment and is compatible with any research and educational activities taking place there (See Appendix A for relevant reserve rules).

The site manager for both reserve locations has expressed a concern for declining diamondback terrapin head count numbers coinciding with increased crab pot numbers observed in the annual citizen science fixed route kayak survey and has provided example results of this project (See Appendix B). This decline in diamondback terrapin populations within the Masonboro NERR have also been quantified by academic research in an analysis by Munden (2018). Negative impacts from crab pot mortality and low potential rates of recolonization may prevent successful long-term populations of diamondback terrapins in refuges or reserves unless diamondback terrapin loss through bycatch is minimized (Lovich et al. 2018). A significant reduction or extirpation of the diamondback terrapin population within the Coastal Reserve sites caused by incidental mortality in the blue crab commercial fishery may put the currently allowed traditional use of commercial crab fishing in direct conflict with both research and educational activities occurring on site, causing this activity to potentially be considered incompatible with the stated principal purposes of the North Carolina Coastal Reserves.

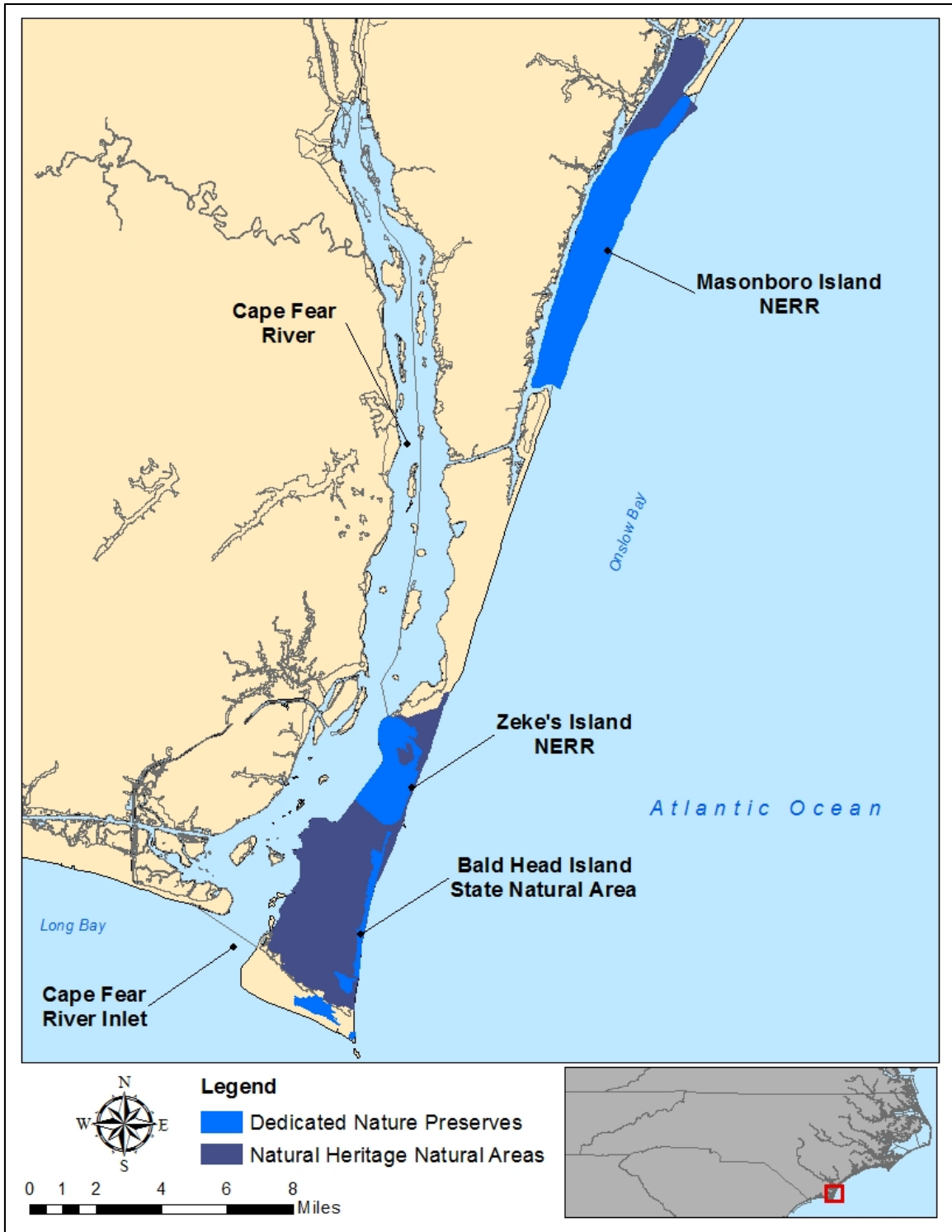


Figure 2. A map of coastal New Hanover and Brunswick counties showing North Carolina Natural Heritage Natural Areas and National Estuarine Research Reserves (NERRs)

The areas encompassing both Masonboro Island and the lower Cape Fear River north of Bald Head Island have also been nominated as Strategic Habitat Areas (SHAs) by the NCMFC (Figure 3). SHAs represent priority locations for protection or restoration due to their exceptional ecological functions or areas that are particularly at risk due to imminent threats to their ability to support coastal fisheries. The large areas in Masonboro Sound and the Cape Fear River were selected due to their biodiversity and high quality of habitats and fishery species. These SHAs also overlap with lands that are already managed for conservation, and were corroborated with biological data, ecological designations, and specific knowledge of the area.

Proposed Management Areas:

Two DTMA's are proposed, the Masonboro Island DTMA and the Lower Cape Fear River DTMA (Figure 4). The proposed Masonboro Island DTMA lies entirely within, and shares nearly the entire boundary with, the Masonboro Island Estuarine Research Reserve and Natural Area. This area is also naturally bounded on the east by Masonboro Island, and on the west by the Intracoastal Waterway (ICW). The proposed Lower Cape Fear River DTMA is comprised of Zeke's Island Estuarine Research Reserve in the northern portion of the management area and the Bald Head Island State Natural Area in the southern portion. This area is also naturally bounded by a barrier island to the east and Bald Head Island to the south. The western boundary of this management area follows the "Wall", a rock structure separating the Cape Fear River from Buzzard Bay and serves as the boundary for the Zeke's Island Estuarine Research Reserve. At the end of the Wall, a line is drawn southwesterly to the northern tip of Bald Head Island. These two areas use boundaries such as the ICW, landmarks, or existing reserve borders to maximize ease of marking these areas and enforcement.

