



NOAA Technical Memorandum NMFS-NE-262

2020
Standardized Bycatch Reporting Methodology
Annual Discard Report
with Observer Sea Day Allocation

by the Northeast Fisheries Science Center
and the Greater Atlantic Regional Fisheries Office

US DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts
April 2020



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and the Greater Atlantic Regional Fisheries Office²

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April 2020

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Internet Availability: This issue of the NOAA Technical Memorandum NMFS-NE series can be accessed at: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/northeast-fisheries-science-center-publications>

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LIST OF ACRONYMS AND ABBREVIATIONS

AA = access area
ASM = At-Sea Monitoring Program
CV = coefficient of variation
CI = confidence interval
EPU = Ecological Protection Unit
ESA = Endangered Species Act
FMP = fishery management plan
FY = fiscal year
GEN = general category
IFS = Industry Funded Scallop Program
lg = large mesh
LIM = limited access category
MA = Mid-Atlantic
MMPA = Marine Mammal Protection Act
NE = New England
NEFMC = New England Fishery Management Council
NEFOP = Northeast Fisheries Observer Program
NEFSC = Northeast Fisheries Science Center
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
OPEN = nonaccess area
PTNS = Pre-Trip Notification System
SBRM = Standardized Bycatch Reporting Methodology
SE = standard error of the estimate
sm = small mesh
TDD = Turtle Deflector Dredge
US = United States
VTR = Vessel Trip Report
xlg = extra large mesh

EXECUTIVE SUMMARY

This document contains a compilation of the information to meet the 2020 Standardized Bycatch Reporting Methodology (SBRM) annual discard report requirements. For fish and invertebrate species groups, several of the required annual discard report elements (discards and precision by fleet) can be found in Wigley and Tholke 2020, along with a description of the data sources, methods, results, and discussion. Similarly, for sea turtles, further information can be found in Murray 2012, 2018, and 2020.

An estimated 61,880 mt (136,420,948 lb) of federally regulated species were discarded from July 2018 through June 2019.

Based on the most recent bycatch analysis of sea turtles in the sink gillnet gear (2012-2016), there were an estimated 141 loggerhead (*Caretta caretta*) interactions per year, 29 Kemp's ridley (*Lepidochelys kempii*) interactions per year, 5 leatherback (*Dermochelys coriacea*) interactions per year, and 22 unidentified hard-shelled turtle interactions per year. In the most recent analysis of bottom trawl gear (2014-2018), there were an estimated 116 loggerhead interactions per year, 9 Kemp's ridley interactions per year, 5 leatherback interactions per year, and 3 green turtle (*Chelonia mydas*) interactions per year.

After sea day adjustments, a total of 7,666 sea days is needed to monitor the 15 SBRM species groups (14 fish/invertebrates species groups and 1 sea turtle species) for April 2020 through March 2021. Of the 7,666 sea days, 6,344 sea days are needed for agency-funded fleets, and 1,322 sea days are needed for industry-funded scallop fleets.

The funds available to the Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Sampling Branch in fiscal year (FY) 2020 are estimated to provide support for 4,419 days, and 774 days are carried over (i.e., bought ahead) from FY2019 funds for a total of 5,193 days (4,808 prioritized days + 385 nonprioritized days) for April 2020 through March 2021. Based upon an observer set-aside compensation rate analysis for the Industry Funded Scallop Program, there is industry funding for 1,890 days. Hence, 7,083 days are available for April 2020 through March 2021 observer coverage.

Within the agency-funded fleets and prioritization-applicable funding, a shortfall of 1,536 (6,344 – 4,808) days is expected. The 2020 funding shortfall triggers the SBRM prioritization process; the prioritization approach is utilized with a portion of the agency funds. Practical limitations prevent the observer program from covering the 36 sea days associated with 4 fleets. These 36 sea days have been reallocated to the fleet impacted by the prioritization process.

The numbers of sea days allocated by fleet (where a fleet represents gear type, access area, trip category, region, and mesh group combinations) are given for April 2020 through March 2021.

There is a proposed SBRM framework action to expand the sampling frame for the Mid-Atlantic and New England lobster pot fleets. If the framework action is approved, then beginning in the calendar quarter following final approval, all active federal lobster vessels may be eligible for selection to take an observer, regardless of whether they are required to submit Vessel Trip Reports.

INTRODUCTION

The Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment was implemented in February 2008 (NMFS 2008; NEFMC, MAFMC, NMFS 2007) to address the requirements of the Magnuson-Stevens Fishery Conservation and Management Act to include standardized bycatch reporting methodology in all of the New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC) federal fishery management plans (FMPs). The regulations implementing the SBRM were removed by National Marine Fisheries Service (NMFS) in December 2011 (NMFS 2011) because of a deficiency associated with the prioritization process (one element of the amendment). A revised SBRM Omnibus Amendment was approved in March 2015, and a final rule was implemented in July 2015 (NEFMC, MAFMC, NMFS 2015).

The SBRM amendment requires an annual discard report utilizing information obtained from the Northeast Fisheries Science Center’s (NEFSC) Fisheries Sampling Branch’s observer programs (Northeast Fisheries Observer Program [NEFOP] and Industry Funded Scallop [IFS] Program) for 14 federally managed species groups¹ and sea turtles (Table 1) in the waters of the northeastern United States (US). Specifically, the SBRM annual discard report requirements include: “...summaries of the trips observed, fishing modes in the relevant time period, funding issues and other related issues and developments, and projections of coverage across fisheries for upcoming time period. More detailed information would be provided in tables and figures that addressed: The number of observer trips and sea days scheduled that were accomplished for each fishing mode and quarter, as well as the number of trips and sea days of industry activity; the kept weight from unobserved quarters and statistical areas summarized by fishing mode; the amount kept and estimated discards of each species by fishing mode; and the relationship between sample size and precision for relevant fishing modes.”(NEFMC, MAFMC, NMFS 2015, pages 237-238).

This document contains a compilation of the information to meet the 2020 SBRM annual discard report requirements. For fish and invertebrate species groups, several of the required annual discard report elements can be found in Wigley and Tholke 2020, along with a description of the data sources, methods, results, and discussion. Similarly, for sea turtles, further information can be found in Murray 2012, 2018, and 2020. This document also presents the number of sea days needed to monitor the 15 species groups, the funding available for observer coverage, and the numbers of sea days allocated by fleet² (where a fleet represents gear type, access area, trip category, region, and mesh group combinations) for April 2020 through March 2021.

SUMMARY OF OBSERVER COVERAGE

A total of 3,371 trips (8,915 days) was observed from July 2018 through June 2019. When these trips were stratified by fleet and quarter, some trips were partitioned between fleets resulting in 3,555 trips (9,357 days). See Tables 2 and 3 in Wigley and Tholke 2020 for a summary of the number of observed trips and industry Vessel Trip Reports (VTR) trips by fleet and calendar quarter and a summary of the number of observed sea days and industry sea days by fleet and

¹ As of December 15, 2017, blueline tilefish became a federally managed species in the [Mid-Atlantic Fishery Management Council’s Golden and Blueline Tilefish Fishery Management Plan](#).

² Fleets are synonymous with “fishing modes.”

calendar quarter, respectively. There were 62 fleets uniquely identified in the July 2018 through June 2019 data. Based upon the industry activity during this time period, the New England (NE) large mesh OPEN general (GEN) scallop trawl fleet (Row 12) and the NE other dredge (Row 59) were added to the collection of fleets analyzed.

A spatial and temporal analysis of the kept weight of all species (i.e., any species retained during the trip) from statistical areas and calendar quarter was conducted. Over all fleets, 75.2% of kept weight of all species occurred in statistical areas and calendar quarters that had observer coverage. For a summary of the percentage of kept weight with observer coverage by fleet from July 2018 through June 2019, see Table 4 in Wigley and Tholke 2020.

SUMMARY OF DISCARD ESTIMATES

For fish/invertebrate species, the total catch, kept, and estimated discards (in live weight) and their associated coefficient of variation (CV) were derived for fleets by using data collected from July 2018 through June 2019 (Wigley and Tholke 2020). Based upon that discard estimation analysis, an estimated 61,880 mt (136,420,948 lb) of federally regulated species were discarded (Table 2). Fleet abbreviations used in this report are described in Appendix Table 1. See Tables 5A and 5B in Wigley and Tholke 2020 for summaries by fleet and SBRM species group and by fleet and individual species that compose these 14 species groups, respectively.

The most recent average annual estimates of sea turtle interactions and CVs in US commercial fisheries are listed in Table 3. Methods to estimate sea day needs for the different gear types can be found in either Murray (2018) or Murray (2020).

SUMMARY OF SEA DAYS NEEDED

For fish/invertebrate species groups, the number of sea days needed to achieve a 30% CV of total discards for each species group was derived for 62 fleets by using data collected from July 2018 through June 2019 (Wigley and Tholke 2020). Based on that sample size analysis, a total of 6,404 sea days would be needed for the 14 fish and invertebrate species groups. Table 4 presents the number of sea days needed for each of the 14 species groups, number of pilot coverage days, and number of minimum pilot days. Table 4 and Step 1 in Table 5 present the sea days needed by fleet. The number of needed sea days for fish/invertebrate species groups is further adjusted as described below.

In the Wigley and Tholke 2020 analysis, there were 14 “erroneous” fleets identified which resulted from either VTR misreporting the gear type used (e.g., scallop trawl, beam trawl), fishing outside the regulations (by using smaller mesh size than allowed), or inconsistent gear codes between data collection systems (e.g., otter trawl, other; pots and trap, other; dredge, other; and shrimp trawl). The 333 sea days associated with the 14 “erroneous” fleets (composed of 1,300 VTR trips for July 2018 through June 2019) have been set to zero (Table 5, Step 2, gray shaded cells). When this adjustment is made, 6,071 days total are needed to monitor 14 fish/invertebrate species groups in 48 fleets (Table 5, Step 2).

An updated analysis of sea turtle bycatch in Mid-Atlantic (MA) bottom trawl gear from 2014-2018 was used to project sea day monitoring needs for turtles in 2020 (Murray 2020). Interaction rates for each turtle species were estimated with stratified ratio estimators, where rates

were stratified by Ecological Production Unit (EPU; Georges Bank and Mid-Atlantic), latitude zone, season, and depth. In the Mid-Atlantic region, a total of 571 loggerhead (*Caretta caretta*, CV = 0.29, 95% confidence interval [CI] = 318-997), 46 Kemp's ridley (*Lepidochelys kempii*, CV = 0.45, 95% CI = 10-88), 16 green (*Chelonia mydas*, CV = 0.73, 95% CI = 0-44), and 20 leatherback (*Dermochelys coriacea*, CV = 0.72, 95% CI = 0-50) turtle interactions were estimated to have occurred in bottom trawl gear over the 5 year period. On Georges Bank, a total of 12 loggerheads (CV = 0.70, 95% CI = 0-31) and 6 leatherback (CV = 1.0, 95% CI = 0-20) interactions were estimated to have occurred (Table 3).

