



Annual Sea Turtle Interaction Monitoring of the Anchored Gill-Net Fisheries
in North Carolina for Incidental Take Permit Year 2021
(1 September 2020–31 August 2021)

Annual Completion Report for Activities under Endangered Species Act
Section 10 Incidental Take Permit No. 16230

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1 INTRODUCTION

The North Carolina Division of Marine Fisheries (NCDMF) has actively addressed the incidental take of sea turtles in commercial estuarine gill nets since 2000. Between 2000 and 2011, the NCDMF had a series of Incidental Take Permits (ITPs) from the National Marine Fisheries Service (NMFS) under Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973 (Public Law 93-205) to “minimize, monitor, and mitigate” sea turtle interactions in anchored gill nets primarily in Pamlico Sound (Boyd 2012; Gearhart 2001, 2002, 2003; Murphey 2011; Price 2004, 2005, 2006, 2007, 2008, 2009, 2010). Five species of sea turtles can occur in North Carolina: the green sea turtle (*Chelonia mydas*), Kemp’s ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), hawksbill sea turtle (*Eretmochelys imbricata*), and leatherback sea turtle (*Dermochelys coriacea*). Anchored gill nets are passive sets deployed with an anchor, stake, or boat at one or both ends of the net string; they do not include run-around, strike, drop, or drift gill nets. For this report, the term “gill net” refers to anchored gill net and mesh sizes are provided as stretched mesh unless stated otherwise.

Evidence of incidental takes of sea turtles outside of Pamlico Sound was documented in June 2009 by NMFS observations of gill-net fisheries operating in Core Sound and nearby waterbodies (Byrd et al. 2016). These takes resulted in a series of temporary measures to address sea turtle interactions until the NCDMF obtained an ITP from NMFS for gill-net fisheries state-wide (see McConnaughey et al. 2019). On 11 September 2013, the NCDMF received the Sea Turtle ITP (No. 16230), which expires on 31 August 2023 (McConnaughey et al. 2019; NMFS 2013). The ITP defined an ITP Year as 1 September through 31 August of the following year, defined mesh size categories as large-mesh (≥ 4 inch) and small-mesh (< 4 inch), and included only three seasons (fall, spring, and summer). The permit also established annual authorized levels of incidental takes for the two mesh size categories and six geographic regions (Management Units A, B, C, D1, D2, and E; Figure 1; Tables 1–5). The ITP included a Conservation Plan to monitor, minimize, and mitigate incidental takes of sea turtles in otherwise lawful gill-net fisheries operating in North Carolina estuarine waters. Part of the plan outlined a state-wide estuarine gill-net observer program to monitor interactions that can be counted and, when applicable, extrapolated across the fishery within a given season and management unit. Required observer coverage thresholds were set for each management unit within each season as a minimum of 7% with a goal of 10% for large-mesh gill nets and a minimum of 1% with a goal of 2% for small-mesh gill nets. If observer data indicated that takes were approaching or exceeding authorized thresholds, the NCDMF could use an adaptive management approach to mitigate incidental takes by implementing temporary management options when needed using the NCDMF director’s Proclamation authority (General Statute 143B-289.52).

To maintain incidental takes below authorized levels, the Conservation Plan included a continuation of restrictions implemented previously as temporary measures for large-mesh (≥ 4 inch) gill nets. Specifically, the restrictions prohibited these gill nets in the deep waters of Pamlico Sound; limited soak times to an hour before sunset to an hour after sunrise in portions of the state; limited days of fishing depending on location; restricted net height to no more than 15 meshes; restricted total net yardage to a maximum of 2,000 yards per vessel in portions of the state; and required for some areas that net configuration for a string of nets (each net is called a ‘shot’) be constructed of shots ≤ 100 yards with a 25-yard break between shots. Large-mesh gill nets set in the southern portion of the state were restricted to a maximum of 1,000 yards per fishing operation (M-31-2014; <http://portal.ncdenr.org/web/mf/proclamation-m-31-2014>).

In May 2020, the NCDMF contacted the NMFS to request clarification of tagging protocols for sea turtles. Although the ITP requires that incidental sea turtles be tagged, staff at the NMFS Southeast Fisheries Science Center (SEFSC, Beaufort, NC) communicated to the NCDMF that there had been recent changes to their tagging protocols. These changes affected the type of training that SEFSC provided, which meant that observers did not have the training necessary to fulfill the tagging requirement per the ITP. On 1 September 2020, the NMFS provided a notification letter to the NCDMF modifying ITP permit 16230 to remove the requirement for observers to apply flipper and Passive Integrated Transponders (PIT) tags to incidentally captured sea turtles (Byrd et al. 2021). This modification applies to the remainder of the current permit.

In July 2014, the NCDMF also received an ITP (No. 18102) to address incidental takes of Atlantic Sturgeon (*Acipenser oxyrinchus*) in gill-net fisheries operating in estuarine waters across the state (NMFS 2014). Although the Atlantic Sturgeon and sea turtle ITPs and their Conservation Plans addressed different taxa, the fisheries included therein were the same. Both ITPs were reliant on observer coverage to document incidental takes and to estimate total incidental take where possible. Data from observed trips are used for both ITPs. Notably, however, the ITPs defined large mesh differently; the sea turtle ITP defined large-mesh gill nets as ≥ 4 inch stretched mesh and the Atlantic Sturgeon ITP defined them as ≥ 5 inch stretched mesh. The Atlantic Sturgeon ITP also included required observer coverage and authorized take levels during winter.

Significant regulatory changes were enacted during fall 2019 (2020 ITP Year) for Southern Flounder (*Paralichthys lethostigma*) fisheries. These regulations were included in Amendment 2 of the Southern Flounder Fishery Management Plan (FMP) adopted by the North Carolina Marine Fisheries Commission on 23 August 2019 (NCDMF 2019). This action was taken because the most recent Southern Flounder stock assessment indicated that the stock is overfished, and overfishing was occurring. North Carolina state law requires management actions be taken to end overfishing within two years and to recover the stock from an overfished condition within 10 years. To meet these legal requirements, the NCDMF determined that a 62% reduction in overall harvest was necessary for 2019 and a 72% reduction would be needed beginning in 2020. To meet this reduction, regulations were implemented that, among other measures, severely limited where and when large-mesh gill nets were allowed. For the commercial gill-net fishery, these regulations included drastic reductions in the number of days the fishery would open, 25% reductions in allowed yardage of large-mesh gill nets and soak-time limits of large-mesh gill nets to overnight soaks state-wide where before this was not required for nets in Management Units A and C.

Another significant event that occurred during the 2020 ITP Year and continued during the 2021 ITP Year was the COVID-19 pandemic. On 20 March 2020, the NMFS waived the requirement for boats fishing in federally managed fisheries to carry observers or at sea monitors due to concerns about the transmission of COVID-19. The NMFS extended this waiver to the NCDMF Observer Program on 23 March 2020; the waiver was in place throughout the rest of the 2020 ITP Year and all of the 2021 ITP Year.

Per the ITP requirements, the Observer Program provides weekly, seasonal, and annual reports to the NMFS for a given ITP year. As required, weekly progress reports were provided for any week in which a sea turtle interaction occurred. Seasonal reports for the 2021 ITP Year also were provided for fall (September–November 2020; McConnaughey 2021), spring (March–May 2021; Byrd and Gahm 2021), and summer (June–August 2021; Byrd 2021). In contrast to the Atlantic Sturgeon ITP, the sea turtle ITP does not require observer coverage or seasonal reports for winter because sea turtles are less likely to be present in North Carolina during this time. This annual

report outlines observer activity, fishing activity, and total or estimated takes of sea turtles for three seasons during the 2021 ITP Year, 1 September 2020–31 August 2021. Data for fishing activity, measured in number of trips, are finalized for fall 2020. After the preliminary data for spring and summer 2021 are finalized in May 2022, observer coverage and authorized estimated sea turtle takes will be recalculated and finalized estimates will be provided to the NMFS in the form of an addendum.

2 METHODS

2.1 Observer Activity

A sea-day schedule of projected observer trips for each season by month and management unit during the 2021 ITP Year was developed during the prior season, recognizing that the COVID-19 pandemic would likely impact planned observer activity. The number of projected observer trips by month and management unit was based on the maximum goal for coverage outlined in the Conservation Plan: 10% coverage of the total large-mesh gill-net fishing trips and 2% coverage of the total small-mesh gill-net fishing trips. Data on commercial fishing effort come from the NCDMF Trip Ticket Program (TTP), whereby fish dealers complete a trip ticket every time a commercial fisher sells finfish and shellfish. Trip tickets record information such as gear type, area fished, species harvested, and total weight by species. For anchored gill nets, the TTP defines large-mesh as ≥ 5 inch and small-mesh as < 5 . It is uncommon, however, for gill nets to have a mesh size between these two sizes; therefore, we assumed effort by mesh categories in the TTP dataset would not be greatly affected by the difference in definitions of mesh size. As such, projected observer trips were stratified across each month within three seasons and six management units proportional to TTP data of reported fishing trips. The seasons crossed calendar years and were defined as follows: fall (September–November 2020), spring (March–May 2021), and summer (June–August 2021). Within Management Unit B, large-mesh gill nets operating in Pamlico Sound were confined to specific subunits (Shallow Water Gill-Net Restricted Areas 1–4, and Mainland Gill-Net Restricted Area), effectively closing the fishery in the deep waters of Pamlico Sound and in corridors near Ocracoke, Hatteras, and Oregon inlets (Daniel 2013; Figure 1).

Projecting observer trips for the sea-day schedule typically has been calculated based on the average of reported small-mesh and large-mesh gill-net trips by month and management unit from the previous five years. However, this approach was not a viable prediction of all large-mesh fishing effort during the 2021 ITP Year due to restrictions on anchored large-mesh gill-net fisheries. Similar to fall 2019, Southern Flounder commercial fisheries (e.g., gill nets and pound nets) were constrained by setting specific dates when fishing was allowed across three flounder management areas, Northern, Central, and Southern (Figure 1). These flounder management areas generally aligned with the ITP management units except for the Core Sound portion of Management Unit B, which was split into a different flounder management area (Southern) than the rest of Management Unit B (Central; Figure 1). During the fall of 2020, the Northern area was open 15 September–6 October, the Central area was open 1–19 October, and the Southern area was open 1 October–2 November (Table 6). Flounder management areas were still subject to conditions put forth in ITPs for sea turtle and sturgeon incidental takes and could be closed by proclamation should authorized take thresholds be approached or exceeded. After November 2, limited allowances for anchored large-mesh gill nets were made during winter and spring for American Shad (*Alosa sapidissima*) fisheries. Portions of Management Unit C were re-opened to

anchored large-mesh gill nets from February 15–April 15 (Table 6). Portions of Management Unit A were re-opened to anchored large-mesh gill nets from March 2–18 (Table 6). These dates for Management Unit A differed from the 2020 ITP Year when limited allowances for large-mesh gill nets were made during late fall and winter for the harvesting of Blue Catfish (*Ictalurus furcatus*) (Byrd et al. 2021).

To estimate the number of fishing trips during the fall flounder fishery, the number of reported fishing trips per month and management unit was divided by the number of days the fishery was open during each of the previous five years. Then, the average number of fishing trips per day was calculated across the five years and expanded to the number of days the fishery would be open during fall 2020. The projected number of observer trips for each month and management unit was based on that expanded number. For the short spring shad season, the five-year average was calculated for the number of reported fishing trips during the months the fishery would be open during the 2021 ITP year. However, outside of the fall flounder and spring shad seasons in Management Units A and C, projected large-mesh observer trips were set to zero in Management Unit D1 year around, Management Units B, D2, and E during spring, and all management units during summer. Management Unit D1 portion has been closed to large-mesh gill nets since November 9, 2017, when estimated green sea turtle takes exceeded the authorized threshold (McConnaughey et al. 2019, Byrd et al. 2020). Lastly, projected small-mesh gill-net trips in Management Unit D1 was also set to zero because the management unit has been closed to anchored small-mesh gill nets since April 2020 (Byrd et al. 2021).

The COVID-19 pandemic impacted the approach to planned, and realized, observer activity during the 2021 ITP Year. Using the sea-day schedule as a guide, observers were distributed as much as possible across management units depending on the season and projected fishing effort. Most staff at NCDMF teleworked during the 2021 ITP Year through June 2021 due to COVID-19, so hiring temporary observers to help cover the busiest months was not pursued. All observed trips used an alternative platform approach whereby observers used a state-owned vessel to observe at a distance. This method requires two observers, so that the person that serves as the observer/data recorder does not have to also serve as the boat driver. Because this approach halves observer capacity, the Observer Program was aided by other NCDMF programs that provided staff to serve as boat drivers on observer teams during the fall flounder fishery. Their participation increased the capacity for completing alternative platform trips during the short flounder season. Additionally, the sea-day schedule was shared with Marine Patrol officers as in past years, who attempted to obtain alternative platform trips as part of their regular duties year around. During fall, observers began overnight travel to cover the fall flounder fishery. By spring, however, the NCDMF temporarily suspended overnight travel for observers due to increased infection rates in the state and related concerns for staff exposure to COVID-19. Observers, all based out of Morehead City, still were able to obtain trips in Management Units D1 and D2, and portions of B, C, and E. Observer Program staff coordinated with NCDMF staff in the Elizabeth City office to help obtain observer trips in Management Unit A, albeit at reduced levels. The Elizabeth City staff were trained on data collection methods for the observer program and some of them had been observers in the past.

Obtaining observer trips was facilitated by the requirement for fishers participating in estuarine anchored gill-net fisheries to obtain an Estuarine Gill-Net Permit (EGNP; M-24-2014; <http://portal.ncdenr.org/web/mf/proclamation-m-24-2014>). As part of this permit, fishers provide their contact information so that observers can call and schedule an observed trip. However, the

permit is free, and many fishers get an EGNP but do not report trips using estuarine gill nets (Byrd et al. 2021). To streamline the contact attempts by observers, the License and Statistics Section of NCDMF provided data on EGNP holders that had reported estuarine anchored fishing trips during the last three years. The dataset included number of reported trips by mesh size category (large and small) and management unit along with the name and contact information for the permit holder. This dataset was used to create a priority call list that was divided among observers. Other outreach efforts, such as visiting fish houses, were limited during the 2021 ITP Year. The Observer Program website (<http://portal.ncdenr.org/web/mf/observers-program>) was available, but fishers were not necessarily reminded to access it during the 2021 ITP Year.

Observers were trained to identify, measure, evaluate condition of, and resuscitate sea turtles by experienced NCDMF staff. Data collected on observed sea turtles included: date, time, location (latitude and longitude, when possible), condition (e.g., no apparent harm, injury including a description of the nature of the injury, or mortality), species, sex (if determinable), curved carapace length (CCL, mm), and curved carapace width (CCW, mm). Photographs of the turtles and environmental parameters (e.g., salinity, water temperature) were also collected when feasible. Dead and live, debilitated sea turtles were retained by the observer when possible and delivered to the North Carolina Wildlife Resource Commission (NCWRC) sea turtle biologist for necropsy or examination and treatment.