Consistent with the adopted criteria, each DTMA has been selected to minimize the inclusion of areas outside the zone of potential diamondback terrapin interaction with crab pots, without creating overly complex and unenforceable borders. Of the area that is water in the Masonboro Island DTMA, 85% meets the depth and distance criteria considered within the interaction zone and 61% of the water area in the Lower Cape Fear River DTMA is considered within the interaction zone. The area in the Masonboro Island DTMA that does not fall within this zone is primarily in Dick Bay, which is mostly less than 3 m (9.9 ft) deep at low tide, but is a large open area that contains waters greater than 250 m (820.2 ft) from any shoreline. Dick Bay is included within the proposed DTMA to reduce complexity in marking and enforcement, as the ICW forms a natural western boundary for this management area. In the Lower Cape Fear River DTMA, the amount of water area that is not considered in the interaction zone is primarily caused by the larger open areas of water to the east of the Wall in the Basin, Second Bay, and Buzzard Bay. These areas are mostly less than 3 m (9.8 ft) deep at low tide but have waters greater than 250 m (820.2 ft) from any shoreline. These areas were also included in the proposed DTMA to reduce complexity in marking and enforcement, as the Wall forms a well-defined boundary for this management area. To illustrate the need for management areas of the size recommended, a map is provided that plots a subset of NCDMF and NCNHP diamondback terrapin occurrence data points as 7.41 km² (2.86 mi²) circles (the maximum known home range size for North Carolina diamondback terrapins) over proposed DTMA boundaries (Figure 5).

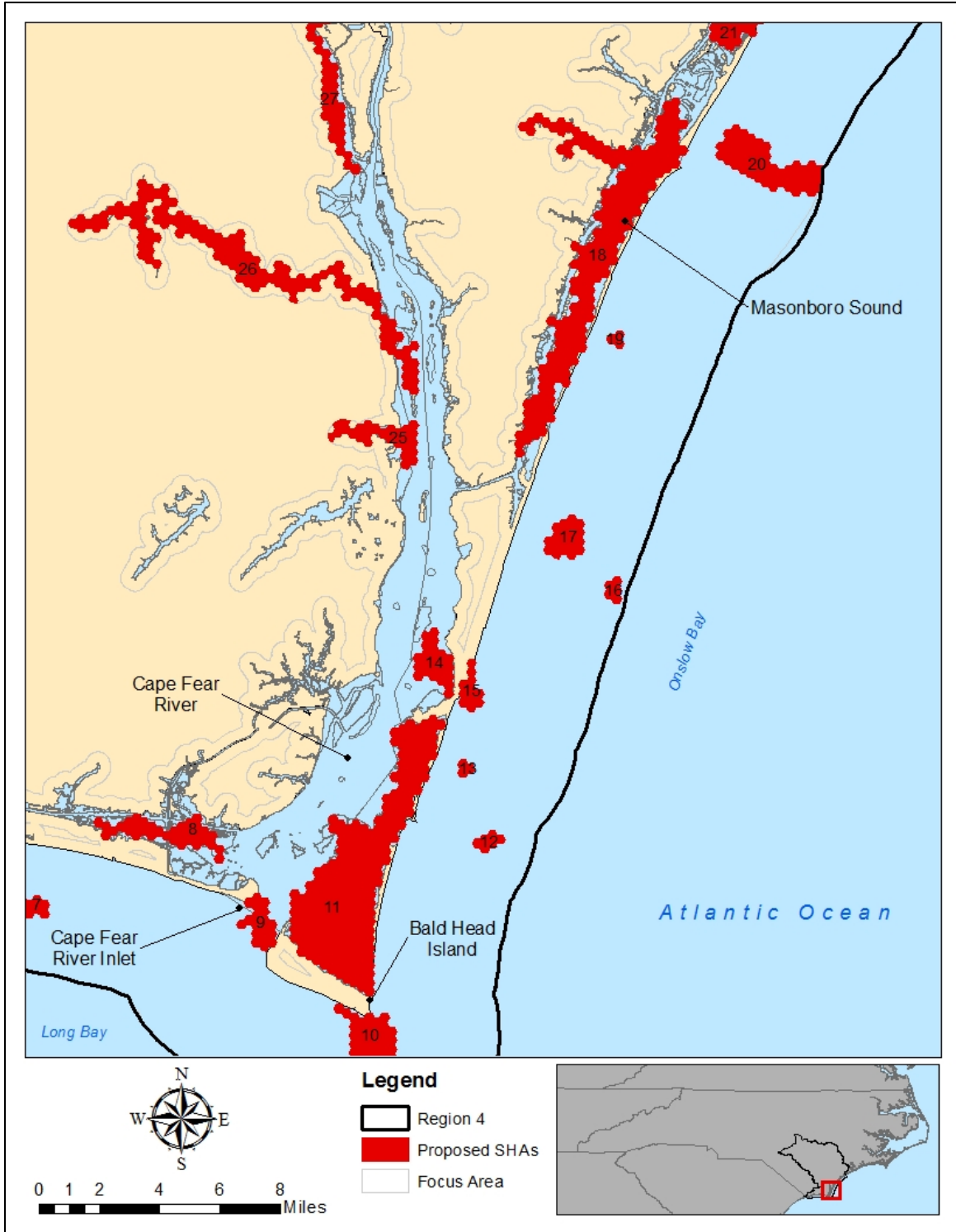


Figure 3. A map of coastal New Hanover and Brunswick counties showing nominated Strategic Habitat Areas in Region 4 of the North Carolina Coastal Habitat Protection Plan.



Figure 4. A map of coastal New Hanover and Brunswick counties showing two proposed DTMA's.