Prior to estimating observer coverage needs for future fishing years, the probability of encountering each turtle species in either the Georges Bank or Mid-Atlantic region was estimated by using results of this analysis. This process was recommended for sea turtles to prevent SBRM sea day needs in some fleets from being driven by species with a low probability of encounter with the fishing gear (Hogan et al. 2019). As a result, monitoring levels were not estimated for Kemp's ridley, leatherback, or green turtles in the updated analysis, nor for loggerheads on Georges Bank, because there was <50% probability of observing 5 or more turtles over 800 trips in a year. Observer coverage needs were estimated for loggerheads in the Mid-Atlantic.

Based on results of the updated analysis, 2,668 sea days are needed annually to monitor loggerhead interactions with 30% precision across bottom trawl fleets operating in the Mid-Atlantic EPU (see text table given below). However, allocating 2,668 days to Mid-Atlantic³ SBRM trawl fleets will overshoot the needed number of days for turtles because some portion of the effort in the Mid-Atlantic EPU is composed of New England fleets. Sea days for turtles are normally merged with days needed for fish to achieve monitoring objectives for both taxa (NEFSC and GARFO 2019). Prior to this step, we aimed to estimate the proportion of New England fishing effort in the Mid-Atlantic EPU and then removed this proportion of sea days from the needed number of days allocated for turtles to account for the overlap of spatial strata when fish and sea turtle sea days are merged.

Using VTR data from 2014-2018, approximately 67% of New England small mesh otter trawl effort (in terms of days fished) occurred in the Mid-Atlantic EPU, and 10% of New England large mesh otter trawl effort⁴. We applied these proportions to the number of days needed to monitor fish in each of the New England otter trawl fleets (988 and 840 days in the New England small mesh and large mesh otter fleets, respectively; Table 5, Step 2, Rows 7 and 8), for a total of 746 days. We then remove 746 days from the coverage needed for turtles, so that days allocated for turtles in the Mid-Atlantic were reduced to 1,922 days (see text table given below and Table 5). We anticipate that the actual amount of observer effort in the Mid-Atlantic EPU is the adjusted amount for turtles plus the amount of effort operating there from New England fleets. The amount of Mid-Atlantic effort fishing in the Northeast EPUs was small (<5% of effort), so we did not make any adjustments in the other direction (i.e., removing Mid-Atlantic effort from the New England fish days).

³ The sampling frame for SBRM "Mid-Atlantic" fleets is composed of vessels departing from Connecticut to North Carolina; however, vessels operating in the Mid-Atlantic EPU depart from Massachusetts to North Carolina, based on the turtle analysis.

⁴ Other bases for these percentages were explored, including a 3 year average from 2016-2018, or the latest year's effort (2018). In both scenarios the percentages differed by <5%, so the 2014-2018 percentages were used to adjust turtle days because these years were the basis of the sea day analysis.

This adjustment process was not conducted for gillnet fleets because the spatial stratification used for estimating and monitoring turtle bycatch is different than otter trawl. Sea day needs for turtles in gillnet fleets are explained in Murray 2018 and NEFSC and GARFO 2019.

Roughly 887 days are needed across sink gillnet fisheries (Murray 2018; see text table given below and Table 5). Days required for loggerhead turtles in gillnet gear encompass both the Mid-Atlantic and Georges Bank regions. Projected sea day coverage was estimated from a pooled CV over all turtle strata, so monitoring needs for both regions are combined, rather than computed separately for each region. As such, days cannot be extracted from the 887 and allocated to Georges Bank and Mid-Atlantic separately. This region is expanded over previous analyses and overlaps a portion of New England fish/invertebrate fleets. Had fish and turtle days been merged over all 6 fleets (NE and MA gillnet fleets), then over 270 of the 887 days would have been allocated to the Gulf of Maine where turtles are not present, and likewise fewer days would have been allocated to the Mid-Atlantic. Therefore, all 887 days were allocated to the Mid-Atlantic because 97% of estimated loggerhead bycatch is in the Mid-Atlantic, and mean bycatch rates in the Mid-Atlantic are >200 times larger than those on Georges Bank. Monitoring for turtles will still occur on Georges Bank because some northern Mid-Atlantic vessels using “Mid-Atlantic” days will likely fish on Georges Bank, and effort is also expected there from fish days⁵.

Estimates of sea day needs for turtles are revised when new bycatch estimates are published for a particular gear type (approximately every 5 years).

Similar to 2019, coverage needs for turtles on vessels using scallop dredge gear in the Mid-Atlantic were not estimated. Since May 2013, the use of turtle deflector dredges (TDDs) with chain mats have been required on scallop dredges in times and areas where loggerhead turtles are known to be most common. These modifications are intended to reduce those interactions in which animals are landed or observed from the deck, although other “unobservable” interactions may still be occurring (i.e., those in which animals escape from the gear or come in contact with the gear but are not captured and brought to the surface where they can be observed; Warden and Murray 2011). Managers currently monitor dredge fishing hours in the Mid-Atlantic scallop fishery as an indicator of whether elevated turtle interactions may be occurring compared to baseline conditions because of the likelihood that most dredge-based takes of sea turtles may be unobservable (NMFS 2012)⁶. Therefore, observer coverage levels in the Mid-Atlantic scallop dredge fleets in 2020 will be driven by other species groups. This approach ensures that some level of coverage still exists to monitor the effectiveness of TDDs and chain mats in reducing observable interactions and to help monitor turtle interactions outside of gear regulated times and areas.

⁵ Using June 2018 through July 2019 VTR data, it has been estimated that the 437 days needed for fish in NE gillnet fleets would provide approximately 230 days of expected coverage in the Georges Bank region.

⁶ The Incidental Take Statement of the 2012 Sea Scallop [Biological Opinion](#) was amended 1 May 2015.

The numbers of sea days needed to achieve a 30% CV associated with the Mid-Atlantic turtle gear types and fish/invertebrate fleets are given below and in Table 5, Steps 2 and 3.

Turtle Gear Types and Fish/Invertebrate Fleets	Sea Days Needed	
	Loggerhead Turtles	Fish/Invertebrate Species Groups
MA Otter Trawl, MA Scallop Trawl, MA Ruhle Trawl, MA Other Otter Trawl Rows 5, 6, 9-11, 16, 17, and 23	2,668 (reduced to 1,922)	1,038
MA Gillnet Rows 28-30	887	176

The numbers of sea days needed for the combined fish/invertebrate and turtle species groups were derived as follows:

- If the sum of the sea days needed for fish/invertebrate species groups of the corresponding fish/invertebrate fleets exceeded the sea days needed for the turtle gear type, then the sea days needed for fish/invertebrate was used. To support the penultimate prioritization approach, the sea days needed for turtles are apportioned to the corresponding fish/invertebrate fleets by using the proportion of fish/invertebrate sea days within the turtle gear type (Table 5, Step 4).
- If the number of sea days needed for turtles for the gear type exceeded the sum of the sea days needed for fish/invertebrate groups of the corresponding fish/invertebrate fleets, then the difference⁷ between the sea days needed for turtles and fish were distributed according to the proportion of VTR sea days corresponding to fish/invertebrate fleets and added to the days needed for fish/invertebrate groups, by fleet (Table 5, Step 4). The number of VTR sea days by fleet is taken from Table 3 in Wigley and Tholke 2020 and reflects industry activity from July 2018 through June 2019.

A total of 7,666 sea days is needed for fish/invertebrates and loggerhead turtles (COMBINED; Table 5, Step 5) for April 2020 through March 2021. Of the 7,666 sea days, 6,344 sea days are needed for agency-funded fleets, and 1,322 sea days are needed for industry-funded scallop fleets (Table 5, Step 6).

⁷ The use of the difference between sea days needed for fish and sea days needed for turtles (rather than the sum of the sea days needed for turtles) represents a 2019 refinement to the sea day allocation methods described in the 2015 SBRM Omnibus Amendment. The 2019 refinement prevents the sea days needed to monitor fish and turtles (combined) from exceeding the sea days needed for either taxon within a gear type.

SUMMARY OF FUNDING AVAILABLE FOR APRIL 2020 THROUGH MARCH 2021

The funds available to the NEFSC's Fisheries Sampling Branch in fiscal year (FY) 2020 are estimated to provide support for 4,419 days, and 774 days are carried over (i.e., bought ahead) from FY2019 funds⁸ for a total of 5,193 (4,419 + 774) days for April 2020 through March 2021. Based upon an observer set-aside compensation rate analysis for the Industry Funded Scallop program, there is industry funding for 1,890 days. Hence, 7,083 (5,193 + 1,890) days are available for April 2020 through March 2021 observer coverage.

Below is a summary of the 2 funding source categories: agency-funded and industry-funded. Within the agency-funded category, there are 5 subcategories: Atlantic Coast Observers, National Observer Program, Northeast Fisheries Observers, Marine Mammal Protection Act, and Reducing Bycatch.

- **Agency-funded:** The funding sources for the 5,193 agency-funded sea days include: Atlantic Coast Observers (574 days), Northeast Fisheries Observers (2,129 days [based on funds⁹ in the Consolidated Appropriations Act of 2020]), National Observer Program (1,160 days), Reducing Bycatch (37 days), National Catch Share Program (263 days), and 645 FY2019 carryover/bought ahead days collectively fund the sea days for prioritization (4,808 days; Table 5, Step 7), and Marine Mammal Protection Act (MMPA; 256 days) and FY2019 carryover/bought ahead (129 days) collectively fund the sea days to monitor protected species (385 days; Table 5, Step 7).
 - 385 agency-funded days are applicable to protected species¹⁰ only.
 - 385 MMPA days are associated with trips having sampling protocols that are specific to protected species (marine mammals, sea turtles, Endangered Species Act [ESA] listed fish species) and are not applicable for non-ESA listed fish and invertebrates. Owing to the extra demands of monitoring protected species, information on finfish and shellfish discards is not collected on these trips. However, these days will provide observer coverage for sea turtles and ESA-listed fish species above that which is allocated for all species.
 - 4,808 (5,193 - 385) agency-funded days are applicable for all species.

⁸ The best estimate of the FY2019 carryover days is 774 days (645 prioritized carryover days and 129 MMPA carryover days).