Observers also collected data on location and gear parameters. Because all trips were alternative platform, additional data on fish catch and bycatch were not collected. Limited data such as date and waterbodies surveyed were also collected for unsuccessful alternative platform attempts (hereafter termed “No Contact” trips) by observers and Marine Patrol. All data were coded onto NCDMF data sheets and uploaded to the NCDMF Biological Database for analysis. Observers were debriefed within 24 hours of each trip to obtain data on catch, set locations, gear parameters, and sea turtle interactions to provide running totals and estimates of sea turtle bycatch in near real time.

Ongoing estimates of observer coverage were calculated by comparing the number of observed trips to the predicted number of fishing trips by mesh-size category, month, and management unit. The numbers of ‘No Contact’ trips were not included in calculations of observer coverage. At the end of the ITP year, the TTP provided actual numbers of reported trips to calculate actual observer coverage by season and management unit. The TTP data for 2020 (September–December) were finalized, but the data for 2021 (March–August) were preliminary. As a result, observer coverage calculated for spring and summer were considered estimates. However, the TTP data for fall were conspicuously missing reported large-mesh gill-net trips in Core Sound. The Core Sound portion of Management Unit B is typically a common location used by fishers to target Southern Flounder with large-mesh gill nets. Staff with the TTP were alerted to this situation so the issue could be investigated. In the meantime, the predicted number of trips for Management Unit B during fall was used to calculate observer coverage and estimate sturgeon bycatch (see Section 2.3).

2.2 Incidental Takes

The ITP outlines authorized levels of incidental takes expressed as either estimated total takes based on observer data or counts of observed takes (Tables 1–5). Both types (estimated and counted) were necessary because there were insufficient data available for modeling predicted estimated takes in the ITP application for some combinations of species, management unit, and mesh-size category (Daniel 2013). As a result, authorized levels of annual estimated interactions were only available for green and Kemp’s ridley sea turtles in Management Units B, D1, and E in

the large-mesh gill-net fishery, and for Kemp's ridley sea turtles in D2 in the large-mesh gill-net fishery. Authorized levels for all other combinations were based on counts of actual observed (i.e., not estimated) takes. Therefore, comparisons of interactions during the 2021 ITP Year to authorized interactions were based either on annual counts of observed sea turtle takes or annual estimates of sea turtle takes. Also, during summer 2015 a minor modification to the ITP was enacted through the NMFS combining authorized takes for Management Units A (n=4) and C (n=4) for a total authorized take limit of eight sea turtles from large-mesh or small-mesh gill nets and any species or disposition (Boyd 2016). Estimates of incidental take as outlined above were calculated using the stratified ratio method where the bycatch rate calculated from observer data (sea turtles caught per observed trip) was multiplied by the total reported fishing trips.

$$\text{Estimated interactions} = \left(\frac{\text{\# of sea turtle interactions observed}}{\text{\# of gill-net trips observed}} \right) * \text{\# of gill-net trips reported}$$

Throughout each month, this calculation was employed for each incidental take to determine the estimated number of interactions by date of capture, management unit, species, and disposition. For the real-time estimates, the predicted number of fishing trips was used. Estimated numbers of interactions and running totals of observed interactions were additive across interaction dates to determine if interactions were approaching authorized take thresholds. The ongoing comparisons allowed for the implementation of management measures to prevent interactions from exceeding authorized levels. The estimated and/or total observed interactions were provided in weekly (when required), monthly, and seasonal reports.

At the end of the ITP year, the estimated number of interactions was recalculated using actual number of trips, albeit preliminary for 2021, reported in the TTP rather than from estimated trips. As mentioned above, an exception was made for Management Unit B where the estimated number of trips was used due to the lack of reported trips in Core Sound. Nonparametric confidence intervals (95%) were calculated using standard bootstrapping techniques (Efron and Tibshirani 1993) using the 'boot' package in R (Canty and Ripley 2015; Davison and Hinkley 1997; R Core Team 2019). Bootstrap replicates were generated by sampling observer trips with replacement 5,000 times within strata (mesh/season/management unit).

2.3 Compliance

The Observer Program used various methods to contact fishers to schedule trips. The most common method was by phone, due to fishers leaving from private launches and overall efficiency. For each contact made to obtain a trip (phone call or in-person), observers logged the contact in a database, assigning a category of the response and noting any additional information (e.g., fisher stated they did not fish until October). Contact response categories included the following: 1) Left message with someone else; 2) Not fishing general; 3) Fishing other gear; 4) Not fishing because of weather; 5) Not fishing because of boat issues; 6) Not fishing because of medical issues; 7) Booked trip; 8) Hung up, got angry, trip refused; 9) Call back later time/date; 10) Saw in person; 11) Disconnected; 12) Wrong number; 13) No answer; 14) No answer, left voicemail; 15) Not fishing because of natural disaster (e.g., hurricane). Observers also documented calls returned from fishers, including the response category and notes. Data in the contact log were summarized by season and response category to determine what percentage of phone calls resulted in observer trips.

As part of their regular duties, Marine Patrol officers checked gill nets for compliance. Citations and/or Notice of Violations (NOVs) were issued to fishers when gear or fishing practices were out

of compliance. A citation is an enforcement action taken by a Marine Patrol officer for person(s) found to be in violation of General Statutes, Rules, or Proclamations under the authority of the Marine Fisheries Commission and is considered a proceeding for District Court. An NOV is the NCDMF administrative process to suspend a permit (e.g., EGNP) and is initiated by an officer or NCDMF employee when a permit holder is found to be in violation of general or specific permit conditions. A citation and NOV may both be initiated by the same violation; however, they are two separate actions. For this report, NOV's or citations under the codes "EGNP" and "NETG" were compiled, as they are applicable to the EGNP and gill-net violations.

3 RESULTS

3.1 Observer Activity

Overall observer coverage during the three seasons covered for 2021 ITP Year was 12.3% of the large-mesh gill-net fishery and 2.2% of the small-mesh gill-net fishery (Tables 7 and 8; Figure 2). This level of coverage was based on 381 observed large-mesh gill-net trips and 133 observed small-mesh gill-net trips during fall, spring, and summer. Only three out of 514 (<0.6%) observed trips recorded a mesh size ≥ 4 and < 5 inch; the mesh size was exactly 4 inches. Additionally, there were 861 No Contact trips (Table 9). Observer activity during winter and spring was hindered by the ongoing COVID-19 pandemic. In addition to the aforementioned limitations that NCDMF imposed on overnight travel, there were instances when observers had to quarantine due to do exposure to COVID-19, further limiting opportunities to obtain trips even in areas within distances that did not necessitate overnight travel.

During the 514 observed trips, observers documented 17 sea turtles (15 green turtles, one Kemp's ridley turtle, and one loggerhead turtle), all in large-mesh gill nets (Table 10; Figures 2–11). No self-reported interactions were received by the Observer Program.

A series of proclamations was issued throughout the ITP year for management needs unrelated to protected species interactions (Table 6).

3.1.1 Fall 2020

During fall 2020 (September–November), the Observer Program achieved 15.4% state-wide coverage of large-mesh gill-net trips, exceeding 7% in all management units (Table 7; Figures 3–6). For small-mesh gill nets, the Observer Program achieved 2.8% state-wide coverage, exceeding 1% coverage in all management units (Table 8; Figures 3–6). There were 225 No Contact trips during fall (Table 9).

All 17 observed sea turtle interactions occurred during fall in large-mesh gill nets (Table 10; Figures 3–6). The interactions comprised 15 green (n=12 alive; n=3 dead), one live Kemp's ridley, and one live loggerhead. The majority of interactions occurred in Management Unit B (13 out of 17) with four other interactions in Management Unit E.

3.1.2 Spring 2021

During spring 2021 (March–May), the Observer Program achieved an estimated 5.4% state-wide coverage of large-mesh gill-net trips, not meeting the minimum 7% coverage overall (Table 7; Figures 7–9). Only Management Units A and C were open to large-mesh gill nets. The Observer Program would have had to observed 14 additional trips in Management Unit A and one trip in

Management Unit C to meet 7% coverage. For small-mesh gill-net trips, the Observer Program achieved an estimated 1.9% state-wide coverage with the majority of reported and observed trips occurring in Management Unit B (Table 8; Figures 7–9). Observer coverage exceeded 1% in Management Units A and B, but not in C, D2, or E. There were 267 No Contact trips (Table 9).

No sea turtle interactions were observed during spring (Table 10; Figures 7–9).

3.1.3 Summer 2021

During summer 2021 (June–August), the Observer Program did not observe any large-mesh gill-net trips as the gear was prohibited state-wide (Table 7; Figures 10–12). For small-mesh gill-net trips, the Observer Program achieved an estimated 1.6% state-wide coverage, exceeding 1.0% in all open management units (Table 8). There was a single observed trip of small-mesh gear in D2, but no small-mesh fishing trips were reported there. During spring, there were 369 No Contact trips (Table 9).

No sea turtle interactions were observed during summer (Table 10; Figures 10–12).

3.2 Incidental Takes

Across the seasons covered by the sea turtle ITP, there were 17 observed sea turtle interactions, all during fall and all in large-mesh gill nets (Table 10; Figures 2–12). The interactions comprised 15 green (n=12 alive; n=3 dead), one live Kemp’s ridley, and one live loggerhead. The majority of interactions occurred in Management Unit B (13 out of 17) with four other interactions in Management Unit E (Figures 4, 6). Additionally, most observed sea turtles were alive (14 of 17). Measured green sea turtles (n=13 of 15) ranged from 279 to 359 mm CCL (mean=323.5, SD=24.7) and 241 to 330 mm CCW (mean=275.6, SD=27.4; Figure 13). Measurements of the single loggerhead turtle were 422 mm CCL and 412 mm CCW.

Observed take levels during the 2021 ITP Year did not reach the thresholds of allowed takes for any species or management unit (Tables 1–5). The single observed loggerhead interaction accounted for only 4% of the threshold for that species (Table 5). Of the separate thresholds expressed as estimated totals of observed takes, green sea turtle takes reached 11% of the live threshold and 6% of the dead threshold, and Kemp’s ridley sea turtle takes reached 7% of the live threshold.

3.3 Compliance

During the 2021 ITP Year, there were 2,572 fishers with an ENGP; 88% (n=2,276) of the permit holders were commercial fishers (i.e., had a Standard Commercial Fishing License [SCFL] or Retired Standard Commercial Fishing License [RSCFL]) and 12% (n=296) were recreational fishers (i.e., had a Recreational Commercial Gear License [RCGL]). Of the commercial fishing permit holders, only 527 (23%) reported trips using anchored estuarine gill-net gear.

Using the priority call list of EGNP holders, 1,201 phone calls or in-person contacts were made with 33% (n=399) representing occasions where observers and fishers spoke to each other. Of the 399 conversations, 46 of them (12%) were a result of fishers returning observer phone calls. Nevertheless, only 0.9% (n=11) of the 1,201 contacts resulted in a booked trip (Figure 14). The greatest number of calls occurred during fall, and the least number of calls occurred in spring.

During the 2021 ITP Year, Marine Patrol officers issued 65 citations: summer=42, spring=11, summer=12 (Table 11). No NOV’s were issued. The NCDMF was in the process of updating NOV

procedures to better follow rule and statutes as well as afford permittees their rights set out in those rules and statutes, and to streamline and automate the internal permit suspension and revocation process. Updated NOV procedures were finalized 1 August 2021.

3.4 Marine Mammals

There was no observed marine mammal interaction during the 2021 ITP Year.

4 DISCUSSION

Incidental takes of sea turtles during the 2021 ITP Year were below authorized levels. Observed incidental takes continue to be primarily alive and in large-mesh gill nets. No new proclamations had to be imposed during the 2021 ITP Year to maintain take levels below thresholds. However, regulations from Amendment 2 imposed on the state-wide Southern Flounder fishery greatly reduced large-mesh gill-net effort during fall and prevented the previous low levels of effort in this fishery during spring and summer. Limited allowance for anchored large-mesh gill nets occurred only during winter and spring for portions of Management Unit A and C.

During the 2021 ITP Year, the COVID-19 pandemic presented challenges for the Observer Program. The Observer Program worked with other NCDMF programs and Marine Patrol to leverage assistance in obtaining coverage. Their assistance allowed for observer coverage in fall to exceed the minimum threshold for both mesh-size categories in each management unit and overall. In spring, however, limitations on observer travel contributed to not meeting minimum thresholds for large-mesh gill nets in open Management Units (A and C) and not meeting minimum thresholds for small-mesh gill nets in three of the five open Management Units. Observers cannot reach all of Management Units B, C, and E without overnight travel. Additionally, few large-mesh gill-net trips were reported in Management Unit C, and finding this effort was difficult. While looking for large-mesh gill nets, observers did find and observe seven runaround (all small mesh) gill-net trips during spring. Although observer coverage of large-mesh gill-net trips during spring in Management Unit A did not meet the 7% minimum threshold, using the estimated number of fishing trips observer coverage was estimated to be close to the threshold (6.8%).

Even without the effects that COVID-19 had on observer coverage, scheduling observed trips continues to be a challenge for the NC Observer Program, not unlike other observer programs (e.g., Lyssikatos and Garrison 2018). The EGNP is a useful tool to improve compliance by including specific permit conditions requiring fishers to allow observers aboard their vessels to monitor catches and by providing contact information for permit holders. Phone calls made to EGNP holders contributed some to observers scheduling trips, but the success rate of observers even talking to a fisher is low (~33%). The success rate did not improve much over last year even with the use of a priority call list for EGNP holders that reported fishing trips during the last several years. The NCDMF is in the beginning stages of developing a call-in system whereby fishers would be required to contact the Observer Program prior to fishing to determine if they were selected to take an observer for a given period of time (e.g., week).

Although onboard observations are the preferred method, alternative platform observations played a critical role to the continuation of observing gill nets during the COVID-19 pandemic. Alternative platform observations have several other advantages. Primarily, they do not rely on previous contact with fishers to obtain an observable trip. Alternative platform observations also allow Marine Patrol to conduct observations as part of their daily patrols; their observed trips

contribute a substantial portion of the total alternative platform observations. Even for fishers who would willingly take an observer, many vessels used by gillnetters in estuarine waters are too small to easily accommodate an observer, making alternative platform observations ideal for capturing trips with this size class of vessel (Kolkmeier et al. 2007). Nevertheless, the alternative platform method has several drawbacks. First, it requires two observers, halving observer effort and program efficiency. The Observer Program leveraged assistance from other NCDMF staff to help build teams to increase the capacity of the program during the 2021 ITP Year. Obtaining alternative platform observations also can be a challenge as some fishers avoid being observed by retrieving their gear before sunrise or changing fishing locations if observers have been seen in an area. Although refusal of an observed trip by a fisher can result in a suspension of their EGNP, non-compliance typically does not include such a direct refusal. As such, non-compliance continues to be a hurdle for ensuring the observer coverage requirements for both ITPs are met. Because few observer trips were scheduled in advance, a significant amount of time was spent searching for fishing activity, especially when fishing activity was less concentrated. However, this effort by observers and Marine Patrol officers was sometimes unsuccessful at finding trips to observe. Outreach activities are an ongoing necessity to improve compliance even when a call-in system is implemented. Outreach will resume when risks associated with COVID-19 are abated.