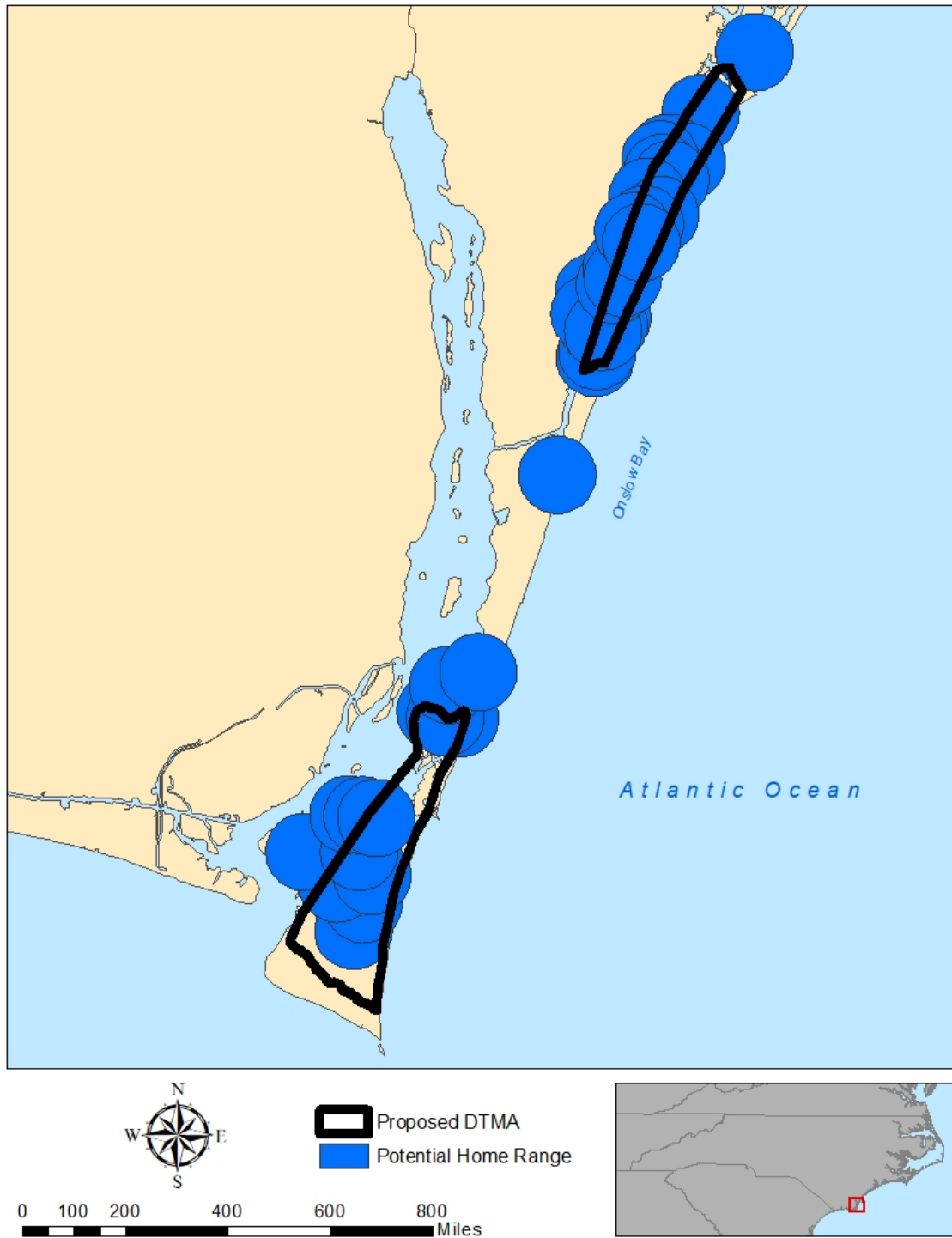


Figure 5. A map of proposed DTMA compared with a subset of NCDMF and NCNHP diamondback terrapin locations shown as 7.41 km² (2.86 mi²) circles to illustrate the potential maximum home range of each observed diamondback terrapin.

Following the eight-step framework in Amendment 3 to the North Carolina Blue Crab FMP, after public comment and NCMFC Southern Regional Advisory Committee discussion of the proposed Lower Cape Fear River DTMA, a boundary modification was identified to be necessary along the Cape Fear River Inlet Crab Spawning Sanctuary eastern border (Figure 6). This modification was due to a 183 to 549 m (200 to 600 yd) space between the established crab spawning sanctuary and original proposed DTMA. Without this boundary adjustment, the lower Cape Fear River would be seasonally subject to three separate crab potting requirements across a relatively small space. The NCDMF considers this modification an administrative solution for increased public ease of understanding and compliance, with a less than seven percent change in overall acreage from the original proposed DTMA.

Regional Commercial Blue Crab Fishery Information:

Landings and participation data for the blue crab fishery does not exist at a fine enough scale relative to specific waterbodies to directly assess the number of participants that could be impacted by the creation of the proposed DTMA. Trip ticket reporting areas for this region include Masonboro Sound, which encompasses the proposed Masonboro Island DTMA, and the Cape Fear River, which encompasses the proposed Lower Cape Fear River DTMA. The proposed Masonboro Island DTMA comprises 64% of the Masonboro Sound trip ticket reporting area, while the proposed Lower Cape Fear River DTMA comprises 29% of the Cape Fear River trip ticket reporting area (Table 1). From 2010 and 2019, between 12 and 19 (average of 16) participants reported landings of blue crabs from hard crab and peeler pots from Masonboro Sound and between 8 and 16 (average 12) participants reported landings of blue crabs from hard crab and peeler pots from the Cape Fear River (Figure 7). Participants reporting landings are generally declining in the Cape Fear River and fluctuating in Masonboro Sound. Although the proposed Masonboro Island DTMA occupies a smaller footprint, it may likely impact more individual participants than the proposed Lower Cape Fear River DTMA, as there are more participants and the proposed Masonboro Island DTMA occupies a greater percentage of the trip ticket reporting area.

Additional species that are landed from crab pots in these two trip ticket reporting areas include whelks or “conch” (*Busycon and Busycotypus spp.*) and Florida stone crabs (*Menippe mercenaria*). Landings and participation data for whelk examined by trip ticket reporting area are considered confidential (having a small number of participants) when analyzed on an annual scale and therefore are only presented in this document as ten-year averages (Table 2). From 2010 and 2019, between 5 and 11 (average of 8) participants reported landings of stone crab from hard crab and peeler pots from Masonboro Sound and between 2 and 8 (average of 4) participants reported landings of stone crab from hard crab and peeler pots from the Cape Fear River (Figure 8). Landings of stone crabs show fluctuations in number between years and area, averaging a small percentage (less than 0.5%) of the overall landings from crab pots in these two reporting areas. Ten-year average (from 2010 and 2019) landings values for these three species from the Masonboro Sound and Cape Fear River trip ticket reporting areas show blue crab has the highest average landings value, followed by stone crab, then whelk (Table 3).