⁹ Per the US DC Circuit Court (*Oceana v. Locke*, 2011), NMFS must fund Standardized Bycatch Reporting Methodology requirements in the Northeast before directing discretionary funds to at-sea monitoring and will therefore allocate the necessary resources from Observers and Training to meet SBRM requirements before funding at-sea monitoring with discretionary funding. However, in the FY20 Consolidated Appropriations Act, Congress allocated specific funds to use for at-sea monitoring and directed NMFS to fully fund the at-sea monitoring program. As such, these funds are not discretionary, and NMFS has been directed to fully fund the at-sea monitoring program regardless of whether the SBRM requirements have been met.

¹⁰ In this document, protected species refers to marine mammals, sea turtles, and ESA-listed fish.

- 4,808 days are subject to the prioritization process across all fleets. The prioritization approach is described in the next section and given in Table 6.
 - No sea days have been set aside to support discovery days to address emerging questions of scientific and management interest as the year progresses.
 - There is a single provider for NEFOP sea days and consequently, the projected costs (i.e., at-sea costs based on realized costs in FY19) are confidential. An estimated rate for shoreside infrastructure that includes fixed and variable costs for operations, training, and data processing increased from \$515 to \$688.
- **Industry-funded:** The number of industry-funded sea days available for scallop fleets is determined by taking 1% of the total acceptable biological catch/annual catch limit set for the year. The Industry Funded Scallop program allows the vessels an increase in landings to help defray the costs of carrying an observer (i.e., the compensation rate). The sale of the additional scallops allocated to each boat supplies the funding for the at-sea costs of observer coverage. Based upon projected landings and expected prices, the IFS program generates funds in support of discard monitoring of the scallop fleets. A compensation rate analysis was undertaken to support observer coverage of the 11 industry-funded scallop fleets (Rows 10-12, and 36-43; Table 5).

Because some NE vessels will be fishing in both NE and MA statistical areas, the New England and Mid-Atlantic open area limited access trips will be observed at 5%. The observer compensation rate in the access areas will remain at 250 lb/day because of the anticipated stability in the prices of scallops. Observer coverage rates for limited access vessels in the proposed Framework 32 Georges Bank access areas would require at least 10%. For the trips to Nantucket Lightship North and Closed Area I, a 1/2 trip at 9,000 lb per full-time limited access vessel is proposed. For trips to Nantucket Lightship South-Deep and Closed Area II East, 1 trip at 18,000 lb is proposed. The coverage rate in the Mid-Atlantic access area, where there are fewer bycatch concerns as well as the proposed allocation of 2 trips at 18,000 lb per limited access vessel, would be 5%.

- Based upon the compensation rate analysis and proposed Framework 32 allocations, a total of 1,890 sea days can be funded: 659 days for Open Areas, 311 days for Mid-Atlantic Access Areas, and 920 days in the New England Access Areas.
 - The industry-funded schedule runs April through March
 - [Bulletins](#) describing the 2020 set-aside compensation rate calculations and scallop management measures are available online.
- Of the 659 days for the Open Areas, there are 63 days for Limited Access General Category fleets (Rows 11, 12, 40, and 41; Table 7) and 596 days for Limited Access fleets (Rows 42 and 43; Table 7).
- Coverage of the 11 fleets depends on industry activity among these fleets for April 2020 through March 2021; the sea days represent the maximum coverage (i.e., caps).

- Projected costs: the average cost to industry for the at-sea portion is \$710/day for industry-funded scallop fleets. Additional agency funds are needed for training and certification of observers and data processing.

Below is a summary of sea days based on the agency budget and the compensation rate analysis, by funding source for April 2020 through March 2021.

Funding Source	Sea Days
Agency-funded total	5,193
Agency-funded applicable to all species (prioritized days)	4,808
Agency-funded applicable to protected species only (nonprioritized days)	385
Industry-funded scallop total applicable to all species	1,890
Total	7,083

PRIORITIZATION TRIGGER AND DETAILS OF THE ALLOCATION OF SEA DAYS TO FLEETS

Within the agency-funded fleets and prioritization-applicable funding, a funding shortfall of 1,536 (6,344 – 4,808) days is expected (Table 5). The 2020 funding shortfall triggers the SBRM prioritization approach; the prioritization approach is utilized with a portion of the agency funds.

The following describes the steps taken to allocate the 7,083 funded sea days (Tables 5, 6, and 7).

Step 1. Derive the number of sea days needed for the 14 fish/invertebrate species groups (see Wigley and Tholke 2020; Table 5).

Step 2. Apply the sea day adjustments to 14 “erroneous” fleets (Rows 9, 16, 18, 21-25, 44, 47, 56-59). A total of 6,071 days is needed for fish/invertebrate species group across 48 fleets (37 agency-funded fleets and 11 industry-funded scallop fleets; Table 5).

Step 3. Derive the number of sea days needed for sea turtles (see Murray 2012, 2018, 2020; Table 5).

A total of 2,668 sea days are needed annually to monitor loggerhead interactions with 30% precision across bottom trawl fleets operating in the Mid-Atlantic EPU (Murray 2020).

The 2,668 sea days were adjusted to account for the overlap of spatial strata when fish and sea turtle sea days are merged. The proportion of New England fishing effort in the Mid-Atlantic EPU was estimated by using the VTR data from 2014-2018.

Approximately 67% of New England small mesh otter trawl effort and 10% of New England large mesh otter trawl effort (in terms of days fished) occurred in the Mid-Atlantic EPU. These proportions were applied to the number of days needed to monitor

fish in each of the New England otter trawl fleets (988 and 840 days in the New England small mesh [Row 5] and large mesh [Row 7] otter fleets, respectively (Table 5) yielding a total of 746 ($[0.67 * 988] + [0.10 * 840]$) days.

After adjusting, the total number of days needed to monitor loggerhead turtles in the Mid-Atlantic trawl fleets is 1,922 days (2,668 – 746). The 1,922 days will be integrated with sea days needed for fish in the SBRM Mid-Atlantic trawl fleets.

- Step 4. To integrate the monitoring needs of fish/invertebrates and sea turtles and to support the penultimate prioritization approach, derive the number of sea days needed for loggerhead turtles for each of the fish/invertebrate fleets associated with the turtle gear types (Table 5).
- a. Summarize the number of VTR sea days corresponding to each fish/invertebrate fleet (see Table 3 in Wigley and Tholke 2020). The VTR sea days associated with the 15 “erroneous” fleets are given but not used (Table 5, Step 4a, gray shaded cells).
 - b. Derive the percentage of VTR sea days for each fish/invertebrate fleet within the turtle gear type. For each fish/invertebrate fleet associated with the turtle gear type, divide the VTR sea days by the sum of the VTR sea days for the gear type.
 - c. Derive the percentage of sea days needed for fish/invertebrate for each fish/invertebrate fleet within the turtle gear type. For each fish/invertebrate fleet associated with a turtle gear type, divide the adjusted sea days (Step 2) by the sum of the sea days for the gear type.
 - d. Derive the number of additional sea days needed for loggerhead turtles.

If the number of sea days needed for loggerhead turtles is less than or equal to the sum of the sea days needed for the fish/invertebrate fleets associated with the turtle gear type, then no additional sea days are needed to monitor turtles. The additional sea days for turtles are set to zero for fish/invertebrate fleets.

If the number of sea days needed for loggerhead turtles is greater than the sum of the sea days needed for the fish/invertebrate fleets associated with the turtle gear type, then derive the difference between the sea days needed for loggerhead turtles and the sum of the sea days needed for fish/invertebrates. For each turtle gear type, multiply the difference between the number of sea days needed by the percentage of VTR sea days for each fish/invertebrate fleet within the turtle gear type. These days represent the number of additional days needed to monitor turtles in the fish/invertebrate fleets.

- e. Derive the number of sea days needed for loggerhead turtles by fish/invertebrate fleets.

If the number of sea days needed for loggerhead turtles is less than or equal to the sum of the sea days needed for the fish/invertebrate fleets associated with the turtle gear

type, then multiply the sea days needed for turtles by the percentage of sea days needed for fish for each fish/invertebrate fleet within the turtle gear type (Step 4c).

If the number of sea days needed for loggerhead turtles is greater than the sum of the sea days needed for the fish/invertebrate fleets associated with the turtle gear type, then add the sea days needed for fish/invertebrates (Step 2) and the additional days needed for turtles (Step 4d) for each fish/invertebrate fleet.

Step 5. Derive the number of sea days needed for fish/invertebrates and turtles COMBINED; select the largest of the 2 sea days (i.e., adjusted sea days needed for the 14 fish/invertebrate species groups [Step 2] and sea days needed for loggerhead turtles [Step 4e]) within the fleet.

A total of 7,666 days is needed to achieve a 30% CV on the discards of the 15 species groups in 2020 (Table 5).

Step 6. Partition fleets into funding source categories and sum the number of sea days needed by funding source.

There were 6,344 days and 1,322 days needed to achieve a 30% CV for the 15 species groups for agency-funded and industry-funded scallop fleets, respectively (Table 5).

Step 7. Obtain funded sea days by funding source category. For agency-funded sea days, calculate the number of sea days applicable to the prioritization process (prioritized versus nonprioritized days).

There are 4,808 agency-funded days applicable to the prioritization process (Table 5).

Step 8. Evaluate needed sea days versus funded sea days for each funding category, and calculate shortfall or surplus sea days associated with the prioritization process.

A funding shortfall of 1,536 days is expected for agency-funded fleets (Table 5).

Step 9. Apply the penultimate approach algorithm to allocate sea days to fleets for agency-funded days that are applicable to prioritization process.

As described in the SBRM Amendment, the number of agency-funded sea days applicable to the prioritization process is assigned to each fleet (fishing mode) after sequentially removing the sea days needed for the species group/fleet with the highest sea day difference between adjacent species groups within a fleet until the sea day shortfall is removed.

The following describes the steps taken to assign the agency-funded sea days applicable to the prioritization process by using the penultimate approach (Table 6).

- Step 9.1. For each agency-funded fleet where sea days are needed, list the sea days needed for the 15 species groups (fish/invertebrates and loggerhead turtles) in descending order within a fleet (Table 6). The minimum pilot days (Table 4) serve as the minimum sea days needed for fleets.
- Step 9.2. Calculate the differences in sea days between adjacent species groups within each agency-funded fleet (Table 6).
- Step 9.3. Within the resulting matrix of sea day differences (Step 9.2), identify the largest difference and remove the sea days associated with the species group accounting for this difference (Table 6).

Repeat this process for the next largest difference, with the constraint that the differences are taken in penultimate order (from left to right in the matrix) within a fleet, until the cumulative reduction of sea days equals the sea day shortfall (Step 8). If the reduction in sea days by using the next largest (penultimate) value is greater than the shortfall, reduce the number of sea days only enough to remove the shortfall.