The NCDMF observer program uses a combination of real-time monitoring of sea turtle takes and an adaptive management approach to successfully control the number of interactions in the estuarine anchored gill-net fisheries. Specific actions to limit sea turtle takes were not necessary during the 2021 ITP Year. Other restrictions were already in place, however. Management Unit D1 was kept closed to large-mesh gill nets based on historical sea turtle densities and take levels. The new management measures for Southern Flounder significantly reduced large-mesh gill-net effort throughout the year, especially during fall when effort was historically high. These management measures, along with challenges faced from the COVID-19 pandemic and associated field restrictions, presented additional and unique challenges in predicting fishing effort and obtaining coverage during the 2021 ITP Year. The Observer Program will continue to assess when adjustments are needed for the approach of projecting fishing effort. It is more difficult to determine how COVID-19 will affect future observer effort as infection rates tend to rise and fall. At the time of writing this report, the observer program continues to operate only alternative platform trips to limit close contact between observers and fishers. This approach will be reevaluated on an ongoing basis to determine when onboard observations could resume. The NCDMF is committed to incorporating new approaches to project observer coverage and overcome the challenges of COVID-19.

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6 TABLES

Table 1. For large-mesh (≥ 4 inch) gill nets, annual estimated authorized and actual takes of sea turtles by species and Management Unit (B, D1, D2, and E) for the 2021 ITP Year. Estimated actual takes were calculated from observer data; 95% confidence intervals are provided in parentheses. Takes of green sea turtles in Management Unit D2 are denoted as not applicable (n/a) because authorized takes in the ITP are expressed as counts not estimated takes (see Table 2).

Species	B				D1				D2			
	Estimated Takes				Estimated Takes				Estimated Takes			
	Authorized		Actual		Authorized		Actual		Authorized		Actual	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Green	225	112	21.47 (9.42, 42.68)	9.27 (2.45, 25.21)	9	5	0	0	n/a	n/a	n/a	n/a
Kemp's ridley	53	26	0	0	15	7	0	0	6	3	0	0
Total	278	138	21.47	9.27	24	12	0	0	6	3	0	0

Species	E				Total			
	Estimated Takes				Estimated Takes			
	Authorized		Actual		Authorized		Actual	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Green	96	48	15.39 (2.51, 44.49)	0	330	165	36.86	9.27
Kemp's ridley	24	13	6.56 (0.00, 19.67)	0	98	49	6.56	0.00
Total	120	61	21.95	0	428	214	43.42	9.27

Table 2. For large-mesh (≥ 4 inch) gill nets, annual authorized and actual counts of observed (not estimated) takes of sea turtles by species and Management Unit (B, D1, D2, and E) for the 2021 ITP Year. Takes of Kemp's ridley sea turtles in Management Units B, D1, D2, and E and green sea turtles in Management Units B, D1, and E are denoted as not applicable (n/a) because authorized takes in the ITP are expressed as estimated takes for the fishery not counts of observed takes (see Table 1).

Species	B		D1		D2		E		Total	
	Observed (live/dead)		Observed (live/dead)		Observed (live/dead)		Observed (live/dead)		Observed (live/dead)	
	Authorized	Actual	Authorized	Actual	Authorized	Actual	Authorized	Actual	Authorized	Actual
Green	n/a	n/a	n/a	n/a	6	0	n/a	n/a	6	0
Kemp's ridley	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hawksbill	1	0	1	0	1	0	1	0	4	0
Leatherback	1	0	1	0	1	0	1	0	4	0
Loggerhead	3	1	3	0	3	0	3	0	12	1
Total	5	1	5	0	11	0	5	0	26	1

Table 3. For large-mesh (≥ 4 inch) and small-mesh (< 4 inch) gill nets combined, annual authorized and actual counts of observed (not estimated) takes of sea turtles by Management Unit (A and C) for the 2021 ITP Year. Authorized levels per management unit are four sea turtles of any species.

Species	A		C		Total	
	Authorized (live/dead)	Actual (live/dead)	Authorized (live/dead)	Actual (live/dead)	Authorized (live/dead)	Actual (live/dead)
Green		0		0		0
Kemp's ridley		0		0		0
Hawksbill	4 (any species)	0	4 (any species)	0	8 (any species)	0
Leatherback		0		0		0
Loggerhead		0		0		0

Table 4. For small-mesh (<4 inch) gill nets, annual authorized and actual counts of observed (not estimated) takes of sea turtles by species and Management Unit (B, D1, D2, and E) for the 2021 ITP Year.

Species	B		D1		D2		E		Total	
	Observed (live/dead)		Observed (live/dead)		Observed (live/dead)		Observed (live/dead)		Observed (live/dead)	
	Authorized	Actual	Authorized	Actual	Authorized	Actual	Authorized	Actual	Authorized	Actual
Green	3	0	3	0	3	0	3	0	12	0
Hawksbill	1	0	1	0	1	0	1	0	4	0
Kemp's ridley	3	0	3	0	3	0	3	0	12	0
Leatherback	1	0	1	0	1	0	1	0	4	0
Loggerhead	3	0	3	0	3	0	3	0	12	0
Total	11	0	11	0	11	0	11	0	44	0

Table 5. Total annual authorized and actual takes (either counts of observed or estimated) of sea turtles by species and, for estimated takes, by condition for the 2021 ITP Year. Takes expressed as estimated numbers are denoted as not applicable (n/a) for species whose authorized takes in the ITP are expressed only as counts.

Species	Observed (live/dead)		Estimated			
	Authorized	Actual	Authorized		Actual	
	Live/Dead	Live/Dead	Alive	Dead	Alive	Dead
Green	18	0	330	165	36.9	9.3
Hawksbill	8	0	n/a	n/a	n/a	n/a
Kemp's ridley	12	0	98	49	6.6	0
Leatherback	8	0	n/a	n/a	n/a	n/a
Loggerhead	24	1	n/a	n/a	n/a	n/a
Any Species	8	0	n/a	n/a	n/a	n/a
Total	78	0	428	214	43.4	9.3

Table 6. Regulations for management units by effective date for large-mesh (≥ 4 inch) and small-mesh (< 4 inch) gill nets during the 2021 ITP Year. Proclamations during winter months affected fishing effort in subsequent months.

Year	Date	Proclamation Number	Regulation
2020	15-Sep	FF-25-2020	This proclamation supersedes Proclamation FF-34-2019, dated September 12, 2019. It establishes commercial flounder season dates for Internal Coastal Waters by Flounder Management Area. It maintains a 15-inch total length minimum size limit. It also maintains the regulation making it unlawful to possess flounder taken from anchored large mesh gill nets with a stretched mesh length less than 6 inches. It makes it unlawful for a commercial fishing operation to possess flounder from the Atlantic Ocean Waters taken by any method other than trawls. This action is being taken to comply with the requirements of Amendment 2 to the N.C. Southern Flounder Fishery Management Plan.
2020	Sep-20	M-13-2020	This proclamation supersedes proclamation M-10-2020 dated April 28, 2020. In Management Unit A, it maintains small mesh gill net attendance requirements. It expands the portion of Management Unit A to include the Chowan River that allows the use of run around, strike, drop, and trammel gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches to harvest blue catfish.
2020	Sep-20	M-14-2020	This proclamation supersedes proclamation M-13-2020 dated September 2, 2020. It opens the previously closed Management Unit A to the use of gill nets for the purpose of harvesting flounder in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan and the Sea Turtle ITP. It maintains the exempted areas in MUA open to the use of run-around, strike, drop, and trammel gill nets to harvest blue catfish. It also maintains small mesh gill net attendance requirements in the entirety of Management Unit A.
2020	Sep-20	M-15-2020	This proclamation supersedes proclamation M-6-2020 dated April 8, 2020. This proclamation opens Management Units B (subunits only), C, D2 and E to the use of gill nets with a stretched mesh length of 4 inches through 6 ½ inches (except as described in Section III.) in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan.
2020	Oct-20	M-16-2020	This proclamation supersedes proclamation M-14-2020 dated September 10, 2020. It closes Management Unit A to the use of large mesh gill nets with overnight soaks for the purpose of harvesting flounder. It maintains the exempted portion of Management Unit A that allows the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches to harvest blue catfish. It maintains small mesh gill net attendance requirements in the entirety of Management Unit A.
2020	Oct-20	M-19-2020	This proclamation supersedes proclamation M-15-2020 dated September 25, 2020. This proclamation closes Management Unit B (subunits SGNRA 1-4, MGNRA and portions of CGNRA) and Management Unit C to the use of gill nets with a stretched mesh length of 4 inches through 6 ½ inches (except as described in Section III.) in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan.

Table 6. (continued) Regulations for management units by effective date for large-mesh (≥ 4 inch) and small-mesh (< 4 inch) gill nets during the 2021 ITP Year. Proclamations during winter months affected fishing effort in subsequent months.

Year	Date	Proclamation Number	Regulation
2020	Nov-20	M-20-2020	This proclamation supersedes proclamation M-19-2020 dated October 16, 2020. This proclamation closes all management units south of Management Unit A to the use of gill nets with a stretched mesh length of 4 inches through 6 ½ inches (except as described in Section III.) in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan.
2020	Dec-20	M-21-2020	This proclamation supersedes proclamation M-16-2020 dated October 1, 2020. In Management Unit A, it removes attendance requirements and imposes vertical height restrictions for anchored gill nets with a stretched mesh length of 3 inches through 3 ¾ inches. It maintains the exempted portion of Management Unit A that allows the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches to harvest blue catfish.
2020	Jan-21	M-3-2021	This proclamation supersedes proclamation M-21-2020 dated November 20, 2020. In Management Unit A, it is unlawful to use fixed or stationary gill nets with a stretched mesh length other than 3 ¼ inches. It maintains the exempted portion of Management Unit A that allows the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches to harvest blue catfish.
2021	Feb-21	M-5-2021	This proclamation supersedes proclamation M-3-2021 dated November 20, 2020. It opens an additional portion of Management Unit A that allows the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches. It maintains that it is unlawful to use fixed or stationary gill nets with a stretched mesh length other than 3 ¼ inches.
2021	Feb-21	M-6-2021	This proclamation supersedes proclamation M-20-2020 dated October 30, 2020. This proclamation opens Management Unit C to the use of gill nets with a stretched mesh length of 4 inches through 6 ½ inches and implements gear exemptions for the shad fishery in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan.
2021	Mar-21	M-7-2021	This proclamation supersedes proclamation M-5-2021 dated January 29, 2021. It opens a portion of Management Unit A to the use of floating gill nets configured for harvesting American shad by removing vertical height and setting restrictions for all gill nets with stretched mesh lengths of 5 ¼ through 6 ½ inches. FF-2-2021 makes it unlawful to possess American shad for commercial purposes prior to 12:01 A.M. Wednesday, March 3, 2021 and after midnight Wednesday, March 24, 2021.
2021	Mar-21	M-8-2021	This proclamation supersedes proclamation M-12-2020 dated July 20, 2020. It increases the yardage limits for gillnets with a stretched mesh length less than 4 inches in Management Unit B and maintains yardage limits for Management Units C, D1, D2 and E. It also maintains attendance requirements for gillnets with a stretched mesh length less than 5 inches.

Table 6. (continued) Regulations for management units by effective date for large-mesh (≥ 4 inch) and small-mesh (< 4 inch) gill nets for the 2021 ITP Year. Proclamations during winter months affected fishing effort in subsequent months.

Year	Date	Proclamation Number	Regulation
2021	Mar-21	M-9-2021	This proclamation supersedes proclamation M-7-2021 dated February 25, 2021. It closes a portion of Management Unit A to the use of all gill nets and reduces the maximum amount of yards allowed for gill nets configured for harvesting American shad
2021	Mar-21	M-10-2021	This proclamation supersedes proclamation M-9-2021 dated March 9, 2021. In Management Unit A, it removes gill nets configured for harvesting American shad. It maintains that it is unlawful to use fixed or stationary gill nets with a stretched mesh length other than $3 \frac{1}{4}$ inches, and opens a portion of Management Unit A to the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of $5 \frac{1}{2}$ inches through $6 \frac{1}{2}$ inches for harvesting blue catfish.
2021	Apr-21	M-11-2021	This proclamation supersedes proclamation M-6-2021 dated January 29, 2021. This proclamation closes Management Unit C and maintains closures in all other management units south of Management Unit A to the use of gill nets with a stretched mesh length of 4 inches through $6 \frac{1}{2}$ inches (except as described in Section II.: coincides with the commercial shad fishery closure) in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan
2021	Apr-21	M-12-2021	This proclamation supersedes proclamation M-10-2021 dated March 17, 2021. In Management Unit A, it implements small mesh gill net attendance requirements. It maintains that it is unlawful to use fixed or stationary gill nets with a stretched mesh length other than 3 inches through $3 \frac{3}{4}$ inches and keeps open a portion of Management Unit A to the use of run-around, strike, drop, and trammel gill nets with a stretched mesh length of $5 \frac{1}{2}$ inches through $6 \frac{1}{2}$ inches for harvesting blue catfish.
2021	May-21	M-13-2021	This proclamation revises proclamation M-13-2021 and changes the issue date only. This proclamation supersedes proclamation M-8-2021 dated March 4, 2021. It increases the yardage limits for the commercial Spanish mackerel drift gill net fishery in Management Unit B. It also reduces the yardage limit for anchored gill nets in Management Unit B.
2021	Jun-21	M-14-2021	This proclamation supersedes proclamation M-13-2021 (REVISED) dated May 4, 2021. It reduces the yardage limit for gill nets with a stretched mess length less than 4 inches in Management Unit B

Table 7. For large-mesh gill nets, observer coverage (observed trips/fishing trips) calculated from observer data (≥ 4 inch) and reported trips from the Trip Ticket Program (≥ 5 inch) by season and management unit for the 2021 ITP Year. Observer coverage was calculated using estimated fishing trips based on Trip Ticket Program data and actual reported trips from the program for the 2021 ITP Year with the exception of Management Unit B during fall when estimated fishing trips were used, denoted by an asterisk (*). Estimated trips=“closed” when and where anchored large-mesh gill nets were prohibited. Trip Ticket Program data are considered finalized for 2020 and preliminary for 2021.

Season	Management Unit	Large Mesh				
		Estimated Fishing Trips	Reported Fishing Trips	Observed Trips	Coverage - Estimated Fishing Trips	Coverage - Reported Fishing Trips
Fall 2020	A	555	1,050	113	20.4	10.8
	B	370	370*	74	20.0	20.0
	C	190	122	41	21.6	33.6
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	182	74	38	20.9	51.4
	E	349	521	63	18.1	12.1
	Overall	1,646	2,137	329	20.0	15.4
Spring 2021	A	762	949	52	6.8	5.5
	B	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	C	376	13	0	0.0	0.0
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	E	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	Overall	1,138	962	52	4.6	5.4
Summer 2021	A	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	B	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	C	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	E	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	Overall	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
Annual		2,784	3,099	381	13.7	12.3

Table 8. For small-mesh gill nets, observer coverage (observed trips/fishing trips) calculated from observer trips (<4 inch) and reported trips from the Trip Ticket Program (<5 inch) by season and management unit for the 2021 ITP Year. Observer coverage was calculated using estimated fishing trips based on the Trip Ticket Program data and actual reported trips from the program for the 2021 ITP Year. Estimated trips=“*closed*” when and where anchored small-mesh gill nets were prohibited. Trip Ticket Program data are considered finalized for 2020 and preliminary for 2021.