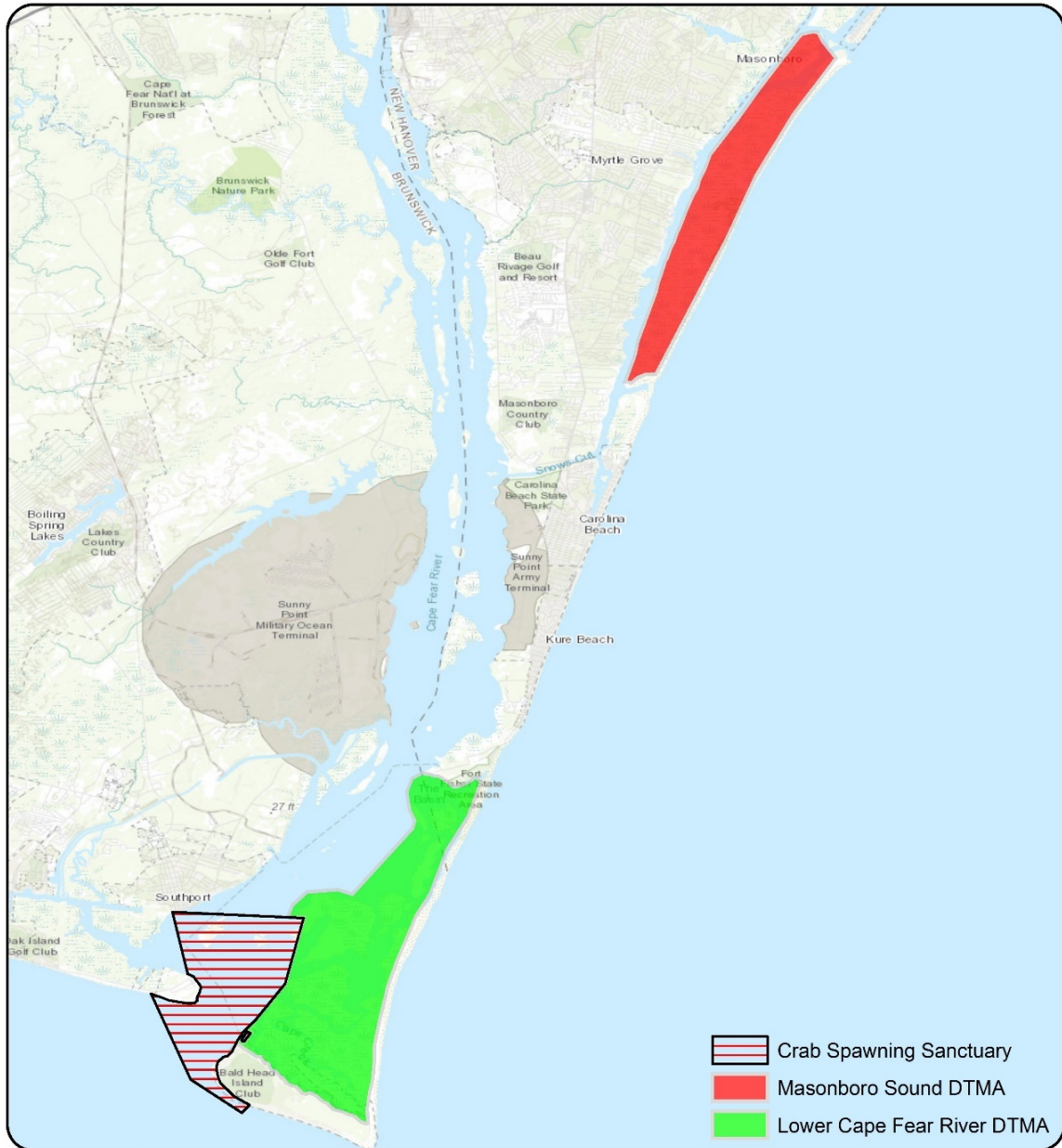


Figure 6. A map of coastal New Hanover and Brunswick counties showing approved DTMAs. Includes expanded Lower Cape Fear River DTMA western boundary that abuts to the eastern boundary of the Cape Fear River Inlet Crab Spawning Sanctuary.

Table 1. Total area in acres of proposed Masonboro and Lower Cape Fear River DTMA's, including percent of DTMA that is water, percent of water area that is in the potential interaction zone [< 3 m (9.8 ft) deep, < 250 m (820.2 ft)], and percent of the total Trip Ticket reporting area (Masonboro Sound, Cape Fear River) the DTMA encompasses.

DTMA Characteristics	Masonboro	Cape Fear
Total land and water area of DTMA (acres)	5,739	9,945
Percent of DTMA area that is water	59%	39%
Percent of DTMA water area in interaction zone	85%	61%
Percent DTMA is of total Trip Ticket reporting area	64%	29%

Table 2. Average landings of whelk (conch) meats from hard crab and peeler pots, and average number of participants reporting landings between 2010 and 2019 from Trip Ticket reporting areas Masonboro Sound, and Cape Fear River. 2019 landings data are preliminary and may change after final review is completed.

	Masonboro Sound	Cape Fear River
Pounds	46	88
Participants	2	3

Table 3. Average value of annual reported landings of blue crab, whelk (conch), and stone crab from hard crab and peeler pots, between 2010 and 2019 from Trip Ticket reporting areas Masonboro Sound, Cape Fear River, and statewide total. Numbers in parentheses represent the percentage of each area to the statewide average for each species. 2019 landings data are preliminary with value calculations based on 2018 prices, and may change after final review is completed.

	Masonboro Sound	Cape Fear River	Statewide
Blue Crab	\$ 138,682 (0.53%)	\$ 596,242 (2.29%)	\$26,077,194
Whelk	\$ 99 (0.08%)	\$ 178 (0.14%)	\$125,502
Stone Crab	\$ 1,384 (7.11%)	\$ 622 (3.19%)	\$19,476