The 2020 sea day shortfall is 1,536 days. The 1,122 days (loggerhead turtles [TURS] in Row 5; Tables 5 and 6) associated with the largest sea day difference (479 days) between adjacent species groups is removed first (Table 6). The penultimate value in Row 5 is associated with small mesh groundfish (GFS, 643 days; Tables 4 and 6). The 753 days (TURS in Row 6; Tables 5 and 6) associated with the second largest sea day difference (389 days) between adjacent species groups is removed next (Table 6). The penultimate value in Row 6 is associated with spiny dogfish (*Squalus acanthias*, DOG, 364 days; Tables 4 and 6). The 428 days (DOG in Row 62; Tables 4, 5, and 6) associated with the third largest sea days difference (386 days) between adjacent species groups is removed next (Table 6). The penultimate value in Row 62 is associated with both monkfish (*Lophius americanus*) and spiny dogfish (MONK and DOG, respectively, 42 days; Tables 4 and 6). The 840 days (skate complex [Rajidae] in Row 8; Tables 4, 5, and 6) are associated with the fourth largest sea day difference (366 days) between adjacent species groups. Removing 840 days associated with the skate complex would remove more sea days than needed to reach the shortfall amount of 1,536 days (Table 6). Thus, only 282 of the 366 sea day difference between adjacent species groups (840 days for the skate complex and 474 days for fluke-scup-black sea bass (*Paralichthys dentatus*, *Stenotomus chrysops*, *Centropristis striata*, respectively; FSB) are needed (Table 6). The penultimate value for Row 8 becomes 558 (840 - 282) days for the skate complex.

- Step 9.4. After the removal of sea days within a fleet (Step 9.3), the remaining highest sea days (i.e., the penultimate or the left-hand-most value in Step 9.1) becomes the “PRIORITIZED” sea days required for that fleet.

The 4,808 prioritized sea days provide observer coverage to all 37 agency-funded fleets. There are 33 fleets for which no reduction in sea days occurred, and there are 4 fleets (Rows 5, 6, 8, and 62) for which the numbers of sea days allocated are fewer than the days needed to achieve a 30% CV. The prioritized sea days for Rows 5, 6, 8, and 62 become 643, 364, 558, and 42 days respectively (Table 6). For Rows 5 and 6, all fish/invertebrate species groups have an expected CV of 30% or less; however, the CV for TURS in the MA otter trawl gear type group is expected to exceed 30%. For Rows 8 and 62, 13 of the 14 fish/invertebrate species groups have an expected CV of 30% or less; however, the CV for skate complex in New England large mesh otter trawl (Row 8) and spiny dogfish in New England ocean quahog/surfclam dredge (Row 62) are expected to exceed 30%.

Step 9.5. Identify fleets that cannot be covered by observer program this year.

In 2020, there are practical limitations that prevent the observer program from covering 4 fleets (MA and NE floating trap [Rows 26 and 27, respectively], MA purse seine [Row 34], and NE urchin dredge [Row 60]; Table 7, rose shaded cells). The observer program currently has no sampling protocols in place for these fleets and will need time to create new trainings, logs, and/or databases to support sampling in these fleets. It is unlikely the observer program will be able to make significant changes to the observer databases or observer manuals this year. There are 36 sea days associated with the 4 fleets. The 36 prioritized sea days associated with the 4 fleets have been reallocated to Row 8, the last fleet impacted by the prioritization process. Row 8 has 593 (557 + 36) prioritized sea days and the 4 fleets with practical limitations have zero days (Table 7).

The observer program has a current contract with 1 third-party provider for a 5-year period that began in 2018.

Step 10. Allocate agency-funded nonprioritized sea days.

There are 385 agency-funded days that are not applicable to the prioritization process (nonprioritized MMPA days; Table 7).

The 385 MMPA sea days, all assumed to have limited sampling protocols, are allocated to a row designated as “MMPA coverage” and will be associated with the MA and NE gillnet fleets (Rows 28-33; Table 7).

Step 11. Allocate industry-funded scallop days. The sea days for the industry-funded scallop fleets are assigned to trips via [the call-in system](#). The sea day coverage for industry-funded scallop fleets will depend on industry activity for April 2020 through March 2021 and will be capped as described above. Because of differences in stratification between the SBRM and scallop compensation rate analyses, the 1,890 industry-funded scallop sea days have not been allocated to individual fish/invertebrate fleets, but rather to groups of fish/invertebrate fleets that correspond to the stratification used in the compensation rate

analysis: Mid-Atlantic Access Area fleets (Rows 10, 36, and 38; Table 7); Open Areas fleets (Rows 11, 12, 40, and 41 for Limited Access General Category fleets and Rows 42 and 43 for Limited Access; Table 7); and New England Access Area fleets (Rows 37 and 39; Table 7). The allocated sea days represent the maximum coverage (i.e., caps).

Industry-funded scallop sea days are expected to meet or exceed the SBRM required sea days for each fleet group corresponding to the stratification used in the compensation rate analysis (Table 7).

Step 12. The sea days allocated for April 2020 through March 2021 (TOTAL) is the sum of the prioritized days (Step 9.5), nonprioritized days (Step 10), and industry-funded scallop days (Step 11). A total of 7,083 days is allocated across 37 fleets (Table 7).

The agency-funded fleets with an * or ** (Table 7) indicate that all or some of the observer coverage will be assigned via the Pre-Trip Notification System (PTNS; Palmer et al. 2013) or call-in programs for scallops and herring. This designation means all or some of the observer coverage within each of these fleets will depend upon industry activity for April 2020 through March 2021. The PTNS sea days for agency-funded fleets will be proportionally allocated based initially on previous year's industry activity and then adjusted to correspond to current year's activity.

All other fleets will have sea days assigned to fishing trips via the NEFOP sea day schedule. The prioritized sea days on the NEFOP sea day schedule are provided by fleet. A matrix of VTR trip percentages by quarter and state within a fleet based on the VTR trips for July 2018 through June 2019 is provided as information on previous industry activity patterns. This information does not replace third-party provider's local knowledge of current industry activity.

DISCUSSION

As a practical matter, fleets with low trip activity within a quarter or overall are very difficult to “find” unless they are part of PTNS or a call-in program. Attempts to assign observers can be inefficient since the probability of randomly finding such trips at a specific port or time period will be very low. While some of the challenges may be overcome with outreach, vessel selection letters, and other operational efforts, some fleets may fall below practical detection limits, and therefore some of the sea days associated with low trip activity fleets may not be accomplished. If any sea days are not accomplished, those sea days will be carried over.

The sample size analysis conducted by Wigley and Tholke (2020) derived the expected CV of the discard estimates for various species groups over a range of sample sizes for each of the species groups that were not filtered out by the importance filter (see Table 7 and Figure 3 in Wigley and Tholke 2020). Deriving the expected CV assumes the variance of the discard estimate is constant over a range of sample sizes (number of trips).

The estimated 645 prioritized carryover days are the result of unaccomplished sea days from April 2019 through March 2020. The 645 prioritized carryover days have increased the number of prioritized sea days to monitor the 15 SBRM species groups for April 2020 through

March 2021. Because of the unaccomplished sea days from April 2019 through March 2020, it is possible that the lower observer coverage could lead to discard estimates with CVs that are higher than the SBRM precision standard for some fleets.

At-Sea Monitoring (ASM) coverage, associated with Northeast Multispecies (groundfish) FMP, is used for compliance monitoring and is not used to meet SBRM sea day requirements. Information relating to industry-funded ASM coverage can be found on the [Greater Atlantic Regional Fisheries Office monitoring webpage](#).

To reduce potential bias within SBRM, data associated with ASM, Atlantic States Marine Fisheries Commission, and New York State Department of Environmental Conservation were not used in the 2020 fish/invertebrate analyses (Wigley and Tholke 2020) because these trips may have different goals/objectives and/or different stratification/sea day allocations than the other NEFOP trips and IFS trips. This approach follows the 2018 SBRM Fishery Management Action Team recommendation to exclude individual FMP compliance monitoring trips from future annual discard estimation, precision, and sample size analyses for fish/invertebrate species groups (Hogan et al. 2019).

The SBRM analyses use master data and are predicated upon accurately reported and audited data. To reduce and/or prevent “erroneous” fleets, the VTR master data would benefit from enhanced data auditing (including data leverage between data collection systems) coupled with targeted outreach and education to industry members on the importance of accurate reporting. Additionally, gear code consistency is needed between the fishery dependent data collection systems (Observer, Vessel Trip Report, and Commercial Fisheries databases).

Trip Selection Systems

The observer program uses 3 systems to select fishing trips for observer coverage: the PTNS; IFS interactive voice response/call-in program; and the NEFOP Sea Day Schedule selection protocols that include selection by phone, email, letter, Vessel Monitoring System message, or in person at the docks (dock intercept). For some fleets, both PTNS and the NEFOP Sea Day Schedule are used for the groundfish and nongroundfish components of these fleets. The Sea Day Schedule is used for trips in the nongroundfish component. Amendment 16 of the Northeast Multispecies FMP specifies that vessel representatives are required to notify NMFS in advance of planned groundfish declared trips via the PTNS. The PTNS handles the selection of trips for NEFOP, NEFOP limited (MMPA funded sea days), and ASM coverage for all groundfish trips. For NEFOP and ASM sampling, trip selection is proportional to the current fishing activity in a given stratum.

In 2018, the PTNS was modified to allow the system to support multiple sampling programs with different sampling designs (e.g., SBRM, ASM). This modification allows NMFS to deploy SBRM coverage in the groundfish fleets consistent with the SBRM requirements. The NEFOP SBRM sea days are assigned consistent with the fleet-based coverage levels prescribed by the SBRM. Since SBRM fleets can experience varying levels of NEFOP coverage depending on the fleet composition of some sectors, some sectors will receive more NEFOP coverage than others. Hence, sectors may require differing amounts of ASM coverage to achieve the combined target coverage level. The methods used to apportion observer sea days among the trip selection systems are described in the 2020 Observer Sea Days by Trip Selection System (NEFSC 2020).

Expanded Sampling Frame for MA and NE Lobster Pot Fleets

The 2020 SBRM analyses for discard estimation and sample size (Wigley and Tholke 2020) used the VTR (including clam logbook) data to define the sampling frame for the Greater Atlantic region's fleets by using data collected from July 2018 through June 2019. Vessels that hold federal fishing permits have VTR reporting requirements except for vessels that hold only a federal lobster permit. Consequently, vessels with only a federal lobster permit were not included in the SBRM data sets. The discard estimates in Wigley and Tholke 2020 appropriately reflect the underlying data used (e.g., the VTR data used to raise the discard ratios to total discards and the observed trips used to derive the discard ratios were from the same VTR-based sampling frame). It is inappropriate to extrapolate beyond the sampling frame used unless it can be shown that the trips with no VTR reporting requirements have the same landings and discard characteristics as the trips with VTR reporting requirements. An approach was needed to include all federal trips in the MA and NE lobster pot fleets such that the SBRM analyses would be based upon information from all federally permitted vessels.