Season	Management Unit	Small Mesh				
		Estimated Fishing Trips	Reported Fishing Trips	Observed Trips	Coverage - Estimated Fishing Trips	Coverage - Reported Fishing Trips
Fall 2020	A	263	496	8	3.0	1.6
	B	812	1,375	25	3.1	1.8
	C	137	161	3	2.2	1.9
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	244	69	9	3.7	13.0
	E	430	402	24	5.6	6.0
	Overall	1,886	2,503	69	3.7	2.8
Spring 2021	A	656	550	11	1.7	2.0
	B	1,363	1,245	27	2.0	2.2
	C	212	121	1	0.5	0.8
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	59	8	0	0.0	0.0
	E	111	101	0	0.0	0.0
	Overall	2,401	2,025	39	1.6	1.9
Summer 2021	A	172	159	5	2.9	3.1
	B	848	1,200	13	1.5	1.1
	C	92	54	1	1.1	1.9
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	31	0	1	3.2	--
	E	193	134	5	2.6	3.7
	Overall	1,336	1,547	25	1.9	1.6
Annual		5,623	6,075	133	2.4	2.2

Table 9. Number of "No Contact" trips by season and management unit completed by Marine Patrol and observers during the 2021 ITP Year. No Contact refers to unsuccessful attempts to find and observe anchored gill-net effort. Management Unit D1 was *closed* to anchored small- and large-mesh gill nets.

Season	Management Unit	Marine Patrol No Contact Trips	Observer No Contact Trips	Total No Contact Trips
Fall 2020	A	37	9	46
	B	17	12	35
	C	15	4	19
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	24	8	32
	E	97	2	99
	Overall	190	35	225
Spring 2021	A	36	2	38
	B	15	12	27
	C	10	15	25
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	29	5	34
	E	139	4	143
	Overall	229	38	267
Summer 2021	A	60	1	61
	B	41	29	70
	C	35	13	48
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	22	4	26
	E	162	2	164
	Overall	320	49	369
Annual		739	122	861

Table 10. Summary of observed sea turtle interactions (n=17) in large-mesh (≥ 4 inch) gill nets during the 2021 ITP Year. No interactions were observed in small-mesh (< 4 inch) gill nets. Tags were not applied. CCL= Curved Carapace Length. CCW= Curved Carapace Width.

Date	Season	Management Unit	Mesh Size Category	Latitude (N)	Longitude (W)	Species	Disposition	CCL (mm)	CCW (mm)
10/1/2020	Fall	B	Large	35.03789	-76.11697	Green	Alive	343	259
10/1/2020	Fall	B	Large	35.03621	-76.11968	Green	Alive	279	241
10/1/2020	Fall	B	Large	35.00119	-76.16446	Green	Alive	332	281
10/2/2020	Fall	B	Large	35.35749	-75.56485	Green	Alive	n/r	n/r
10/2/2020	Fall	E	Large	34.17388	-77.84450	Green	Alive	342	330
10/6/2020	Fall	B	Large	35.35602	-75.56176	Green	Dead	330	273
10/6/2020	Fall	B	Large	35.35785	-75.55959	Green	Alive	317	279
10/6/2020	Fall	B	Large	35.35520	-75.56087	Green	Alive	304	266
10/6/2020	Fall	B	Large	35.45318	-75.51341	Green	Alive	304	254
10/7/2020	Fall	B	Large	35.45039	-75.51256	Green	Alive	330	279
10/7/2020	Fall	B	Large	35.33092	-75.59394	Green	Alive	357	306
10/7/2020	Fall	B	Large	35.33328	-75.58375	Green	Dead	284	245
10/8/2020	Fall	B	Large	34.81448	-76.37898	Loggerhead	Alive	422	412
10/9/2020	Fall	E	Large	34.44384	-77.54328	Green	Alive	n/r	n/r
10/13/2020	Fall	E	Large	34.70069	-77.09571	Kemp's Ridley	Alive	n/r	n/r
10/15/2020	Fall	B	Large	34.89843	-76.31883	Green	Dead	354	316
10/22/2020	Fall	E	Large	34.42334	-77.57556	Green	Alive	330	254

Table 11. All EGNP and NETG Citations written by Marine Patrol for anchored gill nets by season and violation code during the 2021 ITP Year.

Season	Violation Date	Violation Code	Violation Description
Fall	2020-09-01	NETG09	Gill net set too close to bridge
Fall	2020-09-04	NETG23	Use gill/seine net within 1/4 mi of state/national park
Fall	2020-09-13	NETG02	Using gill net without buoys or identification
Fall	2020-09-13	NETG10	Gill net with illegal mesh size
Fall	2020-09-29	NETG03	Using gill net with improper buoys or identification
Fall	2020-09-29	NETG45	Set or retrieve large mesh gill nets no sooner than one hour before sunset on Mon through Thurs Proclamation M-8-2010
Fall	2020-10-01	NETG04	Leave gill net in waters when could not be legally fished
Fall	2020-10-02	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-02	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-02	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-02	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-02	NETG04	Leave gill net in waters when could not be legally fished
Fall	2020-10-02	NETG04	Leave gill net in waters when could not be legally fished
Fall	2020-10-03	NETG04	Leave gill net in waters when could not be legally fished
Fall	2020-10-05	NETG46	Set or retrieve large mesh gill nets later than one hour after sunrise on Tuesday through Friday Proclamation M-8-2010
Fall	2020-10-06	NETG37	Leave small mesh gill nets unattended 3J.0103
Fall	2020-10-07	EGNP30	Failure to comply with gill net configurations outlined in proclamation
Fall	2020-10-07	NETG04	Leave gill net in waters when could not be legally fished
Fall	2020-10-08	EGNP30	Failure to comply with gill net configurations outlined in proclamation
Fall	2020-10-08	NETG55	Violate the provisions of Proclamation M-30-2011 to wit set gill nets before one hour before sunset Proclamation M-30-11
Fall	2020-10-08	NETG55	Violate the provisions of Proclamation M-30-2011 to wit set gill nets before one hour before sunset Proclamation M-30-11
Fall	2020-10-12	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Fall	2020-10-12	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Fall	2020-10-12	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Fall	2020-10-14	EGNP11	Failure to attend nets
Fall	2020-10-14	NETG46	Set or retrieve large mesh gill nets later than one hour after sunrise on Tues through Fri Proclamation M-8-2010
Fall	2020-10-14	NETG46	Set or retrieve large mesh gill nets later than one hour after sunrise on Tues through Fri Proclamation M-8-2010
Fall	2020-10-15	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-15	NETG01	Leave gill net in coastal waters unattended

Table 11 (continued). All EGNP and NETG citations written by Marine Patrol for anchored gill nets by season and violation code during the 2021 ITP Year.

Season	Violation Date	Violation Code	Violation Description
Fall	2020-10-15	NETG37	Leave small mesh gill nets unattended 3J.0103
Fall	2020-10-15	NETG37	Leave small mesh gill nets unattended 3J.0103
Fall	2020-10-16	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-23	NETG37	Leave small mesh gill nets unattended 3J.0103
Fall	2020-10-27	NETG01	Leave gill net in coastal waters unattended
Fall	2020-10-27	NETG03	Using gill net with improper buoys or identification
Fall	2020-10-28	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Fall	2020-10-28	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Fall	2020-10-28	NETG01	Leave gill net in coastal waters unattended
Fall	2020-11-05	NETG02	Using gill net without buoys or identification
Fall	2020-11-10	NETG01	Leave gill net in coastal waters unattended
Fall	2020-11-19	NETG01	Leave gill net in coastal waters unattended
Spring	2021-03-06	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Spring	2021-03-10	NETG03	Using gill net with improper buoys or identification
Spring	2021-03-14	EGNP10	Set more than the legal length of gill net
Spring	2021-04-05	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Spring	2021-04-06	NETG03	Using gill net with improper buoys or identification
Spring	2021-04-06	NETG12	Net in middle third of marked navigational channel
Spring	2021-04-08	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Spring	2021-04-08	NETG04	Leave gill net in waters when could not be legally fished
Spring	2021-04-23	NETG10	Gill net with illegal mesh size
Spring	2021-04-27	EGNP26	Observer harassment
Spring	2021-05-19	NETG22	Improperly set gill net
Summer	2021-06-17	NETG27	Gill Net set within 50 yards from shore 3H.0103 M-9-2008
Summer	2021-07-26	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Summer	2021-07-26	NETG03	Using gill net with improper buoys or identification
Summer	2021-07-26	NETG10	Gill net with illegal mesh size
Summer	2021-08-16	NETG04	Leave gill net in waters when could not be legally fished

Table 11 (*continued*). All EGNP and NETG citations written by Marine Patrol for anchored gill nets by season and violation code during the 2021 ITP Year.

Season	Violation Date	Violation Code	Violation Description
Summer	2021-08-20	NETG02	Using gill net without buoys or identification
Summer	2021-08-25	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Summer	2021-08-25	NETG10	Gill net with illegal mesh size
Summer	2021-08-26	NETG01	Leave gill net in coastal waters unattended
Summer	2021-08-26	NETG04	Leave gill net in waters when could not be legally fished
Summer	2021-08-31	EGNP01	Fishing gill net without a valid Estuarine Gill Net Permit
Summer	2021-08-31	NETG10	Gill net with illegal mesh size

7 FIGURES

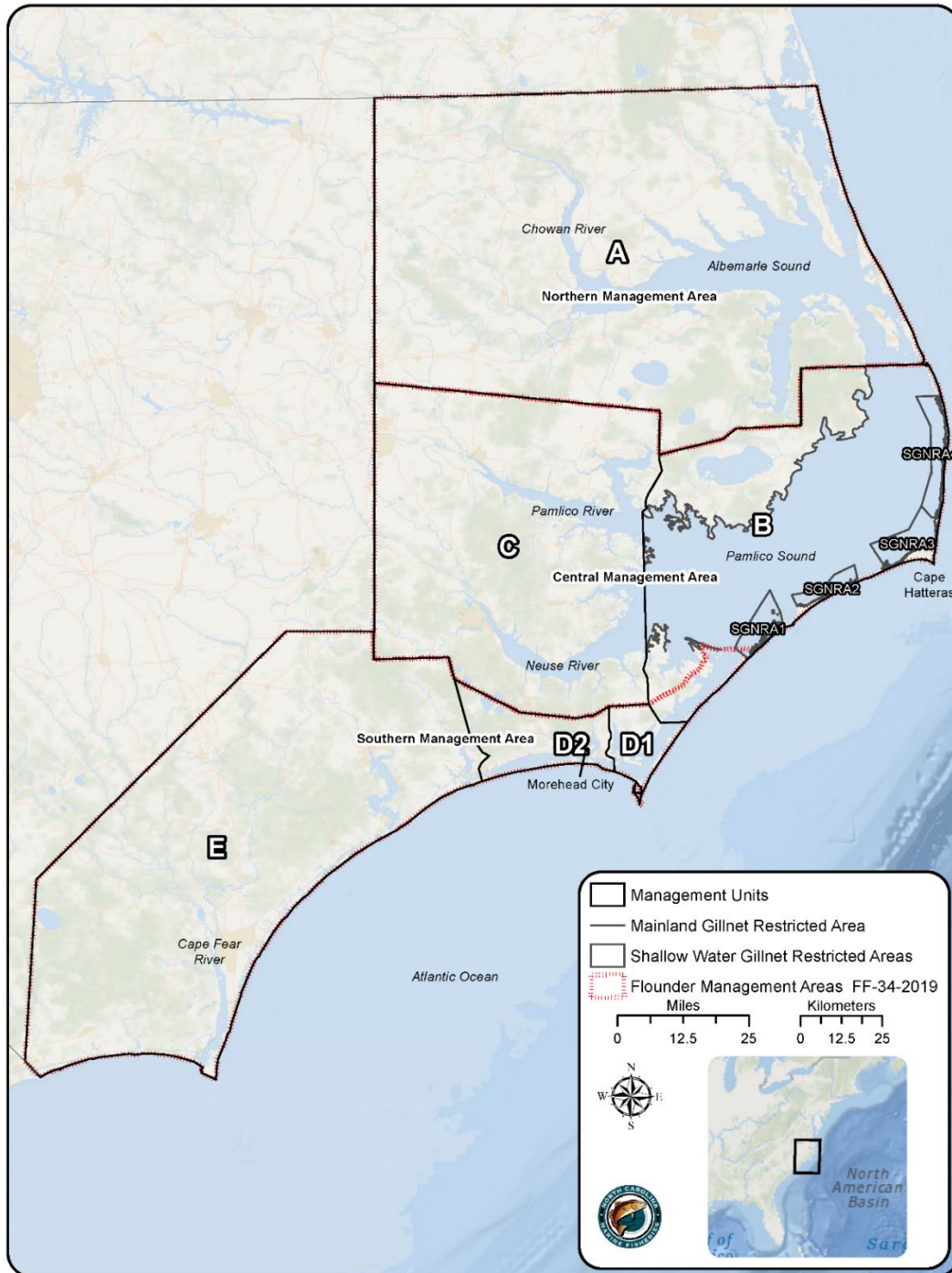


Figure 1. Management Units (A, B, C, D1, D2, and E) as outlined in the Incidental Take Permit (ITP) Conservation Plan and used by the Observer Program for the 2021 ITP Year. In the Pamlico Sound portion of B, large-mesh (≥ 4 inch) gill nets were confined to Shallow Water Gillnet Restricted Areas (SGNRA) 1-4 and the Mainland Gillnet Restricted Area (200 yards from shore). The three Southern Flounder Management Areas are shown with red hatched lines: northern, central, and southern.