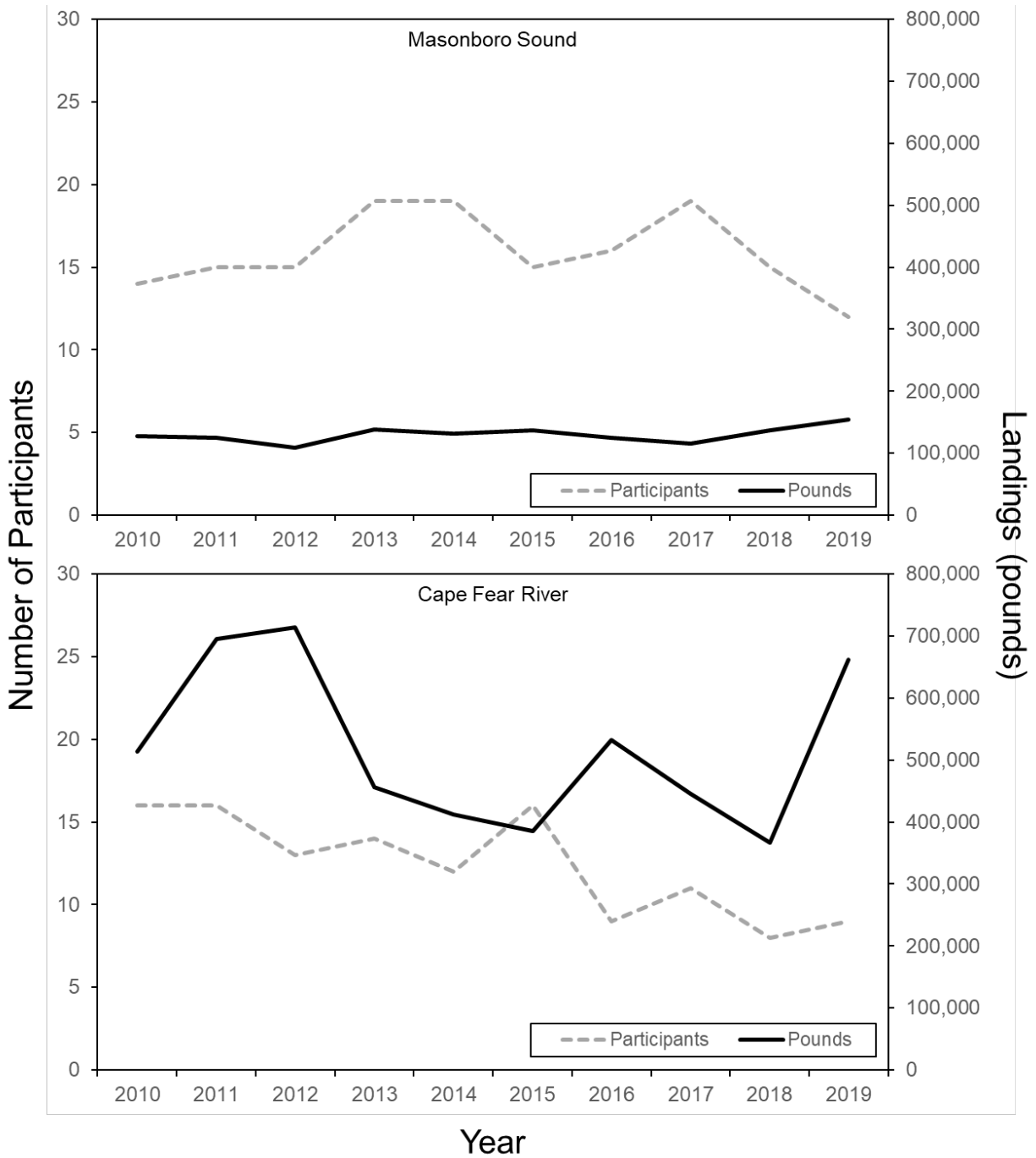


Figure 7. A graph showing number of participants (left axis, dashed line) and landings in pounds (right axis, solid line) of blue crabs in both, hard crab and peeler pots for the Masonboro Sound (upper panel) and Cape Fear River (lower panel) trip ticket reporting areas. 2019 landings data are preliminary and may change after final review is completed.

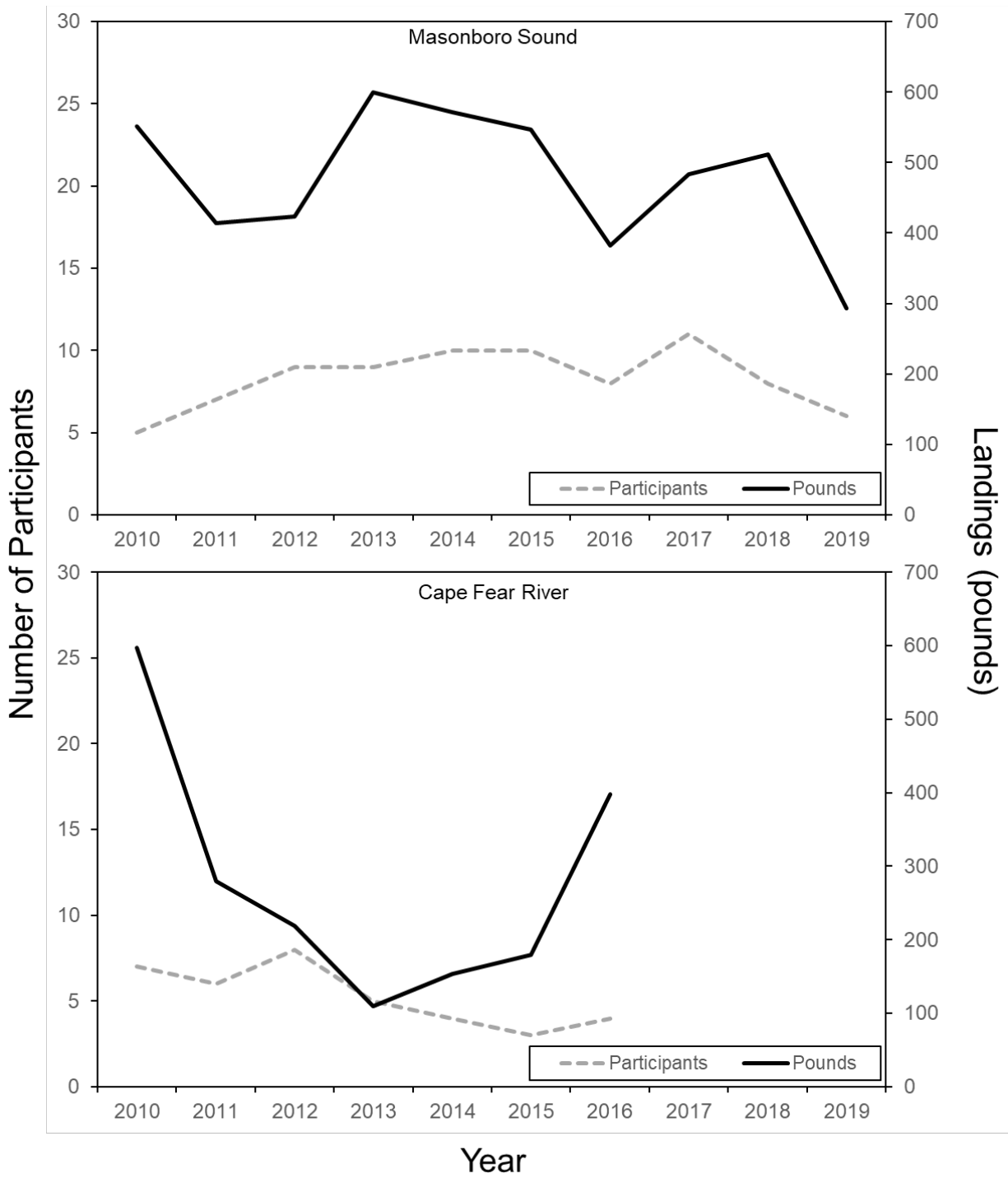


Figure 8. A graph showing number of participants (left axis, dashed line) and landings in pounds (right axis, solid line) of stone crabs in both hard crab and peeler pots for the Masonboro Sound (upper panel) and Cape Fear River (lower panel) trip ticket reporting areas. Landings data after 2016 for the Cape Fear River are confidential. 2019 landings data are preliminary and may change after final review is completed.