In April 2016, the agency found that expanding the sampling frame for the MA and NE lobster pot fleets to include all vessels with a federal permit requires a regulatory change to the SBRM Amendment. The agency has pursued the required language change through a pending framework action. The pending SBRM framework action seeks to clarify the Councils' intent for the SBRM process to monitor bycatch of federally managed or protected species from the entire active lobster pot fleet. This pending action would expand the lobster pot sampling frame used in this analysis by allowing the NEFSC to include fishing activity and catch data (e.g., trip length, date, pounds kept, port of landing) for all active lobster pot vessels in the annual SBRM analyses and to assign NEFOP coverage to any federal lobster pot vessel, regardless of whether the vessel is required to submit VTRs. When the pending SBRM framework action is implemented then, beginning in the calendar quarter following approval, all active federal lobster vessels may be eligible for selection. Implementing the pending action would not change the number of sea days needed for April 2020 through March 2021.

The rest of the SBRM fleets did not need to have the sampling frame expanded because these vessels have VTR reporting requirements associated with their federal fishing permits and their fishing trips are already included in the SBRM sampling frame.

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Table 1. A list of the 14 fish and invertebrate species groups and 1 species of sea turtle (in bold), with species group abbreviations in parentheses and scientific names in italics, and the species that compose these groups, corresponding to the 13 federal fishery management plans implemented in the waters off the northeastern United States.

Species/Group	Scientific Name
ATLANTIC SALMON (SAL)	<i>Salmo salar</i>
BLUEFISH (BLUE)	<i>Pomatomus saltatrix</i>
FLUKE - SCUP - BLACK SEA BASS (FSB)	
Black sea bass	<i>Centropristis striata</i>
Fluke	<i>Paralichthys dentatus</i>
Scup	<i>Stenotomus chrysops</i>
HERRING, ATLANTIC (HERR)	<i>Clupea harengus</i>
LARGE MESH GROUND FISH (GFL)	
American plaice	<i>Hippoglossoides platessoides</i>
Atlantic cod	<i>Gadus morhua</i>
Atlantic halibut	<i>Hippoglossus hippoglossus</i>
Atlantic wolffish	<i>Anarhichas lupus</i>
Haddock	<i>Melanogrammus aeglefinus</i>
Ocean pout	<i>Zoarces americanus</i>
Pollock	<i>Pollachius virens</i>
Redfish	<i>Sebastes fasciatus</i>
White hake	<i>Urophycis tenuis</i>
Windowpane flounder	<i>Scophthalmus aquosus</i>
Winter flounder	<i>Pseudopleuronectes americanus</i>
Witch flounder	<i>Glyptocephalus cynoglossus</i>
Yellowtail flounder	<i>Limanda ferruginea</i>
MONKFISH (MONK)	<i>Lophius americanus</i>
RED DEE PSEA CRAB (RCRAB)	<i>Chaceon quinquedens</i>
SEA SCALLOP (SCAL)	<i>Placopecten magellanicus</i>
SKATE COMPLEX (SKATE)¹¹	Rajidae
Barndoor skate	<i>Dipturus laevis</i>
Clearnose skate	<i>Raja eglanteria</i>
Little skate	<i>Leucoraja erinacea</i>
Rosette skate	<i>Leucoraja garmani</i>
Smooth skate	<i>Malacoraja senta</i>
Thorny skate	<i>Amblyraja radiata</i>
Winter skate	<i>Leucoraja ocellata</i>
SMALL MESH GROUND FISH (GFS)	
Offshore hake	<i>Merluccius albidus</i>
Red hake	<i>Urophycis chuss</i>
Silver hake	<i>Merluccius bilinearis</i>
SPINY DOGFISH (DOG)	<i>Squalus acanthias</i>
SQUID¹² - BUTTERFISH - MACKEREL (SBM)	
Atlantic mackerel	<i>Scomber scombrus</i>
Butterfish	<i>Peprilus triacanthus</i>
Longfin inshore squid	<i>Doryteuthis (Amerigo) pealeii</i>
Northern shortfin squid	<i>Illex illecebrosus</i>
SURFLAM - OCEAN QUAHOG (SCOQ)	
Surflam	<i>Spisula solidissima</i>
Ocean quahog	<i>Arctica islandica</i>
TILEFISH (TILE)¹³	
Blueline tilefish	<i>Caulolatilus microps</i>
Golden tilefish	<i>Lopholatilus chamaeleonticeps</i>
LOGGERHEAD TURTLE (TURS)	<i>Caretta caretta</i>

¹¹ Skate complex comprises 7 species as well as skate, unknown.

¹² Squid, unclassified is included in this species group. Longfin inshore squid and northern shortfin squid are also known as Loligo squid and Illex squid, respectively.

¹³ Tilefish, unclassified is included in this species group.

Table 2. Total catch (live lb), Vessel Trip Report landings (kept; live lb), estimated discards (live lb), associated coefficient of variation (CV), and standard error of the estimated discards (SE; live lb) for 14 Standardized Bycatch Reporting Methodology (SBRM) species groups combined, by fleet, based on July 2018 through June 2019 data. Dark shading indicates fleets not considered or with no observed trips in the annual analysis. These CV were not used in the annual sample size analysis. Blank CV indicates either no discards or discards equal 0. "P" indicates fleets with "pilot" designation. Taken from Table 5C in Wigley and Tholke 2020.

Species: 14 SBRM SPECIES GROUPS COMBINED

Fleet Row	Gear Type	Access Area	Trip Category	Region	Mesh Group	Total	Kept	Discarded	CV	SE	Pilot
1	Longline, Bottom	OPEN	all	MA	all	1,610,853	1,505,392	105,462	0.435	45,884	
2	Longline, Bottom	OPEN	all	NE	all	4,413,204	4,116,046	297,158	0.141	41,798	
3	Hand Line	OPEN	all	MA	all	264,162	237,011	27,151	0.615	16,696	
4	Hand Line	OPEN	all	NE	all	1,211,462	1,134,573	76,889	0.176	13,561	
5	Otter Trawl	OPEN	all	MA	sm	59,445,317	43,672,477	15,772,840	0.079	1,244,755	
6	Otter Trawl	OPEN	all	MA	lg	17,935,913	11,615,330	6,320,584	0.111	700,717	
7	Otter Trawl	OPEN	all	NE	sm	79,303,628	61,970,392	17,333,236	0.114	1,975,343	
8	Otter Trawl	OPEN	all	NE	lg	77,016,194	56,839,965	20,176,230	0.164	3,318,747	
9	Otter Trawl, Scallop	AA	GEN	MA	sm	40,317	40,317				P
10	Otter Trawl, Scallop	AA	GEN	MA	lg	589,872	492,781	97,091	0.000	0	P
11	Otter Trawl, Scallop	OPEN	GEN	MA	lg	25,134	25,134				P
18	Otter Trawl, Ruhle	OPEN	all	NE	sm	693,753	693,753				P
19	Otter Trawl, Ruhle	OPEN	all	NE	lg	70,769	70,769				P
20	Otter Trawl, Haddock Separator	OPEN	all	NE	lg	3,951,168	3,105,873	845,295	0.158	133,945	
21	Otter Trawl, Shrimp	OPEN	all	MA	sm	19,048	19,048				P
22	Otter Trawl, Shrimp	OPEN	all	NE	sm	69,357	69,357				P
24	Otter Trawl, Other	OPEN	all	NE	sm	1,615,065	1,615,065				P
25	Otter Trawl, Other	OPEN	all	NE	lg	123,200	123,200				P
26	Floating Trap	OPEN	all	MA	all	794	794				P
27	Floating Trap	OPEN	all	NE	all	4,384	4,384				P
28	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	sm	3,045,457	2,944,604	100,853	0.150	15,124	
29	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	lg	4,154,481	3,989,963	164,518	0.193	31,678	
30	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	xlg	5,697,264	5,363,696	333,568	0.144	48,094	
31	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	sm	0	0	0			
32	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	lg	6,576,499	5,622,718	953,781	0.226	215,768	
33	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	xlg	23,378,147	20,651,805	2,726,341	0.159	432,830	
34	Purse Seine	OPEN	all	MA	all	11	11				P
35	Purse Seine	OPEN	all	NE	all	37,651,867	37,651,756	111	0.780	87	

See Appendix Table 1 for fleet abbreviations.

Table 2, continued. Total catch (live lb), Vessel Trip Report landings (kept; live lb), estimated discards (live lb), associated coefficient of variation (CV), and standard error of the estimated discards (SE; live lb) for 14 Standardized Bycatch Reporting Methodology (SBRM) species groups combined, by fleet, based on July 2018 through June 2019 data. Dark shading indicates fleets not considered or with no observed trips in the annual analysis. These CV were not used in the annual sample size analysis. Blank CV indicates either no discards or discards equal 0. "P" indicates fleets with "pilot" designation. Taken from Table 5C in Wigley and Tholke 2020.