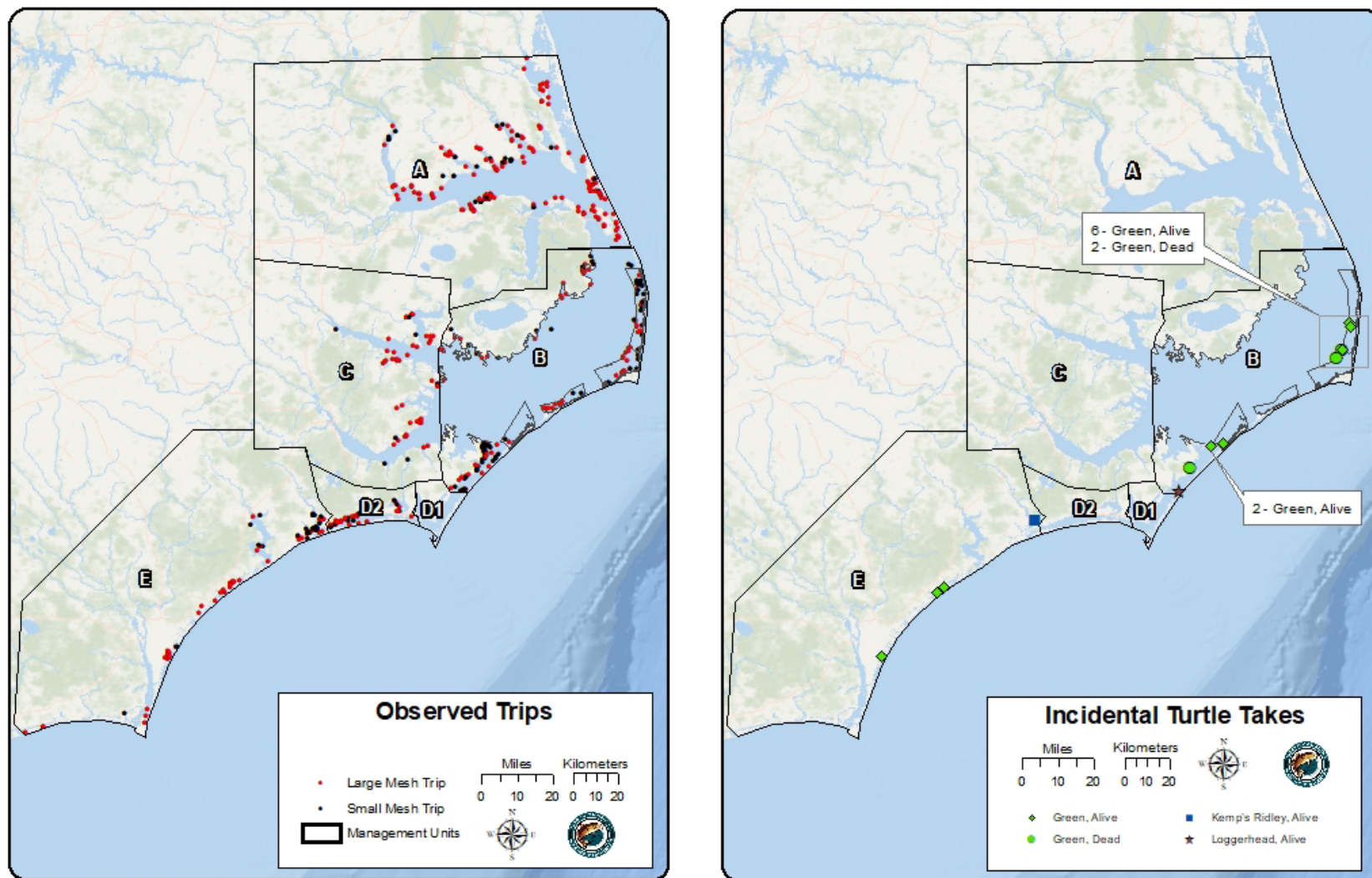


Figure 2. For the entire 2021 ITP Year, observed gill-net trips (left) by mesh-size category (381 large mesh= ≥ 4 inch; 133 small mesh= ≤ 4 inch) and sea turtle interactions (right) by species and disposition (alive, n=14; dead, n=3) across management units.

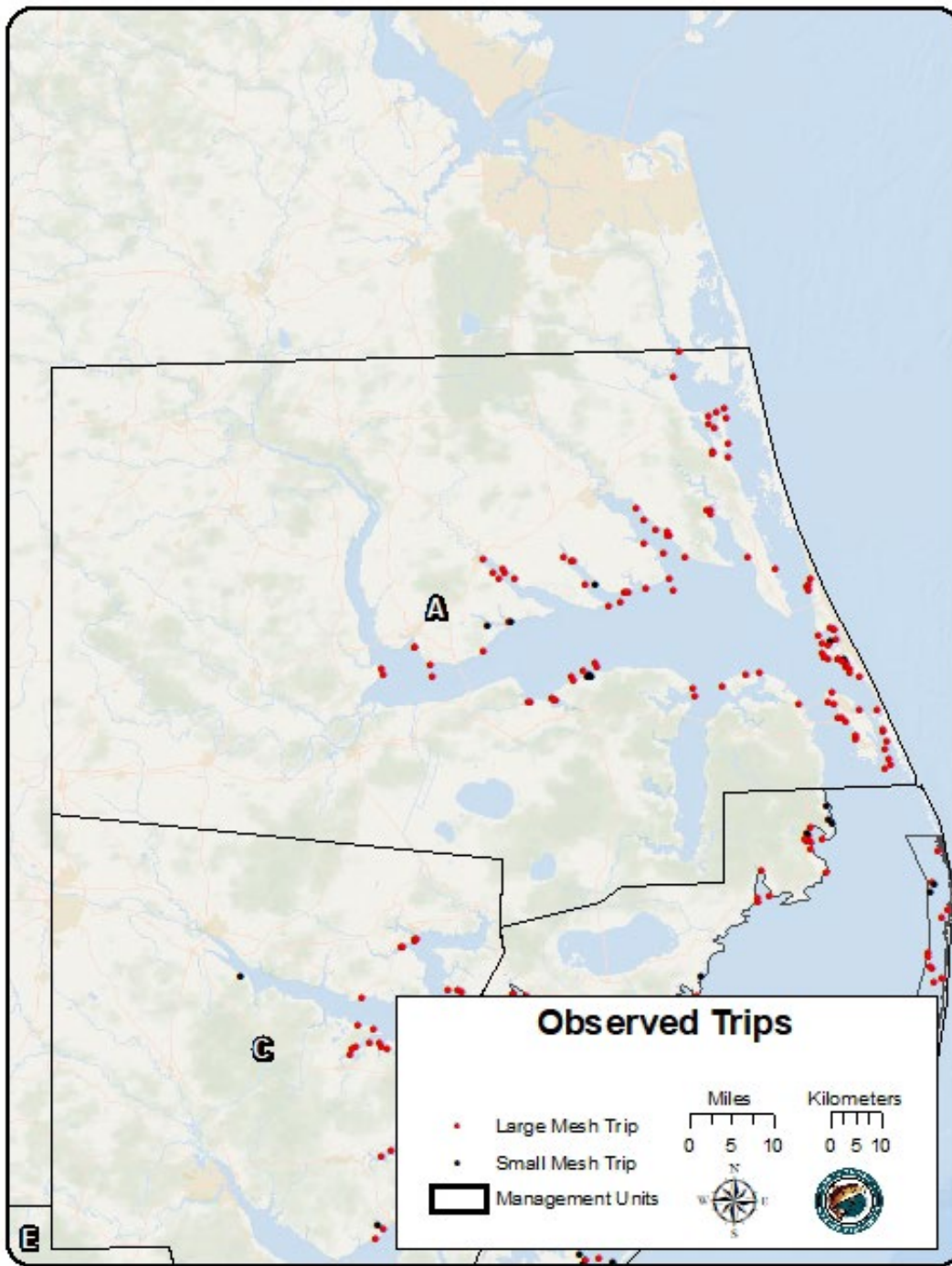


Figure 3. For fall 2020, observed gill-net trips by mesh-size category for Management Unit A (113 large mesh= ≥ 4 inch; 8 small mesh= < 4 inch). No sea turtle interactions were observed in Management Unit A.

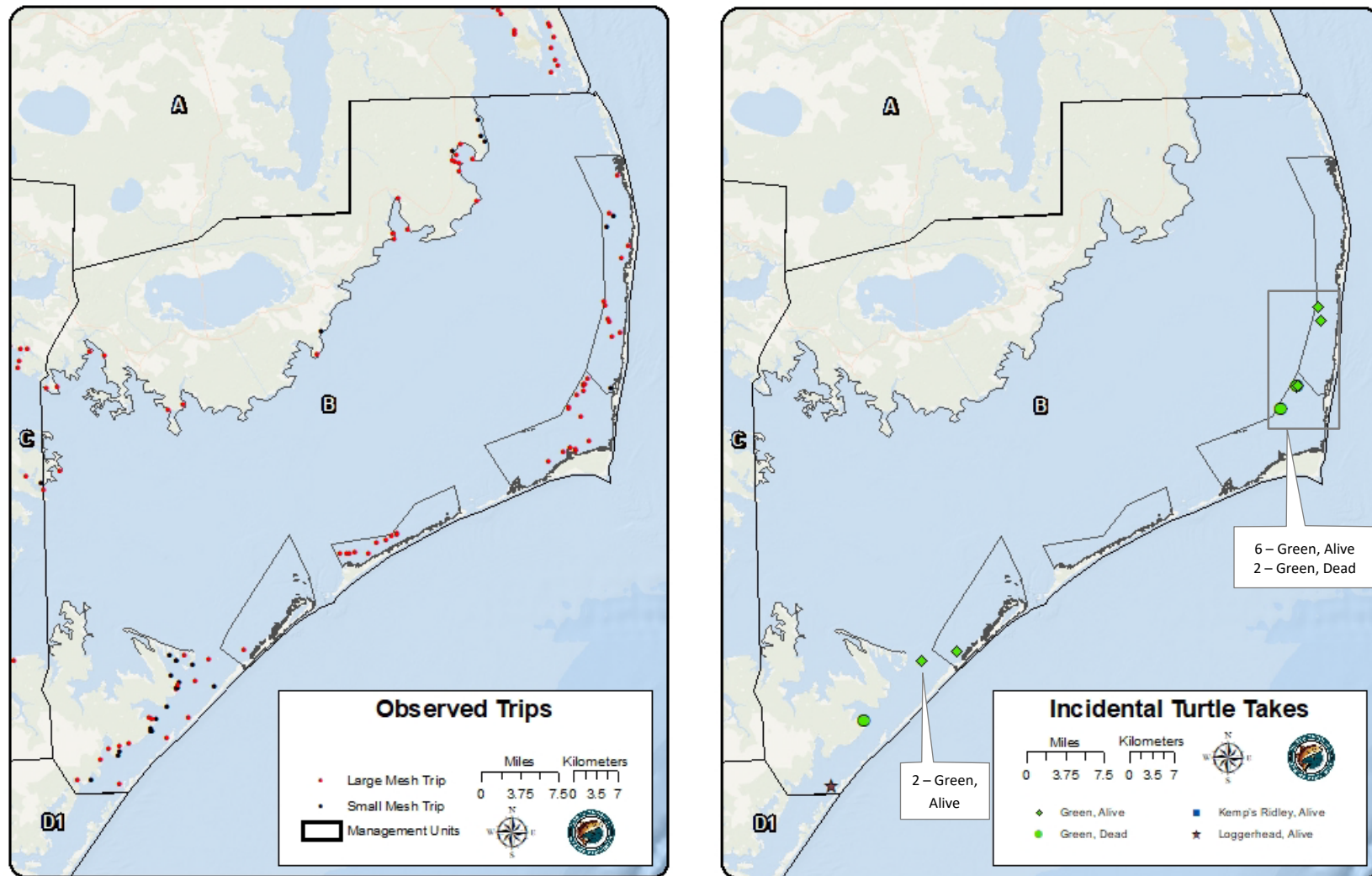


Figure 4. For fall 2020, observed gill-net trips (left) by mesh-size category (74 large mesh= ≥ 4 inch; 25 small mesh= ≤ 4 inch) and sea turtle interactions (right) by species and disposition (alive, $n=10$; dead, $n=3$) for Management Unit B.

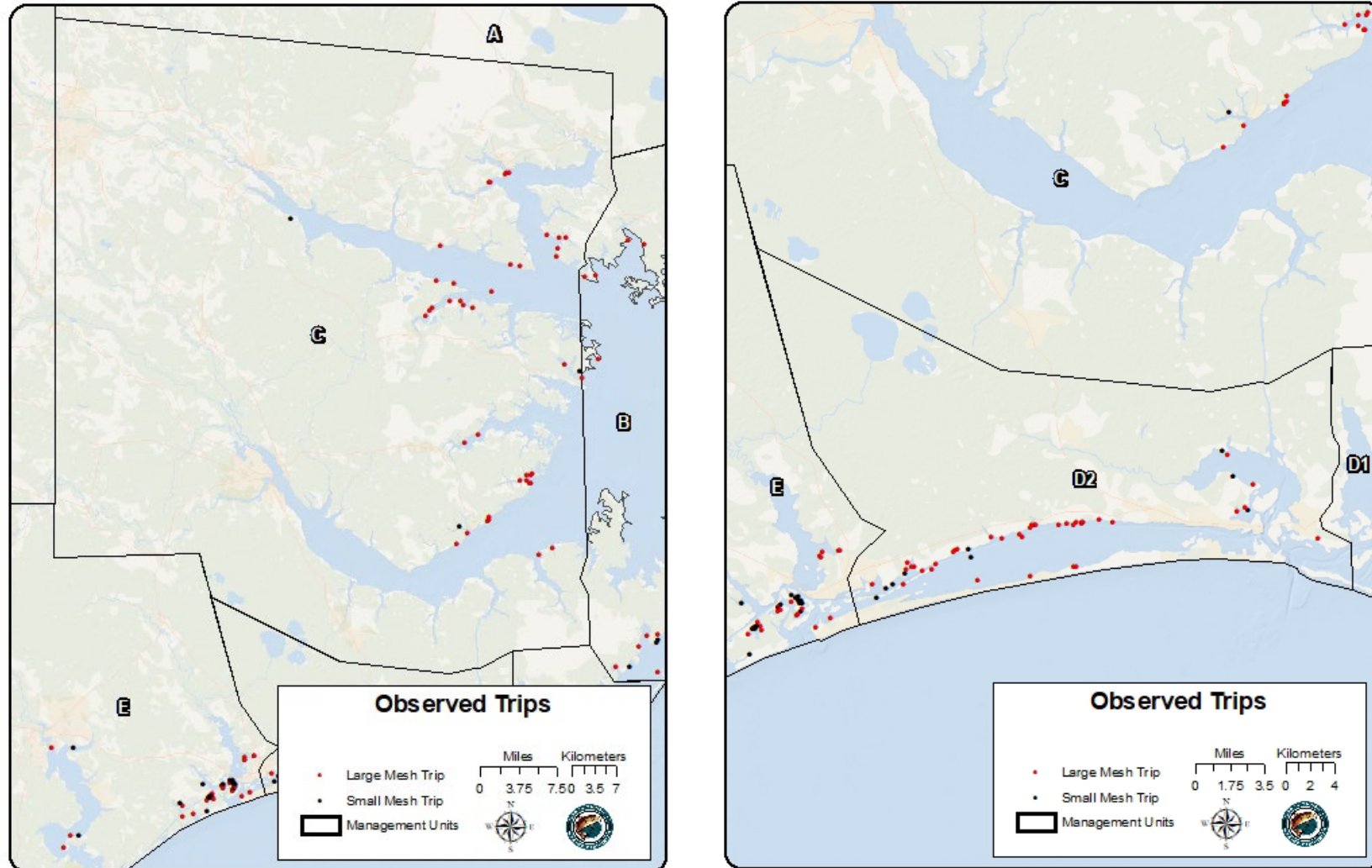


Figure 5. For fall 2020, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= < 4 inch) for Management Unit C (41 large mesh; 3 small mesh) and Management Unit D2 (38 large mesh= ≥ 4 inch; 9 small mesh= < 4 inch). No sea turtle interactions were observed in either management unit.