VII. PROPOSED MANAGEMENT OPTIONS

(Note: Impacts are the same for each option.)

(+ Potential positive impact of action)

(- Potential negative impact of action)

Option 1: Designate the Masonboro Sound area described above as a DTMA.

- + Provide protection for documented diamondback terrapin populations in high quality habitat while still allowing commercial crab potting to occur.
- + A proactive conservation measure for a state and federal “Species of Concern”
- + Remove conflict between commercial crab potting and research or educational activities occurring at NERR sites.
- + Mitigate negative ratings by sustainable seafood consumer advisory groups for the bycatch of diamondback terrapin in the North Carolina blue crab fishery.
- Additional cost and regulatory burden to modify crab pots for compliance
- Economic impact from potential reduction in crab pot catch within DTMA area
- +/- Will only impact fisherman who crab pot within DTMA

Option 2: Designate the lower Cape Fear River area described above as a DTMA.

- + Provide protection for documented diamondback terrapin populations in high quality habitat while still allowing commercial crab potting to occur.
- + A proactive conservation measure for a state and federal “Species of Concern”
- + Remove conflict between commercial crab potting and research or educational activities occurring at NERR sites.
- + Mitigate negative ratings by sustainable seafood consumer advisory groups for the bycatch of diamondback terrapin in the North Carolina blue crab fishery.
- Additional cost and regulatory burden to modify crab pots for compliance
- Economic impact from potential reduction in crab pot catch within DTMA area
- +/- Will only impact fisherman who crab pot within DTMA

VIII. RECOMMENDATIONS

NCDMF – Recommend establishing the areas described above as the Masonboro Island and Lower Cape Fear River DTMA’s by proclamation, including the modified western boundary for the Lower Cape Fear River DTMA (Figure 6).

Southern Regional Advisory Committee – Recommended to have the areas created under the terms and conditions outlined in the presentation, to explore options for funding for offsetting cost of excluder devices to current fishermen, and to explore options for research on approved and additional designs.

NCMFC Selected Management Strategy – (See Appendix C) Approve the DTMA’s as presented by the NCDMF, including the adjusted boundaries.

IX. MANAGEMENT REVISION TO AMENDMENT 3 TO THE NORTH CAROLINA BLUE CRAB FMP

Amendment 3 to the North Carolina Blue Crab FMP provides the adaptive management strategy to identify areas of the state where terrapin excluder devices are required. This document serves as the May 2020 Revision to Amendment 3 to the North Carolina Blue Crab FMP and documents the supporting data and rationale of the NCMFC for the approval of two DTMA's that are to be implemented by the NCDMF director's proclamation authority in 2021. The proclamation effective date will coincide with the closed potting season so fishermen can modify their gear and include terrapin excluder devices. All other management strategies contained in Amendment 3 will remain in force until another revision, supplement, or amendment to the North Carolina Blue Crab FMP is adopted.

NCMFC Selected Management Revision – Approve the DTMA's as presented by the NCDMF, including the adjusted boundaries.

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APPENDIX A. Select rules governing the North Carolina Coastal Reserves.

15A NCAC 070 .0101 STATEMENT OF PURPOSE

The principal purposes of the North Carolina Coastal Reserve and supporting programs are to:

- (1) preserve coastal ecosystems representative of the various biogeographic regions and typologies in North Carolina and to make them available for continuous future study of the processes, functions, and influences which shape and sustain the coastal ecosystems;
- (2) provide new information on coastal ecosystem processes to decisionmakers as a basis for the promotion of sound management of coastal resources;
- (3) provide a focal point for educational activities that increase the public awareness and understanding of coastal ecosystems, effects of man on them, and the importance of the coastal systems to the state and the Nation;
- (4) accommodate traditional recreational activities, commercial fishing, and other uses of the Reserve as long as they do not disturb the Reserve environment and are compatible with the research and educational activities taking place there.

History Note: Authority G.S. 113-3; 113-8; 143B-10; Eff. July 1, 1986; Amended Eff. April 1, 1988.

15A NCAC 070 .0202 RESERVE USE REQUIREMENTS

The following use requirements shall apply to all of the components of the Reserve:

- (1) The essential natural character of the Reserve shall be maintained.
- (2) Traditional recreational uses within each component shall be allowed to continue as long as the activities do not disrupt the natural integrity of the Reserve or any research or educational projects. Incompatible traditional uses shall include:
 - (a) fishing, hunting, or trapping activities not allowed by state rules;
 - (b) target shooting;
 - (c) hydraulic clam dredging within Reserve boundaries;
 - (d) use of vehicles off designated corridors at components where vehicles are allowed for upland transportation according to the management plan; and
 - (e) production of noise disruptive to local wildlife and the aesthetic enjoyment of the Reserve as a natural area.
- (3) No user shall disturb a research project or research equipment in place at the Reserve.
- (4) Camping or any form of habitation, whether on the uplands, wetlands, or waters within Reserve boundaries, shall not be allowed unless written permission is posted by the Division of Coastal Management.
- (5) Personal property not authorized by the management agency may not be placed within the boundaries of the Reserve for more than two consecutive days.
- (6) Users of the Reserve shall not disturb or remove any live animals, except those allowed by local or state hunting and fishing rules as they apply to the Reserve, or vegetation within the Reserve unless such action is part of a research or educational project approved by the management agency.

- (7) Persons wishing to engage in scientific research or collection of natural materials within the Reserve shall first secure written permission from the management agency.
- (8) No activity shall be allowed which might pollute any stream or body of water in the Reserve. Acts of pollution shall include:
 - (a) Deposition of solid materials not indigenous to the local coastal ecosystem; and
 - (b) Discharge of liquids other than uncontaminated estuarine water.
- (9) No other acts or uses which are detrimental to the maintenance of the property in its natural condition shall be allowed including, but not limited to, disturbances of the soil, mining, commercial or industrial uses, timber harvesting, ditching and draining, deposition of waste materials.

History Note: Authority G.S. 143B-10; Eff. July 1, 1986; Amended Eff. April 1, 1999; December 1, 1991; April 1, 1988.