Species: 14 SBRM SPECIES GROUPS COMBINED

Fleet Row	Gear Type	Access Area	Trip Category	Region	Mesh Group	Total	Kept	Discarded	CV	SE	Pilot
36	Dredge, Scallop	AA	GEN	MA	all	7,409,937	6,621,185	788,752	0.214	169,159	
37	Dredge, Scallop	AA	GEN	NE	all	6,940,209	6,342,177	598,032	0.120	71,565	
38	Dredge, Scallop	AA	LIM	MA	all	78,090,677	74,745,881	3,344,796	0.151	506,096	
39	Dredge, Scallop	AA	LIM	NE	all	301,575,940	262,552,802	39,023,138	0.063	2,452,145	
40	Dredge, Scallop	OPEN	GEN	MA	all	7,681,976	5,875,383	1,806,593	0.096	173,501	
41	Dredge, Scallop	OPEN	GEN	NE	all	8,026,078	7,260,523	765,555	0.188	144,299	
42	Dredge, Scallop	OPEN	LIM	MA	all	30,697,261	27,736,180	2,961,081	0.153	452,439	
43	Dredge, Scallop	OPEN	LIM	NE	all	116,123,673	103,120,758	13,002,915	0.109	1,419,056	
45	Trawl, Midwater Paired&Single	all	all	NE	sm	40,472,032	40,356,096	115,936	0.897	104,013	
47	Pots and Traps, Other	OPEN	all	NE	all	9,625	9,625				P
48	Pots and Traps, Fish	OPEN	all	MA	all	542,873	346,797	196,076	0.270	52,870	
49	Pots and Traps, Fish	OPEN	all	NE	all	431,411	264,450	166,961	0.286	47,812	
50	Pots and Traps, Conch	OPEN	all	MA	all	4,263	3,865	398	0.385	153	
51	Pots and Traps, Conch	OPEN	all	NE	all	463,896	462,527	1,369	1.034	1,415	
52	Pots and Traps, Lobster	OPEN	all	MA	all	137,128	128,598	8,530	0.342	2,917	
53	Pots and Traps, Lobster	OPEN	all	NE	all	722,648	182,463	540,185	0.802	433,212	
54	Pots and Traps, Crab	OPEN	all	MA	all	125,281	89,060	36,221	0.120	4,353	
55	Pots and Traps, Crab	OPEN	all	NE	all	4,815,929	3,812,063	1,003,866	0.230	230,568	
56	Beam Trawl	OPEN	all	MA	sm	422,013	422,013				P
58	Dredge, Other	OPEN	all	MA	all	0	0				P
60	Dredge, Urchin	OPEN	all	NE	all	0	0				P
61	Dredge, Ocean Quahog/Surfclam	OPEN	all	MA	all	249,431,129	246,539,038	2,892,091	0.342	988,060	
62	Dredge, Ocean Quahog/Surfclam	OPEN	all	NE	all	190,170,891	187,444,910	2,725,981	0.210	571,599	
	Confidential fleets					13,071,289	11,959,924	1,111,365	0.147	163,868	
	Other minor fleets					516,243	516,243				
	TOTAL					1,386,789,721	1,250,368,773	136,420,948	0.038	5,232,114	

Table 3. The most recent average annual estimates and 5 year pooled estimates of sea turtle (Loggerhead [*Caretta caretta*], Kemp's ridley [*Lepidochelys kempi*], Leatherback [*Dermochelys coriacea*], and Green [*Chelonia mydas*]) interactions and their associated coefficient of variation (CV) in US commercial fisheries.

Fishery	Average Annual Estimate	5 year Estimate	CV	Years Included	Species*	Reference
Bottom trawl, for fish and scallops, Mid-Atlantic	114	571	0.29	01 Jan 2014-2018	Loggerhead	Murray 2020
Bottom trawl, for fish and scallops, Mid-Atlantic	9	46	0.45	01 Jan 2014 - 2018	Kemp's ridley	Murray 2020
Bottom trawl, for fish and scallops, Mid-Atlantic	4	20	0.72	01 Jan 2014 - 2018	Leatherback	Murray 2020
Bottom trawl, for fish and scallops, Mid-Atlantic	3	17	0.73	01 Jan 2014 - 2018	Green	Murray 2020
Bottom trawl, for fish and scallops, Georges Bank	2	12	0.70	01 Jan 2014 - 2018	Loggerhead	Murray 2020
Bottom trawl, for fish and scallops, Georges Bank	1	6	1.0	01 Jan 2014 - 2018	Leatherback	Murray 2020
Sink Gillnet (Mid-Atlantic and Georges Bank combined)	141	705	0.29	01 Jan 2012-2016	Loggerhead	Murray 2018
Sink Gillnet (Mid-Atlantic and Georges Bank combined)	29	145	0.43	01 Jan 2012-2016	Kemp's ridley	Murray 2018
Sink Gillnet (Mid-Atlantic and Georges Bank combined)	5	27	0.71	01 Jan 2012-2016	Leatherback	Murray 2018
Sink Gillnet (Mid-Atlantic and Georges Bank combined)	22	112	0.37	01 Jan 2012-2016	Unidentified hard-shelled	Murray 2018

* Sea day monitoring needs for Kemp's ridley and leatherback turtles in sink gillnet gear were not projected because of the low encounter rate of these species.

Table 4. The number of sea days needed to achieve a 30% coefficient of variation of the discard estimate for each of the 14 fish and invertebrate species groups, the number of pilot sea days, the number of minimum pilot sea days, and the maximum number of sea days needed for each fleet (2020 Sea Days Needed) for fish and invertebrate species groups based on July 2018 through June 2019 data. Bold red font indicates basis for fleet sea days. "P" indicates fleets with "pilot" designation. Species group abbreviations are given in Table 1. Taken from Table 6B in Wigley and Tholke 2020.

Row	Fleet Gear Type	Access Area	Trip	Region	Mesh Size	BLUE	HERR	SAL	RCRAB	SCAL	SBM	MONK	GFL	GFS	SKATE	DOG	FSB	SCOQ	TILE	Pilot Days	Min Pilot Days	2020 Sea Days Needed	Pilot	
1	Longline, Bottom	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	84	84	
2	Longline, Bottom	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	23	15	17	
3	Hand Line	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	14	14	
4	Hand Line	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	13	13	
5	Otter Trawl	OPEN	all	MA	sm	0	0	0	0	0	633	577	443	643	440	457	396	0	0	0	167	29	643	
6	Otter Trawl	OPEN	all	MA	lg	0	0	0	0	0	0	275	0	0	137	364	161	0	0	0	136	31	364	
7	Otter Trawl	OPEN	all	NE	sm	0	0	0	0	0	988	0	288	319	494	755	557	0	0	0	200	35	988	
8	Otter Trawl	OPEN	all	NE	lg	0	0	0	0	0	0	157	147	161	840	433	474	0	0	0	261	33	840	
9	Otter Trawl, Scallop	AA	GEN	MA	sm	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	P
10	Otter Trawl, Scallop	AA	GEN	MA	lg	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	P
11	Otter Trawl, Scallop	OPEN	GEN	MA	lg	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	P
12	Otter Trawl, Scallop	OPEN	GEN	NE	lg	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	P
13	Otter Trawl, Twin	OPEN	all	MA	sm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	51	51	
14	Otter Trawl, Twin	OPEN	all	MA	lg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	P
15	Otter Trawl, Twin	OPEN	all	NE	sm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22	22	
16	Otter Trawl, Ruhle	OPEN	all	MA	sm	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	P
17	Otter Trawl, Ruhle	OPEN	all	MA	lg	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	P
18	Otter Trawl, Ruhle	OPEN	all	NE	sm	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	P
19	Otter Trawl, Ruhle	OPEN	all	NE	lg	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	P
20	Otter Trawl, Haddock Separator	OPEN	all	NE	lg	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	102	102	102	
21	Otter Trawl, Shrimp	OPEN	all	MA	sm	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	51	64	P
22	Otter Trawl, Shrimp	OPEN	all	NE	sm	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	P
23	Otter Trawl, Other	OPEN	all	MA	sm	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	P
24	Otter Trawl, Other	OPEN	all	NE	sm	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	P
25	Otter Trawl, Other	OPEN	all	NE	lg	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	P
26	Floating Trap	OPEN	all	MA	all	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	P
27	Floating Trap	OPEN	all	NE	all	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	P
28	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	sm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	13	13	
29	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	lg	0	0	0	0	0	0	0	0	0	0	149	0	0	0	0	35	13	149	
30	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	xl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	14	14	
31	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	sm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	
32	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	lg	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	55	19	225	
33	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	xl	0	0	0	0	0	0	68	0	0	142	209	0	0	0	0	91	20	209	
34	Purse Seine	OPEN	all	MA	all	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	P
35	Purse Seine	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	14	14	
36	Dredge, Scallop	AA	GEN	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	15	15	
37	Dredge, Scallop	AA	GEN	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	26	26	
38	Dredge, Scallop	AA	LIM	MA	all	0	0	0	0	0	0	91	0	0	76	0	0	0	0	0	102	76	91	
39	Dredge, Scallop	AA	LIM	NE	all	0	0	0	0	227	0	238	389	299	168	520	0	0	0	0	323	87	520	
40	Dredge, Scallop	OPEN	GEN	MA	all	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	38	20	20	
41	Dredge, Scallop	OPEN	GEN	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	16	16	
42	Dredge, Scallop	OPEN	LIM	MA	all	0	0	0	0	0	0	140	0	0	48	0	0	0	0	0	93	93	140	
43	Dredge, Scallop	OPEN	LIM	NE	all	0	0	0	0	0	0	454	0	0	218	0	0	0	0	0	137	107	454	

Table 4, continued. The number of sea days needed to achieve a 30% coefficient of variation of the discard estimate for each of the 14 fish and invertebrate species groups, the number of pilot sea days, the number of minimum pilot sea days, and the maximum number of sea days needed for each fleet (2020 Sea Days Needed) for fish and invertebrate species groups based on July 2018 through June 2019 data. Bold red font indicates basis for fleet sea days. "P" indicates fleets with "pilot" designation. Species group abbreviations are given in Table 1. Taken from Table 6B in Wigley and Tholke 2020.

Row	Fleet Gear Type	Access Area	Trip	Region	Mesh Size	BLUE	HERR	SAL	RCRAB	SCAL	SBM	MONK	GFL	GFS	SKATE	DOG	FSB	SCOQ	TILE	Pilot Days	Min Pilot Days	2020 Sea Days Needed	Pilot	
44	Danish Seine	OPEN	all	MA	all	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	P
45	Trawl, Midwater Paired&Single	all	all	NE	sm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	31	31	
46	Trawl, Midwater Paired&Single	OPEN	all	MA	sm	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	P
47	Pots and Traps, Other	OPEN	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	P
48	Pots and Traps, Fish	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	13	13	
49	Pots and Traps, Fish	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	15	15	
50	Pots and Traps, Conch	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	13	13	
51	Pots and Traps, Conch	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	12	
52	Pots and Traps, Lobster	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	20	20	
53	Pots and Traps, Lobster	OPEN	all	NE	all	0	0	0	0	0	0	0	0	0	0	0	255	0	0	0	437	17	255	
54	Pots and Traps, Crab	OPEN	all	MA	all	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22	22	
55	Pots and Traps, Crab	OPEN	all	NE	all	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	79	79	79	
56	Beam Trawl	OPEN	all	MA	sm	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	P
57	Beam Trawl	OPEN	all	NE	lg	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	P
58	Dredge, Other	OPEN	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	P
59	Dredge, Other	OPEN	all	NE	all	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	P
60	Dredge, Urchin	OPEN	all	NE	all	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	P
61	Dredge, Ocean Quahog/Surfclam	OPEN	all	MA	all	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	73	23	33	
62	Dredge, Ocean Quahog/Surfclam	OPEN	all	NE	all	0	0	0	0	0	0	42	0	0	42	428	0	0	0	0	51	18	428	
					Totals	436	436	436	482	663	2,057	2,511	1,718	1,858	3,053	3,993	2,279	436	436	3,575	1,651	6,404		

See Appendix Table 1 for fleet abbreviations.