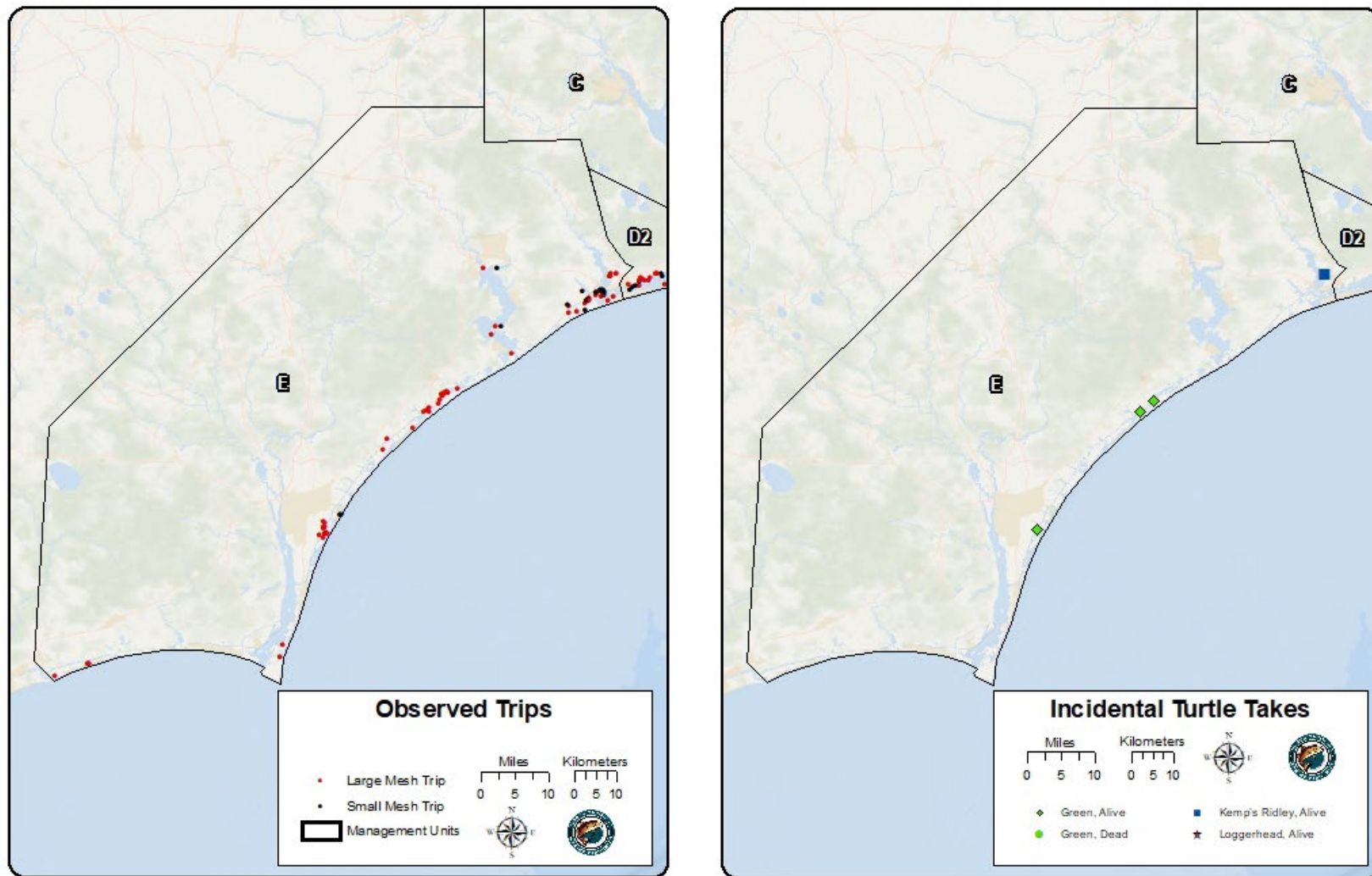


Figure 6. For fall 2020, observed gill-net trips (left) by mesh-size category (63 large mesh= ≥ 4 inch; 24 small mesh= ≤ 4 inch) and sea turtle interactions (right) by species and disposition (alive, $n=4$; dead, $n=0$) for Management Unit E.

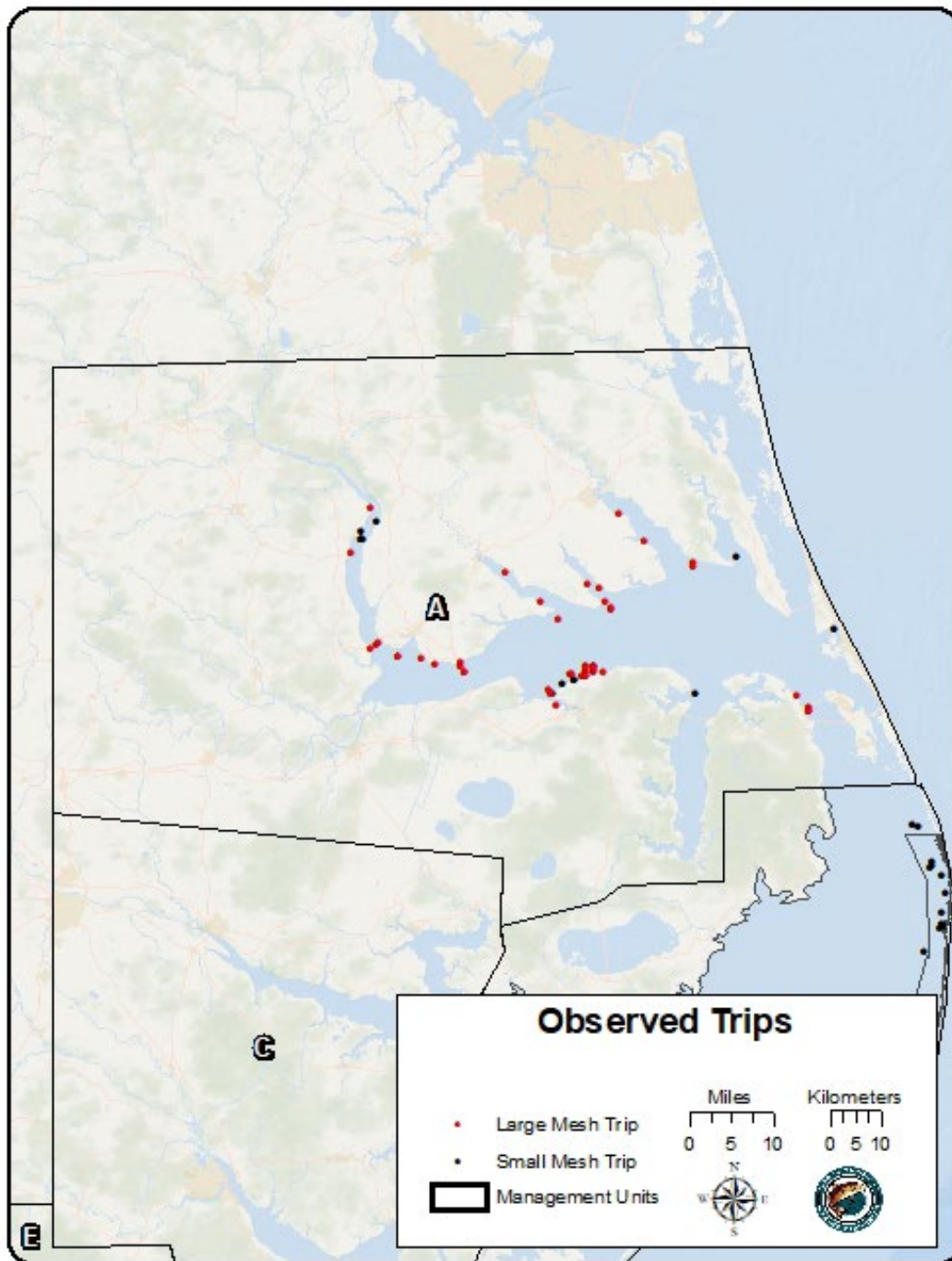


Figure 7. For spring 2021, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= ≤ 4 inch) for Management Unit A (52 large mesh; 11 small mesh) Management Unit A was open to large-mesh gill nets during spring between March 2–March 18 only. No sea turtle interactions were observed in Management Unit A.

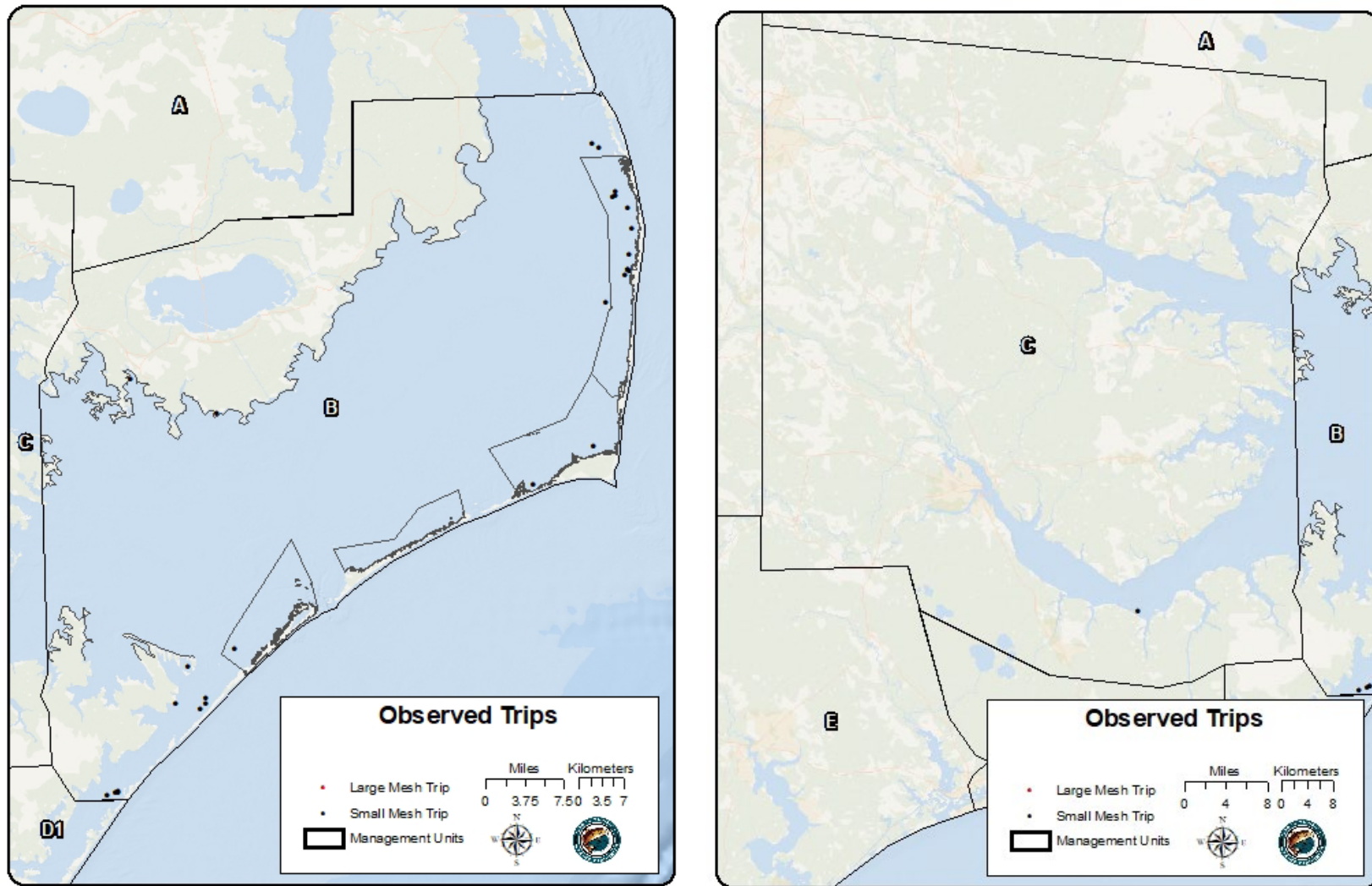


Figure 8. For spring 2021, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= < 4 inch) for Management Unit B (left: 0 large mesh; 27 small mesh) and Management Unit C (right: 0 large mesh; 1 small mesh). Management Unit B was closed to large-mesh gill nets during spring; Management Unit C was open to large-mesh gill nets during spring between March 1–April 15 only. No sea turtle interactions were observed in either management unit.

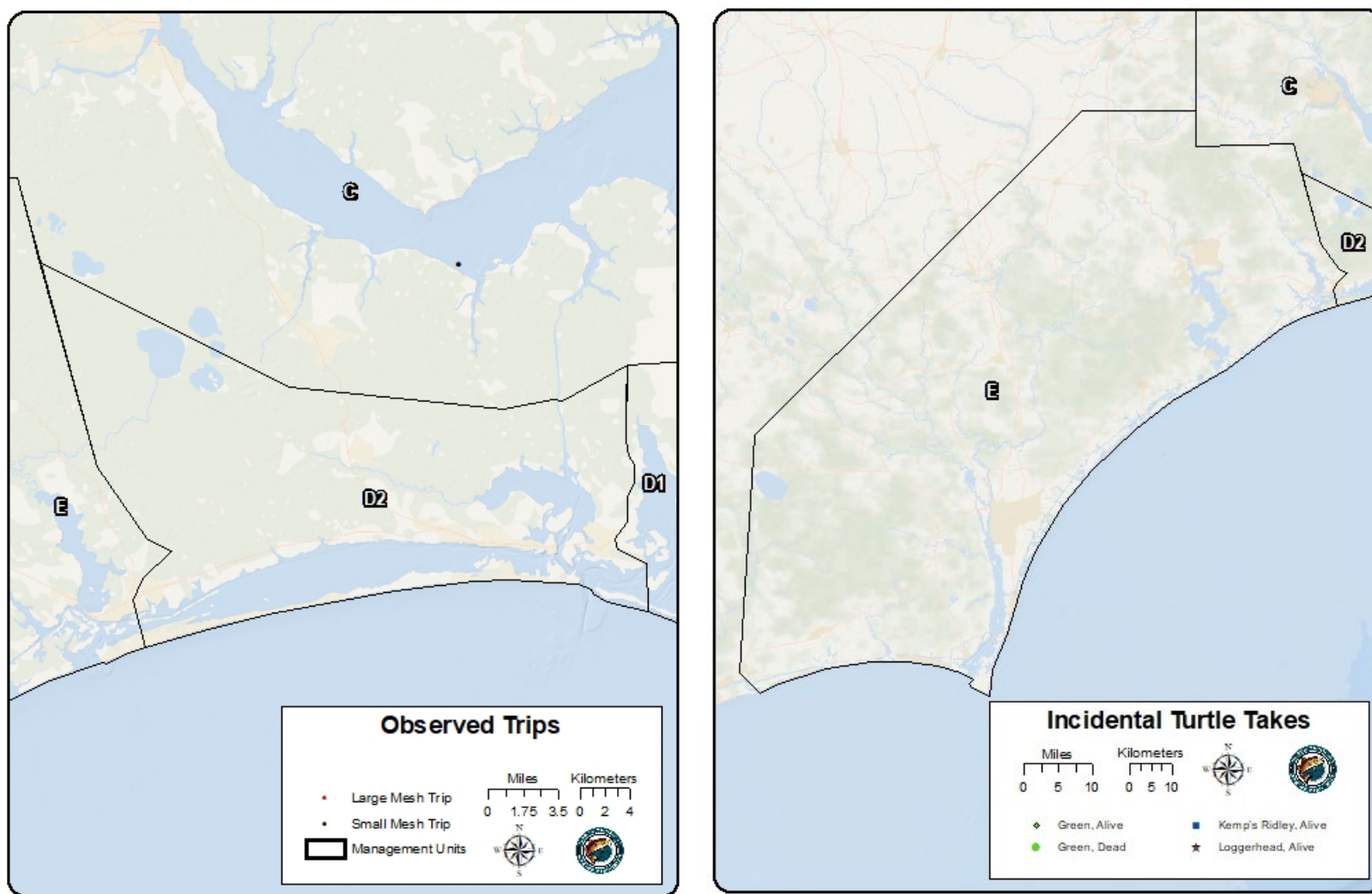


Figure 9. For spring 2021, there were no observed large-mesh (≥ 4 inch) or small-mesh (< 4 inch) gill-net trips for Management Unit D2 or Management Unit E. Both management units were closed to large-mesh gill nets during spring.