APPENDIX B. Example results of diamondback terrapin and crab pot count data from fixed route kayak surveys in Masonboro Island National Estuarine Research Reserve.

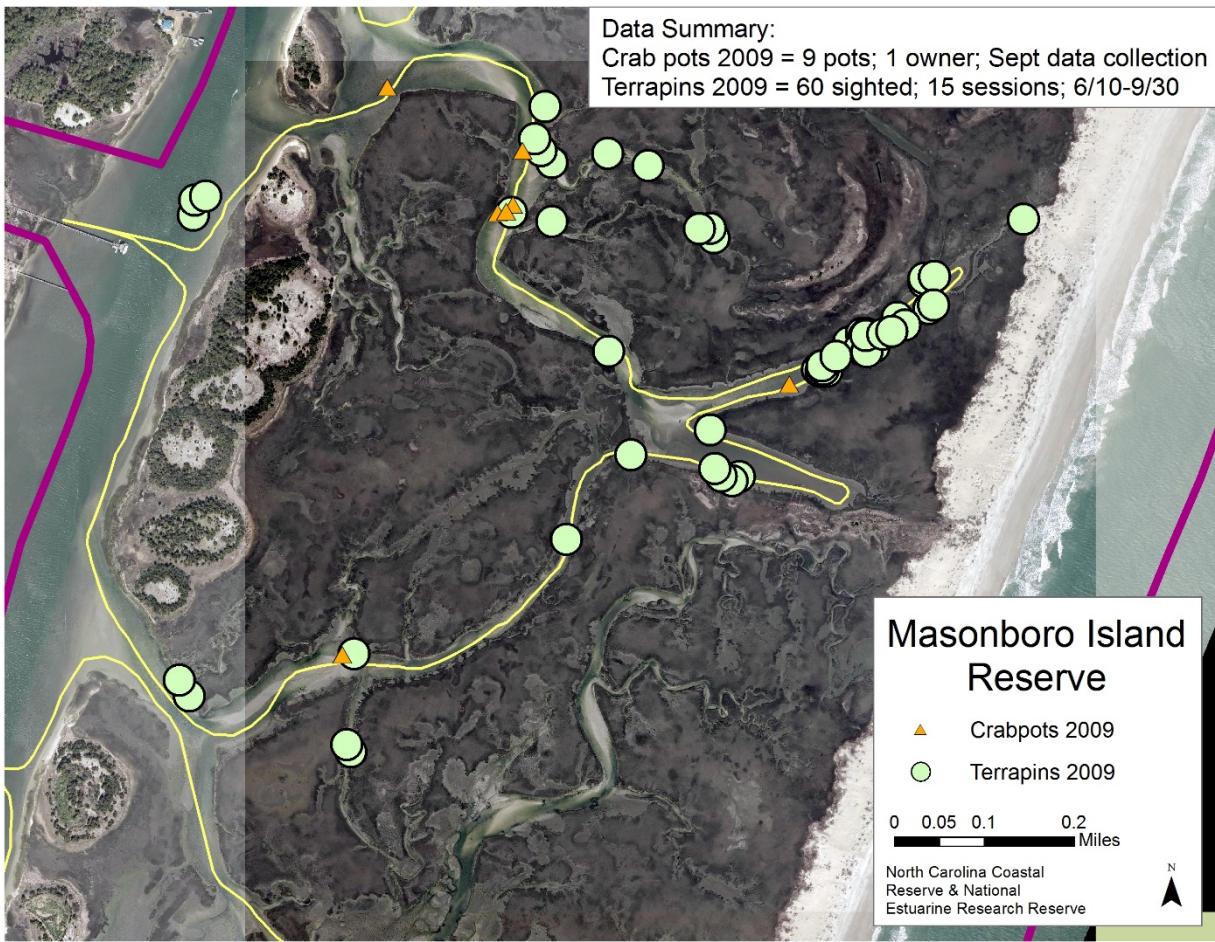


Figure B1. A map showing diamondback terrapin and crab pot locations and counts from a fixed route kayak survey conducted in the Masonboro Island NERR in 2009.