Table 5. The number of sea days needed to monitor fish/invertebrates (FISH), loggerhead turtles (TURS), combined species groups (COMBINED) by fleet (Steps 1 through 6); the number of funded sea days for April 2020 through March 2021 (Step 7); and the differences between needed and funded days (Step 8).

Fleet						Step 1	Step 2	Step 3	Step 4a	Step 4b	Step 4c	Step 4d	Step 4e	Step 5
Row	Gear Type	Access Area	Trip Cat.	Region	Mesh	2020 Sea Days Needed for FISH	2020 Sea Days Needed for FISH ADJUSTED	2020 Sea Days Needed for TURS	Vessel Trip Report Sea Days	% Vessel Trip Report Sea Days	% Sea Days Needed for FISH	Additional Sea Days needed for TURS	TURS Sea Days by FISH fleet	2020 Sea Days Needed COMBINED
1	Longline, Bottom	OPEN	all	MA	all	84	84							84
2	Longline, Bottom	OPEN	all	NE	all	17	17	889						17
3	Hand Line	OPEN	all	MA	all	14	14	942						14
4	Hand Line	OPEN	all	NE	all	13	13	3,231						13
5	Otter Trawl	OPEN	all	MA	sm	643	643	1,922	8,335	0.542	0.619	479	1,122	1,122
6	Otter Trawl	OPEN	all	MA	lg	364	364		6,777	0.440	0.351	389	753	753
7	Otter Trawl	OPEN	all	NE	sm	988	988	10,008						988
8	Otter Trawl	OPEN	all	NE	lg	840	840	13,045						840
9	Otter Trawl, Scallop	AA	GEN	MA	sm	6	0		18	0.000	0.000	0	0	0
10	Otter Trawl, Scallop	AA	GEN	MA	lg	13	13		209	0.014	0.013	12	25	25
11	Otter Trawl, Scallop	OPEN	GEN	MA	lg	5	5		28	0.002	0.005	2	7	7
12	Otter Trawl, Scallop	OPEN	GEN	NE	lg	8	8	12						8
13	Otter Trawl, Twin	OPEN	all	MA	sm	51	51	223						51
14	Otter Trawl, Twin	OPEN	all	MA	lg	6	6	49						6
15	Otter Trawl, Twin	OPEN	all	NE	sm	22	22	75						22
16	Otter Trawl, Ruhle	OPEN	all	MA	sm	23	0.0		36	0.000	0.000	0	0	0
17	Otter Trawl, Ruhle	OPEN	all	MA	lg	13	13		41	0.003	0.013	2	15	15
18	Otter Trawl, Ruhle	OPEN	all	NE	sm	12	0	42						0
19	Otter Trawl, Ruhle	OPEN	all	NE	lg	9	9	30						9
20	Otter Trawl, Haddock Separator	OPEN	all	NE	lg	102	102	473						102
21	Otter Trawl, Shrimp	OPEN	all	MA	sm	64	0	2,328						0
22	Otter Trawl, Shrimp	OPEN	all	NE	sm	7	0	44						0
23	Otter Trawl, Other	OPEN	all	MA	sm	29	0		38	0.000	0.000	0	0	0
24	Otter Trawl, Other	OPEN	all	NE	sm	64	0		360					
25	Otter Trawl, Other	OPEN	all	NE	lg	62	0	123						0
26	Floating Trap	OPEN	all	MA	all	6	6	14						6
27	Floating Trap	OPEN	all	NE	all	21	21	113						21
28	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	sm	13	13	887	2,002	0.387	0.074	275	288	288
29	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	lg	149	149		1,731	0.335	0.847	238	387	387
30	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	xlg	14	14		1,439	0.278	0.080	198	212	212
31	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	sm	3	3	31						3
32	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	lg	225	225	2,558						225
33	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	xlg	209	209	4,529						209
34	Purse Seine	OPEN	all	MA	all	6	6	305						6
35	Purse Seine	OPEN	all	NE	all	14	14	813						14

See Appendix Table 1 for fleet abbreviations.

Table 5, continued. The number of sea days needed to monitor fish/invertebrates (FISH), loggerhead turtles (TURS), combined species groups (COMBINED) by fleet (Steps 1 through 6); the number of funded sea days for April 2020 through March 2021 (Step 7); and the differences between needed and funded days (Step 8).

Fleet						Step 1	Step 2	Step 3	Step 4a	Step 4b	Step 4c	Step 4d	Step 4e	Step 5
Row	Gear Type	Access Area	Trip Cat.	Region	Mesh	2020 Sea Days Needed for FISH	2020 Sea Days Needed for FISH ADJUSTED	2020 Sea Days Needed for TURS	Vessel Trip Report Sea Days	% Vessel Trip Report Sea Days	% Sea Days Needed for FISH	Additional Sea Days needed for TURS	TURS Sea Days by FISH fleet	2020 Sea Days Needed COMBINED
36	Dredge, Scallop	AA	GEN	MA	all	15	15		2,182					15
37	Dredge, Scallop	AA	GEN	NE	all	26	26		2,537					26
38	Dredge, Scallop	AA	LIM	MA	all	91	91		4,646					91
39	Dredge, Scallop	AA	LIM	NE	all	520	520		16,150					520
40	Dredge, Scallop	OPEN	GEN	MA	all	20	20		1,908					20
41	Dredge, Scallop	OPEN	GEN	NE	all	16	16		4,097					16
42	Dredge, Scallop	OPEN	LIM	MA	all	140	140		2,085					140
43	Dredge, Scallop	OPEN	LIM	NE	all	454	454		6,019					454
44	Danish Seine	OPEN	all	MA	all	3	0		26					0
45	Trawl, Midwater Paired&Single	all	all	NE	sm	31	31		505					31
46	Trawl, Midwater Paired&Single	OPEN	all	MA	sm	13	13		76					13
47	Pots and Traps, Other	OPEN	all	NE	all	12	0		365					0
48	Pots and Traps, Fish	OPEN	all	MA	all	13	13		735					13
49	Pots and Traps, Fish	OPEN	all	NE	all	15	15		928					15
50	Pots and Traps, Conch	OPEN	all	MA	all	13	13		1,069					13
51	Pots and Traps, Conch	OPEN	all	NE	all	12	12		1,180					12
52	Pots and Traps, Lobster	OPEN	all	MA	all	20	20		1,661					20
53	Pots and Traps, Lobster	OPEN	all	NE	all	255	255		34,614					255
54	Pots and Traps, Crab	OPEN	all	MA	all	22	22		51					22
55	Pots and Traps, Crab	OPEN	all	NE	all	79	79		666					79
56	Beam Trawl	OPEN	all	MA	sm	18	0		49					0
57	Beam Trawl	OPEN	all	NE	lg	18	0		30					0
58	Dredge, Other	OPEN	all	MA	all	12	0		310					0
59	Dredge, Other	OPEN	all	NE	all	3	0		7					0
60	Dredge, Urchin	OPEN	all	NE	all	3	3		10					3
61	Dredge, Ocean Quahog/Surfclam	OPEN	all	MA	all	33	33		3,668					33
62	Dredge, Ocean Quahog/Surfclam	OPEN	all	NE	all	428	428		2,573					428
Total						6,404	6,071	2,809	151,389					7,666
Step 6		Agency Fleets (Sea Days Needed)		Industry Fleets (Sea Days Needed)		5,090	4,763							6,344
						1,314	1,308							1,322
Step 7		Agency Fleets (Sea Days Funded)		Industry Fleets (Sea Days Funded)		Prioritized						4,808		
						Non-prioritized (MMPA)						385		
												1,890		
Step 8		Agency Fleet Difference		Industry Fleet Difference		SHORTFALL						-1,536		
						SURPLUS						568		
		Turtle Gear Types		MA Trawl		1,096	1,038	1,922	15,390	884	884	1,922	1,922	
				MA Gillnet		176	176	887	5,172	711	711	887	887	
KEY: Agency funded fleets		Industry funded fleets								Difference between taxa				
Fleets identified as "erroneous"		Fleets with NEFOP Limitation												
Steps used in sea day allocation		Fleets with reduction in sea days												

See Appendix Table 1 for fleet abbreviations.

Table 6, continued. The 2020 sea days needed (COMBINED; Step 5) and the information used in the penultimate approach to prioritize sea days to fleets for agency-funded days that are applicable to the prioritization process (Steps 9.1 through 9.5).

Fleet						Step 5	Step 9.1					Step 9.2					Step 9.3		Step 9.4	Step 9.5				
Row	Gear Type	Access Area	Trip Cat.	Region	Mesh	2020 Sea Days Needed COMBINED	Penultimate sea days needed for the 15 species groups, in descending order with minimum pilot coverage as minimum for fleet					Sea day differences between adjacent species groups within a row (red font indicated values used in Step 9.3)					Sea day differences, in descending order with fleet constraint	Cumulative reduction of sea days	2020 Sea Days PRIORITIZED (Penultimate)	2020 Sea Days PRIORITIZED (Penultimate)				
51	Pots and Traps, Conch	OPEN	all	NE	all	12	12									0						12	12	
52	Pots and Traps, Lobster	OPEN	all	MA	all	20	20									0						20	20	
53	Pots and Traps, Lobster	OPEN	all	NE	all	255	17									238						255	255	
54	Pots and Traps, Crab	OPEN	all	MA	all	22	22									0						22	22	
55	Pots and Traps, Crab	OPEN	all	NE	all	79	79									0						79	79	
56	Beam Trawl	OPEN	all	MA	sm	0	0									0						0	0	
57	Beam Trawl	OPEN	all	NE	lg	0	0									0						0	0	
58	Dredge, Other	OPEN	all	MA	all	0	0									0						0	0	
59	Dredge, Other	OPEN	all	NE	all	0	0									0						0	0	
60	Dredge, Urchin	OPEN	all	NE	all	3	3									0						3	0	
61	Dredge, Ocean Quahog/Surfclam	OPEN	all	MA	all	33	33									0						33	33	
62	Dredge, Ocean Quahog/Surfclam	OPEN	all	NE	all	428	42									386						42	42	
Total						7,666																	4,808	4,808
Step 6		Agency Fleets (Sea Days Needed)				6,344																		
		Industry Fleets (Sea Days Needed)				1,322																		
Step 7		Agency Fleets (Sea Days Funded)				4,808	Prioritized days																	
		Agency Fleets (Sea Days Funded)				385	Non-prioritized days (MMPA)																	
		Industry Fleets (Sea Days Funded)				1,890	Industry-funded scallop days																	
Step 8		Agency Fleet Difference				-1,536																		
		Industry Fleet Difference				568																		
		Turtle Gear Types																						
		MA Trawl				1,922																		
		MA Gillnet				887																		