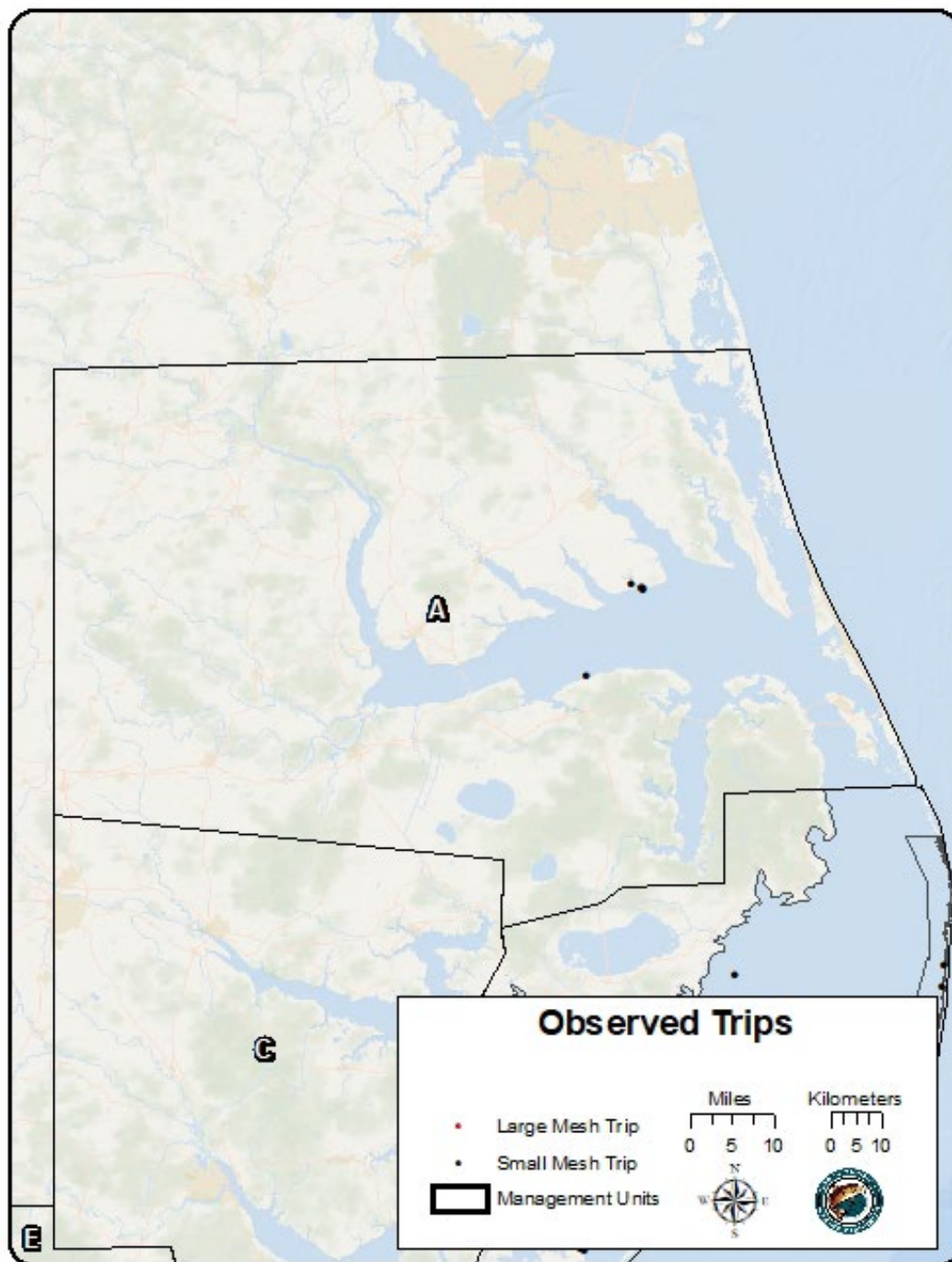


Figure 10. For summer 2021, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= ≤ 4 inch) for Management Unit A (0 large mesh; 5 small mesh). Management Unit A was closed to large-mesh gill nets during summer. No sea turtle interactions were observed in Management Unit A.

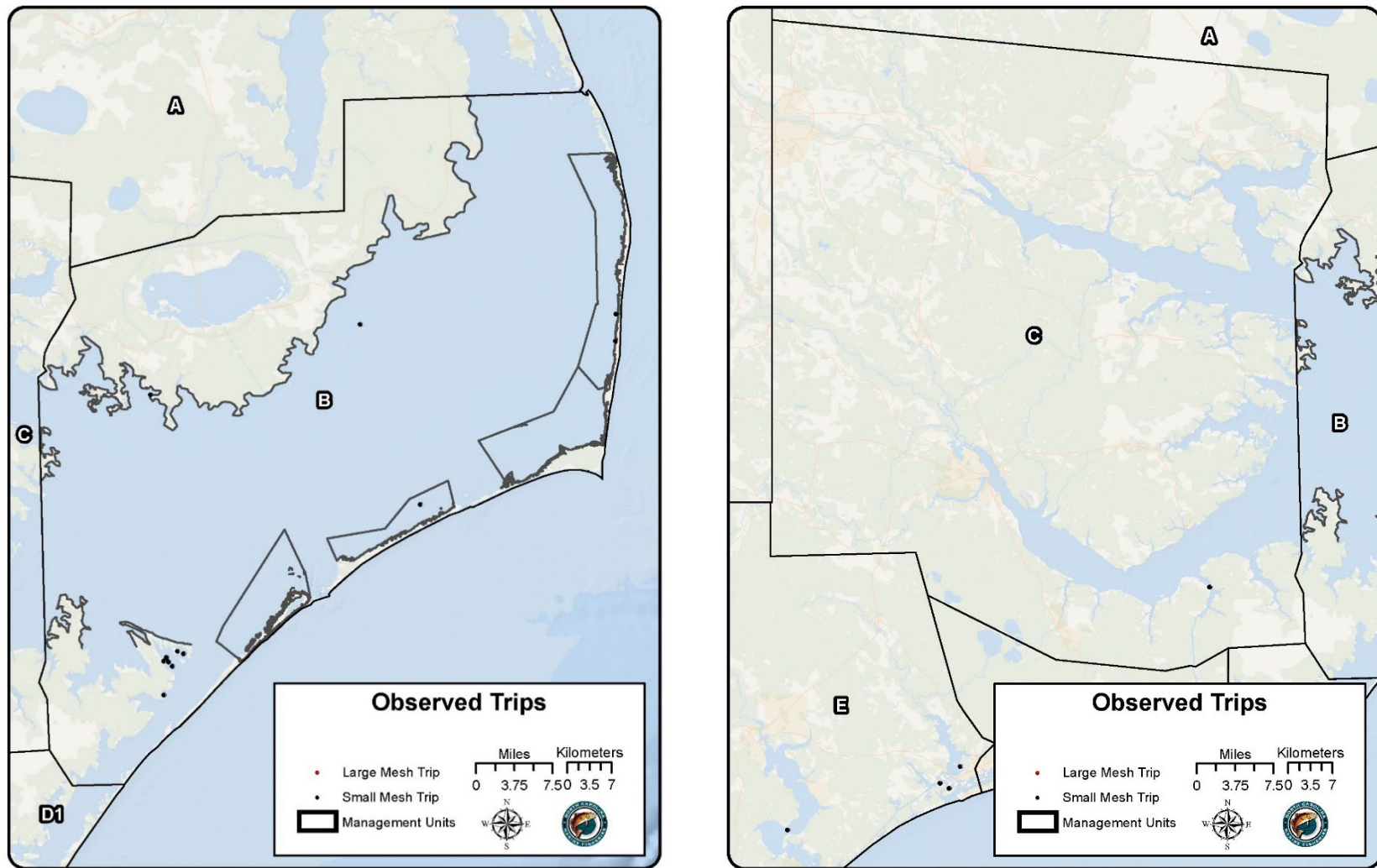


Figure 11. For summer 2021, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= < 4 inch) for Management Unit B (left: 0 large mesh; 13 small mesh) and Management Unit C (right: 0 large mesh; 1 small mesh). Management Units B and C were closed to large-mesh gill nets during summer. No sea turtle interactions were observed in either management unit.

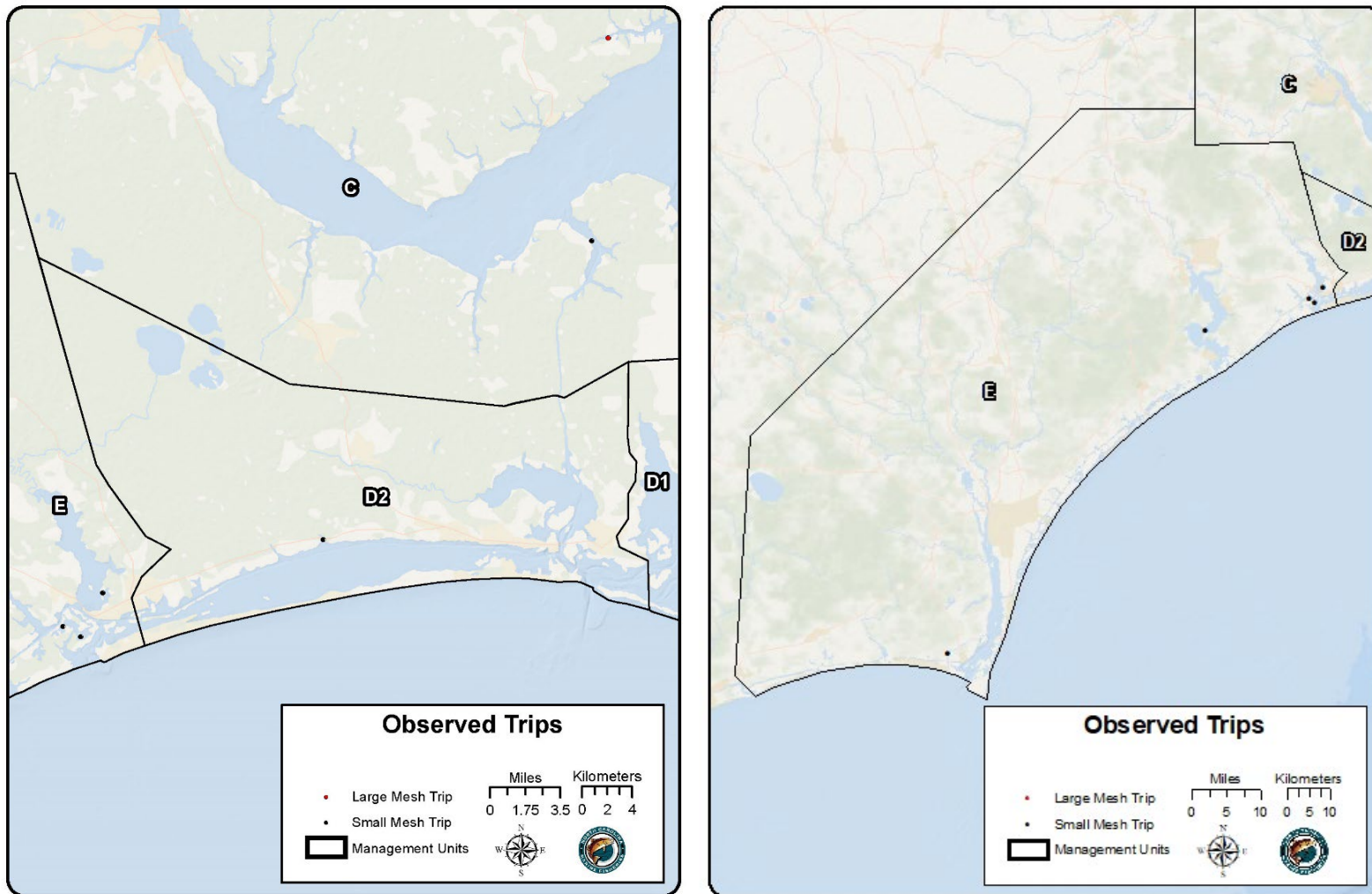


Figure 12. For summer 2021, observed gill-net trips by mesh-size category (large mesh= ≥ 4 inch; small mesh= ≤ 4 inch) for Management Unit D2 (left: 0 large mesh, 1 small mesh) and Management Unit E (right: 0 large mesh; 5 small mesh). Management Units D2 and E were closed to large-mesh gill nets during summer. No sea turtle interactions were observed in either management unit.

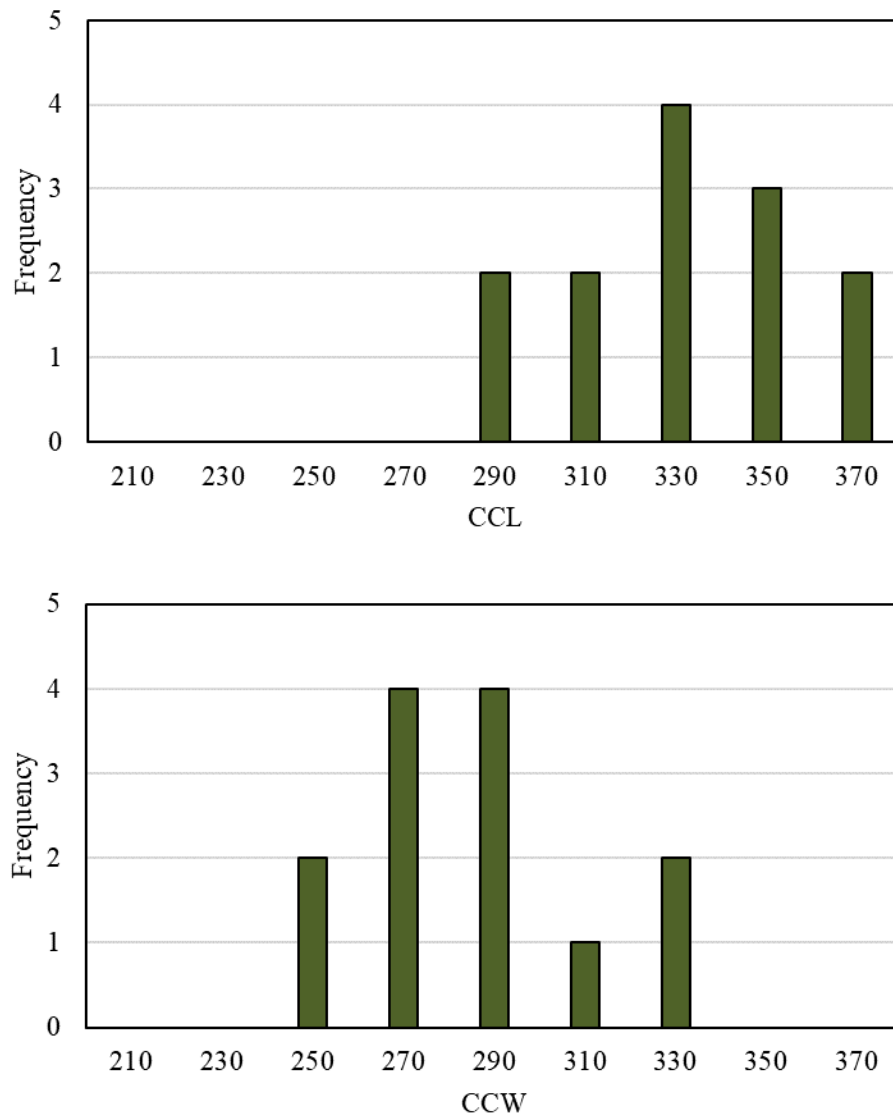


Figure 13. For observed and measured incidental takes of green sea turtles during the 2021 ITP Year (n=13 of 15), length-frequency of (top) curved carapace length (CCL, mm) and (bottom) curved carapace width (CCW, mm).