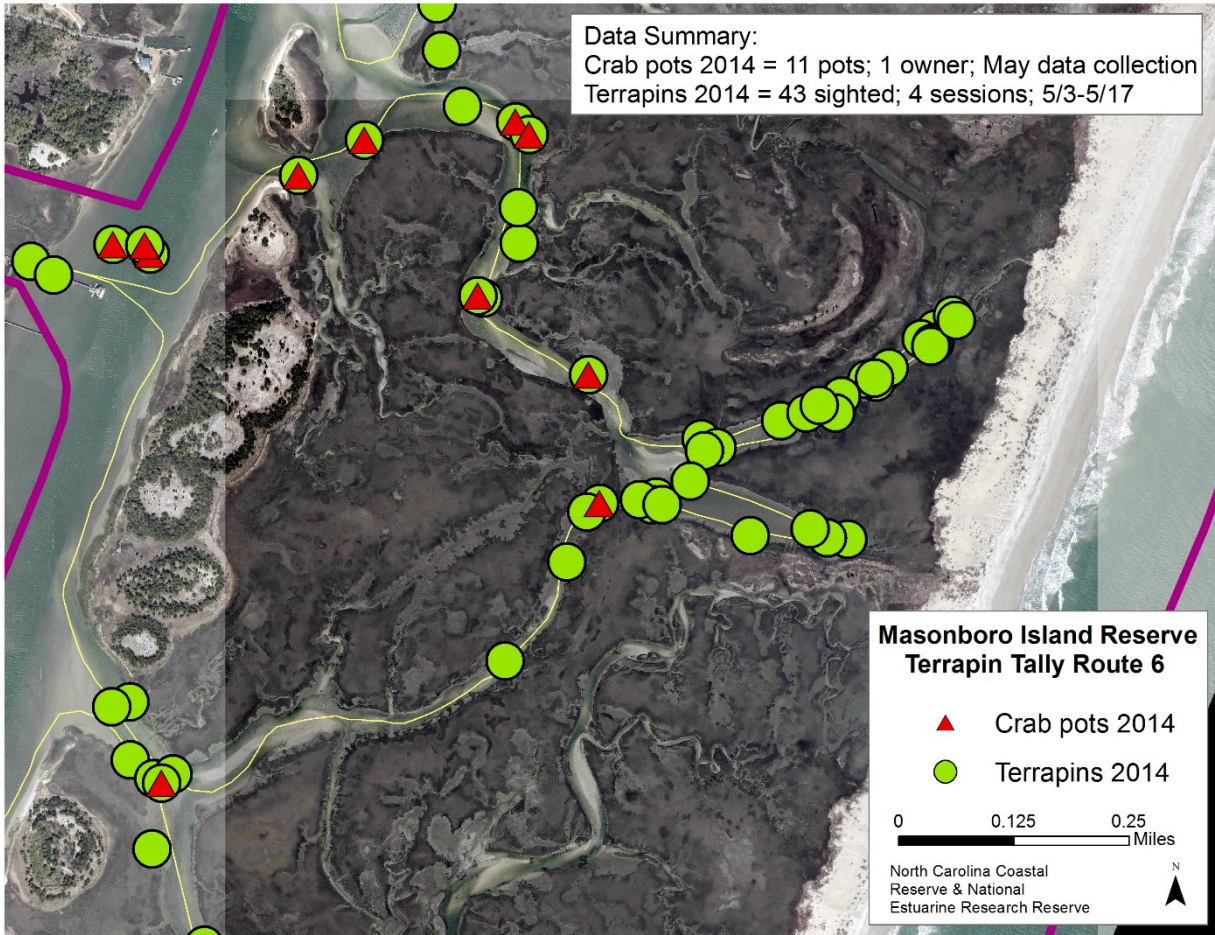


Figure B2. A map showing diamondback terrapin and crab pot locations and counts from a fixed route kayak survey conducted in the Masonboro Island NERR in 2014.

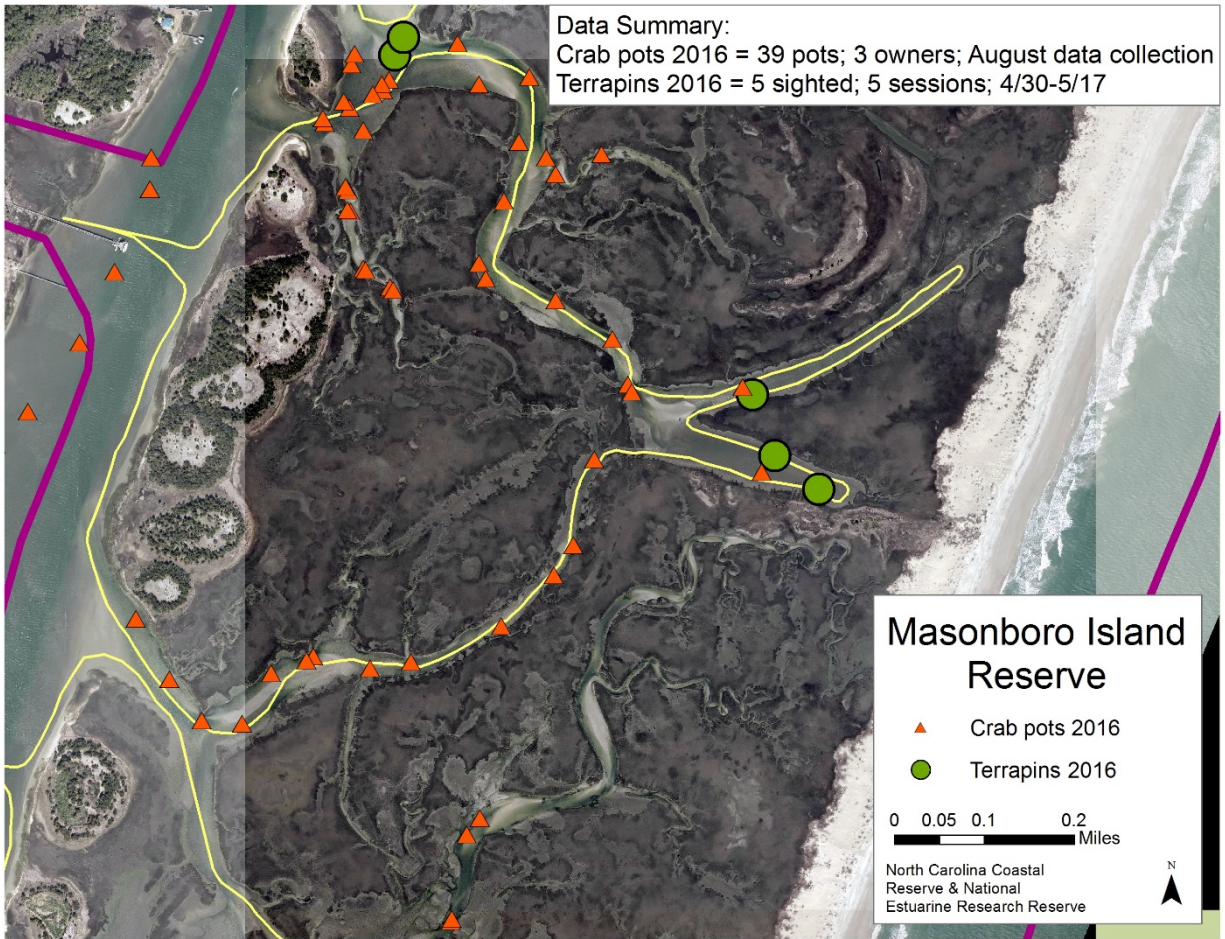


Figure B3. A map showing diamondback terrapin and crab pot locations and counts from a fixed route kayak survey conducted in the Masonboro Island NERR in 2016.

APPENDIX C. NCMFC motions for Amendment 3 to the North Carolina Blue Crab FMP that established and adopted the framework for the DTMA approach to diamondback terrapin bycatch reduction in the North Carolina blue crab pot fishery.

At its November 2019 business meeting, the NCMFC preferred management strategy for DTMAs was to determine a locally specific pot funnel design to reduce terrapin interactions as well as identify individual areas with terrapin population hot spots that would be closed to potting unless an excluder is used.

Motion to use science on locally specific pot funnel design to reduce terrapin interactions and identify individual areas with terrapin population hot spots that would be closed to potting unless an excluder is used.

At the February 2020 NCMFC business meeting, the NCDMF asked for clarification of the preferred management strategy over concerns of limited criteria details and enforcement capabilities. The NCMFC changed its final management strategy to adopt the framework and criteria for designating DTMAs as presented in the Amendment 3 issue paper, where the use of an approved terrapin excluder device will be required. The NCMFC also added a step to the framework: to bring proposed management areas back to the NCMFC following committee meetings at the next regularly scheduled meeting for approval. This eight-step framework covers criteria for approved terrapin excluder devices, time period when excluders are required in pots, terrapin interaction zone, terrapin presence, boundary designation, issue paper development with advisory committee recommendations and public comment, NCMFC action, and implementation by proclamation.

Motion to adopt the framework and criteria presented by the NCDMF for identifying diamondback terrapin management areas.