KEY: Agency funded fleets	Industry funded fleets
Fleets identified as "erroneous"	Fleets with NEFOP Limitation
Steps used in sea day allocation	Fleets with reduction in sea days

Table 7. The number of sea days needed to monitor the combined species groups (COMBINED; Step 5), prioritized days (Step 9.5), nonprioritized days (Marine Mammal Protection Act [MMPA]; Step 10), industry-funded scallop days (Step 11), and the 2020 observer sea days allocated for April 2020 through March 2021 (Step 12), by fleet. Note: * indicates all coverage is dependent on industry activity; ** indicates some coverage is dependent on industry activity; * indicates coverage for protected species bycatch.**

Fleet						Step 5	Step 9.5	Step 10	Step 11	Step 12	
Row	Gear Type	Access Area	Trip Cat.	Region	Mesh	2020 Sea Days Needed COMBINED	2020 Sea Days PRIORITIZED (Penultimate)	2020 Sea Days non-prioritized (MMPA)	2020 Sea Days Industry-funded Scallop	Sea Days Allocated for April 2020 - March 2021 (TOTAL)	Comments
1	Longline, Bottom	OPEN	all	MA	all	84	84			84	Fish stock assessment support
2	Longline, Bottom	OPEN	all	NE	all	17	17			17	Fish stock assessment support **
3	Hand Line	OPEN	all	MA	all	14	14			14	Fish stock assessment support
4	Hand Line	OPEN	all	NE	all	13	13			13	Fish stock assessment support **
5	Otter Trawl	OPEN	all	MA	sm	1,122	643			643	Fish stock assessment and turtle bycatch support
6	Otter Trawl	OPEN	all	MA	lg	753	364			364	Fish stock assessment and turtle bycatch support **
7	Otter Trawl	OPEN	all	NE	sm	988	988			988	Fish stock assessment support **
8	Otter Trawl	OPEN	all	NE	lg	840	594			594	Fish stock assessment support **
9	Otter Trawl, Scallop	AA	GEN	MA	sm	0					Fleet removed (erroneous fleet)
10	Otter Trawl, Scallop	AA	GEN	MA	lg	25					Industry funded scallop * (see Row 36)
11	Otter Trawl, Scallop	OPEN	GEN	MA	lg	7					Industry funded scallop * (see Row 40)
12	Otter Trawl, Scallop	OPEN	GEN	NE	lg	8					Industry funded scallop * (see Row 40)
13	Otter Trawl, Twin	OPEN	all	MA	sm	51	51			51	Fish stock assessment support *
14	Otter Trawl, Twin	OPEN	all	MA	lg	6	6			6	Fish stock assessment support
15	Otter Trawl, Twin	OPEN	all	NE	sm	22	22			22	Fish stock assessment support
16	Otter Trawl, Ruhle	OPEN	all	MA	sm	0	0			0	Fleet removed (erroneous fleet)
17	Otter Trawl, Ruhle	OPEN	all	MA	lg	15	15			15	Fish stock assessment and turtle bycatch support *
18	Otter Trawl, Ruhle	OPEN	all	NE	sm	0	0			0	Fleet removed (erroneous fleet)
19	Otter Trawl, Ruhle	OPEN	all	NE	lg	9	9			9	Fish stock assessment support *
20	Otter Trawl, Haddock Separator	OPEN	all	NE	lg	102	102			102	Fish stock assessment support *
21	Otter Trawl, Shrimp	OPEN	all	MA	sm	0	0			0	Fleet removed (erroneous fleet)
22	Otter Trawl, Shrimp	OPEN	all	NE	sm	0	0			0	Fleet removed (erroneous fleet)
23	Otter Trawl, Other	OPEN	all	MA	sm	0	0			0	Fleet removed (erroneous fleet)
24	Otter Trawl, Other	OPEN	all	NE	sm	0	0			0	Fleet removed (erroneous fleet)
25	Otter Trawl, Other	OPEN	all	NE	lg	0	0			0	Fleet removed (erroneous fleet)
26	Floating Trap	OPEN	all	MA	all	6	0			0	Fleet removed (NEFOP limitation)
27	Floating Trap	OPEN	all	NE	all	21	0			0	Fleet removed (NEFOP limitation)
28	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	sm	288	288			288	Fish stock assessment and turtle bycatch support
29	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	lg	387	387			387	Fish stock assessment and turtle bycatch support
30	Gillnet, Sink, Anchor, Drift	OPEN	all	MA	xl	212	212			212	Fish stock assessment and turtle bycatch support **
31	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	sm	3	3			3	Fish stock assessment support
32	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	lg	225	225			225	Fish stock assessment support **
33	Gillnet, Sink, Anchor, Drift	OPEN	all	NE	xl	209	209			209	Fish stock assessment support **
34	Purse Seine	OPEN	all	MA	all	6	0			0	Fleet removed (NEFOP limitation)
35	Purse Seine	OPEN	all	NE	all	14	14			14	Fish stock assessment support **

Table 7, continued. The number of sea days needed to monitor the combined species groups (COMBINED; Step 5), prioritized days (Step 9.5), nonprioritized days (Marine Mammal Protection Act [MMPA]; Step 10), industry-funded scallop days (Step 11), and the 2020 observer sea days allocated for April 2020 through March 2021 (Step 12), by fleet. Note: * indicates all coverage is dependent on industry activity; ** indicates some coverage is dependent on industry activity; * indicates coverage for protected species bycatch.**

Fleet							Step 5	Step 9.5	Step 10	Step 11	Step 12	
Row	Gear Type	Access Area	Trip Cat.	Region	Mesh	2020 Sea Days Needed COMBINED	2020 Sea Days PRIORITIZED (Penultimate)	2020 Sea Days non-prioritized (MMPA)	2020 Sea Days Industry-funded Scallop	Sea Days Allocated for April 2020 - March 2021 (TOTAL)	Comments	
36	Dredge, Scallop	AA	GEN	MA	all	15			311	311	Industry funded scallop * (Rows 9, 10, 36, & 38)	
37	Dredge, Scallop	AA	GEN	NE	all	26			920	920	Industry funded scallop * (Rows 37 & 39)	
38	Dredge, Scallop	AA	LIM	MA	all	91					Industry funded scallop * (see Row 36)	
39	Dredge, Scallop	AA	LIM	NE	all	520					Industry funded scallop * (see Row 37)	
40	Dredge, Scallop	OPEN	GEN	MA	all	20			63	63	Industry funded scallop * (Rows 11, 12, 40, & 41)	
41	Dredge, Scallop	OPEN	GEN	NE	all	16					Industry funded scallop * (see Row 40)	
42	Dredge, Scallop	OPEN	LIM	MA	all	140			596	596	Industry funded scallop * (Rows 42 & 43)	
43	Dredge, Scallop	OPEN	LIM	NE	all	454					Industry funded scallop * (see Row 42)	
44	Danish Seine	OPEN	all	MA	all	0	0			0	Fleet removed (erroneous fleet)	
45	Trawl, Midwater Paired&Single	all	all	NE	sm	31	31			31	Fish stock assessment support **	
46	Trawl, Midwater Paired&Single	OPEN	all	MA	sm	13	13			13	Fish stock assessment support *	
47	Pots and Traps, Other	OPEN	all	NE	all	0	0			0	Fleet removed (erroneous fleet)	
48	Pots and Traps, Fish	OPEN	all	MA	all	13	13			13	Fish stock assessment support	
49	Pots and Traps, Fish	OPEN	all	NE	all	15	15			15	Fish stock assessment support	
50	Pots and Traps, Conch	OPEN	all	MA	all	13	13			13	Fish stock assessment support	
51	Pots and Traps, Conch	OPEN	all	NE	all	12	12			12	Fish stock assessment support	
52	Pots and Traps, Lobster	OPEN	all	MA	all	20	20			20	Fish stock assessment support	
53	Pots and Traps, Lobster	OPEN	all	NE	all	255	255			255	Fish stock assessment support	
54	Pots and Traps, Crab	OPEN	all	MA	all	22	22			22	Fish stock assessment support	
55	Pots and Traps, Crab	OPEN	all	NE	all	79	79			79	Fish stock assessment support	
56	Beam Trawl	OPEN	all	MA	sm	0	0			0	Fleet removed (erroneous fleet)	
57	Beam Trawl	OPEN	all	NE	lg	0	0			0	Fleet removed (erroneous fleet)	
58	Dredge, Other	OPEN	all	MA	all	0	0			0	Fleet removed (erroneous fleet)	
59	Dredge, Other	OPEN	all	NE	all	0	0			0	Fleet removed (erroneous fleet)	
60	Dredge, Urchin	OPEN	all	NE	all	3	0			0	Fleet removed (NEFOP limitation)	
61	Dredge, Ocean Quahog/Surfclam	OPEN	all	MA	all	33	33			33	Fish stock assessment support	
62	Dredge, Ocean Quahog/Surfclam	OPEN	all	NE	all	428	42			42	Fish stock assessment support	
MMPA coverage												
Total							7,666	4,808	385	1,890	7,083	Coverage associated with Rows 28-33***
Step 6		Agency Fleets (Sea Days Needed)					6,344					
		Industry Fleets (Sea Days Needed)					1,322					
Step 7		Agency Fleets (Sea Days Funded)					4,808	Prioritized days				4,808
		Agency Fleets (Sea Days Funded)					385	Non-prioritized days (MMPA)				385
		Industry Fleets (Sea Days Funded)					1,890	Industry-funded scallop days				1,890
Step 8		Agency Fleet Difference					-1,536					
		Industry Fleet Difference					568					
		Turtle Gear Types										
		MA Trawl					1,922					
		MA Gillnet					887					

KEY: Agency funded fleets	Industry funded fleets
Fleets identified as "erroneous"	Fleets with NEFOP Limitation
Steps used in sea day allocation	Fleets with reduction in sea days

Appendix Table 1. Stratification abbreviations used for 2020 fleets.

Abbreviation	Definition
NE	New England ports (RI and northward)
MA	Mid-Atlantic ports (CT and southward)
Sm	Small mesh (less than 5.50 in)
Lg	Large mesh (from 5.50 to 7.99 in for gillnet; 5.50 in and greater for trawl)
Xlg	Extra large mesh (8.00 in and greater for gillnet)
AA	Access area
OPEN	Nonaccess area
GEN	General category
LIM	Limited access category

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