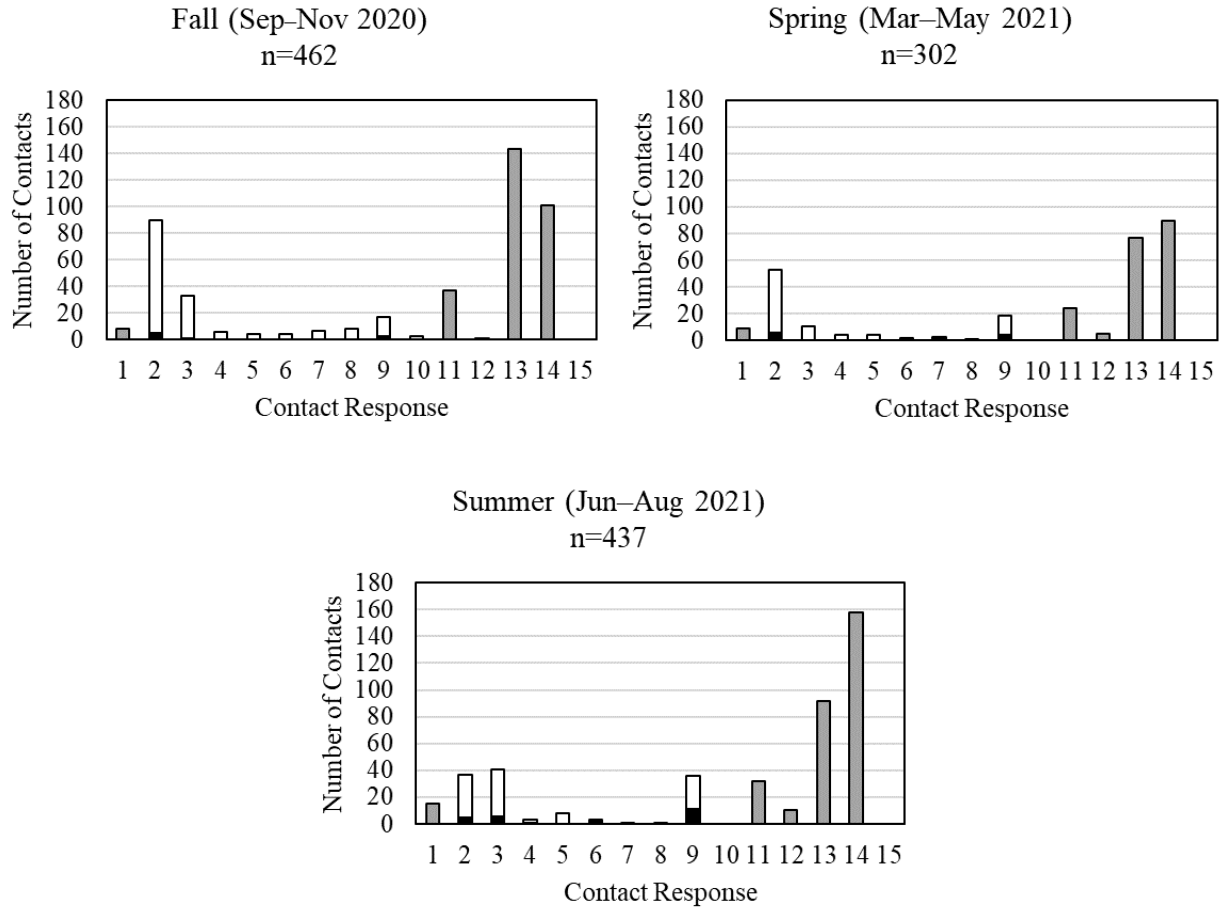


Figure 14. For the 2021 ITP Year, contacts attempted (n=1,201) by observers to schedule trips categorized by contact type (0-15) for fall, spring, and summer. Contact type categories include the following: 1) Left message with someone else; 2) Not fishing general; 3) Fishing other gear; 4) Not fishing because of weather; 5) Not fishing because of boat issues; 6) Not fishing because of medical issues; 7) Booked trip; 8) Hung up, got angry, trip refused; 9) Call back later time/date; 10) Saw in person; 11) Disconnected; 12) Wrong number; 13) No answer; 14) No answer, left voicemail; 15) Not fishing because of natural disaster (e.g., hurricane). Contact types are shown as those when the observer talked to a fisher (white bars), when the observer did not (gray bars), and when the fisher returned an observer's call (black bars).



ROY COOPER
Governor

ELIZABETH S. BISER
Secretary

KATHY B. RAWLS
Director

5 July 2022

Wendy Piniak
Office of Protected Resources (F/PR)
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Wendy:

The North Carolina Division of Marine Fisheries (NCDMF) submitted the Annual Completion Report for the Sea Turtle Incidental Take Permit (ITP) No. 16230 in February 2022 for the 2021 ITP Year (September 2020 through August 2021). Since then, the NCDMF Trip Ticket Program (TTP) finalized the 2021 data for reported fishing trips. Using the finalized TTP data, Tables 1, 5, 7, and 8 from the Annual Completion Report were updated and presented in this memo to reflect the final estimates of observer coverage and sea turtle takes. Tables representing takes expressed as counts are not included in this memo because there are no changes. Although TTP data for fall 2020 were finalized in the Annual Completion Report, changes to the dataset were found during the recent data pull for reported small-mesh and large-mesh gill-net trips (Tables 1 & 2). These differences in reported trips are due to dealers reporting data after the deadline, data edits discovered when processing applications related to the Coronavirus Aid Relief and Economic Security (CARES) Act, and data edits resulting from identification of potential errors by Protected Resources Program staff. As a reminder, the sea turtle ITP defines large-mesh as ≥ 4 inches stretched mesh (ISM), but the TTP defines large-mesh as ≥ 5 ISM. Because it is uncommon for gill nets to have a mesh size between 4 and 5 ISM (see Annual Completion Report), we assumed effort by mesh-size categories in the TTP dataset would not be greatly affected by the difference in definitions of mesh size between the ITP and the TTP.

Anchored Large Mesh

Using finalized TTP data, there were 3,190 reported large-mesh gill-net trips during fall, spring, and summer seasons of the 2021 ITP Year (Table 1), a net difference of 88 more trips than reported in the Annual Completion Report. The difference in trips was spread among Management Unit A during fall and spring (73 and 53 fewer trips, respectively), Management Unit B during fall (97 more trips), Management Unit C in fall and spring (84 more trips and 13 fewer trips, respectively), Management Unit D2 in fall (19 more trips), and Management Unit E during fall (27 more trips). The increase during fall in Management Unit B was influenced by the fact that the number of large-mesh fishing trips included in the Annual Completion Report was the predicted number of fishing trips not the reported number. The decision was made to include the predicted number of fishing trips for the Annual Completion Report because the TTP data available at the time was conspicuously missing reported large-mesh gill-net trips in Core Sound during fall. The Core Sound portion of Management Unit B is typically a common location used by fishers to target Southern Flounder with large-mesh gill nets. Staff with the TTP were informed of this potential error so the issue could be investigated; corrections were made, and the finalized data included large-mesh gill-net trips in Core Sound. The finalized data sometimes caused large changes in the percent observer coverage (from 0% up to a difference of 13.7%). These differences did not push observer coverage over the 7% threshold for management units and seasons that were $<7\%$ with preliminary data nor did these differences drop observer coverage below the 7% threshold for management units and seasons that were $\geq 7\%$ with preliminary data.

Anchored Small Mesh

Using finalized TTP data, there were 7,218 reported small-mesh gill-net trips during fall, spring, and summer seasons of the 2021 ITP Year (Table 2), a net difference of 1,143 trips more than reported in the Annual Completion Report. The net difference in the finalized data was due primarily to large increases in reported trips in Management Unit B across all three seasons (949 trips total). Although there were only three reported fishing trips in the finalized data for Management Unit D during summer, the difference resulted in a perceived increase of 33.3% observer coverage. This is because there were no reported fishing trips in that management unit and season for the Annual Completion Report so observer coverage could not be calculated for the one observed trip. Otherwise, finalized data affected percent observer coverage for a given management unit and season only slightly; however, in Management Unit B during summer the finalized data changed the percent observer coverage from above the 1% threshold (1.2%) to below it (0.9%) when presented as a tenth of one percent. On a state-wide basis, the finalized data had a negligible effect on percent observer coverage and did not reduce observer coverage below the 1% threshold for any season or for the 2021 ITP Year overall.

Sea Turtle Takes

The NCDMF's ITP outlines authorized levels of annual incidental takes that are expressed as either estimated total takes based on observer data or counts of observed takes. There were 17 observed incidental takes of sea turtles, all in large-mesh gill nets, during the 2021 ITP Year. For the combinations of species, management unit, and gear type where annual takes need to be estimated, those estimates were recalculated using the finalized 2021 TTP data. The number of estimated sea turtle takes using finalized TTP data was slightly higher than the Annual Completion Report for Green sea turtles in Management Unit B (alive: 26.6 vs 21.5, dead: 11.4 vs 9.3), Green sea turtles in Management Unit E (alive: 17.1 vs 15.4), and Kemp's Ridley in Management Unit E (alive: 7.2 vs 6.6); however, takes of both species were below authorized thresholds specific to management units (Table 3). Overall, the annual sea turtle takes for all species during the 2021 ITP Year remained well below authorized thresholds (Table 4).

Sincerely,



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Table 1. For large-mesh gill nets, percent observer coverage calculated from observer data (≥ 4 inches stretched mesh [ISM]) and finalized reported fishing trip (≥ 5 ISM) data from the Trip Ticket Program (TTP) by season and management unit for the 2021 ITP Year. Differences are shown for the number of reported fishing trips and percent observer coverage using finalized TTP data versus those reported in the Annual Completion Report, which included preliminary and finalized data. Positive difference numbers indicate more reported trips or higher coverage using finalized data while negative numbers indicate fewer reported trips or lower coverage. “closed” represents when/where anchored large-mesh gill nets were prohibited.

Season	Management Unit	Large Mesh				
		Reported Fishing Trips	Observed Trips	Percent Observer Coverage	Difference in Reported Fishing Trips	Difference in Observer Coverage
Fall 2020	A	977	113	11.6	-73	0.8
	B	467	74	15.8	97	-4.2
	C	206	41	19.9	84	-13.7
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	93	38	40.9	19	-10.5
	E	548	63	11.5	27	-0.6
	Overall	2,291	329	14.4	154	-1.0
Spring 2021	A	896	52	5.8	-53	0.3
	B	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	C	3	0	0.0	-13	0.0
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	E	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	Overall	899	52	5.8	-66	0.4
Summer 2021	A	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	B	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	C	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	E	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	Overall	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
All Seasons		3,190	381	11.9	88	-0.4

Table 2. For small-mesh gill nets, observer coverage calculated from observer data (< 4 inches stretched mesh [ISM]) and finalized reported fishing trip (< 5 ISM) data from the Trip Ticket Program (TTP) by season and management unit for the 2021 ITP Year. Differences are shown for the number of reported fishing trips and percent observer coverage using finalized TTP data versus those reported in the Annual Completion Report, which included preliminary and finalized data. Positive difference numbers indicate more reported trips or higher coverage using finalized data while negative numbers indicate fewer reported trips or lower coverage. The exception is denoted by an asterisk (*) for which there were no reported fishing trips in the Annual Completion Report; therefore, observer coverage could not be calculated for the one observed trip. The finalized data included three reported fishing trips, resulting in a perceived increase in observer coverage “closed” represents when/where anchored small-mesh gill nets were prohibited.

Season	Management Unit	Small Mesh				
		Reported Fishing Trips	Observed Trips	Percent Observer Coverage	Difference in Reported Fishing Trips	Difference in Observer Coverage
Fall 2020	A	496	8	1.6	0	0.0
	B	1,761	25	1.4	386	-0.4
	C	174	3	1.7	13	-0.2
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	130	9	6.9	61	-6.1
	E	416	24	5.8	14	-0.2
	Overall	2,977	69	2.3	474	-0.5
Spring 2021	A	612	11	1.8	62	-0.2
	B	1632	27	1.7	387	-0.5
	C	134	1	0.7	13	-0.1
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	11	0	0.0	3	0.0
	E	103	0	0.0	2	0.0
	Overall	2,492	39	1.6	467	-0.3
Summer 2021	A	185	5	2.7	26	-0.4
	B	1376	13	0.9	176	-0.2
	C	55	1	1.8	1	-0.1
	D1	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>	<i>closed</i>
	D2	3	1	33.3	3	33.3*
	E	130	5	3.8	-4	0.1
	Overall	1,749	25	1.4	202	-0.2
All Seasons		7,218	133	1.8	1,143	-0.4

Table 3. For large-mesh (≥ 4 inches stretched mesh [ISM]) gill nets, annual estimated authorized and actual takes of Green and Kemp's Ridley sea turtles by Management Units B, D1, D2, and E during fall, spring, and summer of the 2021 ITP Year. Estimated actual takes were calculated from observer data and finalized Trip Ticket Program data. 95% confidence intervals are provided in parentheses. Annual estimated takes for Green sea turtles in D2 are not applicable (n/a) because authorized takes are expressed as counts (see Table 4).

Species	B				D1				D2			
	Estimated Takes				Estimated Takes				Estimated Takes			
	Authorized		Actual		Authorized		Actual		Authorized		Actual	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Green	225	112	26.6 (11.5, 54.1)	11.4 (3.0, 31.4)	9	5	0	0	n/a	n/a	n/a	n/a
Kemp's Ridley	53	26	0	0	15	7	0	0	6	3	0	0
Total	278	138	26.63	11.40	24	12	0	0	6	3	0	0

Species	E				Total			
	Estimated Takes				Estimated Takes			
	Authorized		Actual		Authorized		Actual	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Green	96	48	17.1 (2.90, 52.08)	0	330	165	43.7	11.4
Kemp's Ridley	24	13	7.2 (0.0, 21.7)	0	98	49	7.2	0
Total	120	61	24.3	0	428	214	51.0	11.4

Table 4. Total annual authorized and actual takes (either counts of observed or estimated) of sea turtles by species and, for estimated takes, by condition for the 2021 ITP Year using finalized Trip Ticket Program data. Takes expressed as estimated numbers are denoted as not applicable (n/a) for species whose authorized takes in the ITP are expressed only as counts.

Species	Observed		Estimated			
	Authorized	Actual	Authorized		Actual	
	Alive/Dead	Alive/Dead	Alive	Dead	Alive	Dead
Green	18	0	330	165	43.7	11.4
Hawksbill	8	0	n/a	n/a	n/a	n/a
Kemp's Ridley	12	0	98	49	7.2	0
Leatherback	8	0	n/a	n/a	n/a	n/a
Loggerhead	24	1	n/a	n/a	n/a	n/a
Any Species	8	0	n/a	n/a	n/a	n/a
Total	78	1	428	214	51.0	11.4