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Estimates of Cetacean and Pinniped Bycatch in the 2007 and 2008 Northeast Sink Gillnet and Mid-Atlantic Gillnet Fisheries

by Christopher D. Orphanides

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ABSTRACT

This report provides incidental take estimates for seven marine mammal species observed taken in the 2007 and 2008 Northeast sink gillnet (NESG) and Mid-Atlantic gillnet (MAG) fisheries and documents the methodology used to produce the estimates. The estimated incidental takes in the 2007 NESG fishery were 11 (CV = 94%) common dolphins (*Delphinis delphis*), 395 (CV = 38%) harbor porpoises (*Phocoena phocoena*), 889 (CV = 24%) gray seals (*Halichoerus grypus*), 93 (CV = 49%) harbor seals (*Phoca vitulina*), and 119 (CV = 36%) harp seals (*Phoca groenlandica*). For the MAG fishery, the estimated 2007 incidental takes was 59 (CV = 104%) harbor porpoises, 38 (CV = 90%) harp seals, and 34 (CV = 73%) Risso's dolphin (*Grampus griseus*). The estimated incidental takes in the 2008 NESG fishery, were 666 (CV = 0.48) harbor porpoises, 34 (CV = 77%) common dolphins, 81 (CV = 57%) white-sided dolphins (*Lagenorhynchus acutus*), 618 (CV = 23%) gray seals, 243 (CV = 41%) harbor seals, and 238 (CV = 38%) harp seals. For the MAG fishery, the estimated 2008 incidental takes were 350 (CV = 75%) harbor porpoises, 88 (CV = 74%) harbor seals, and 176 (CV = 74%) harp seals.

INTRODUCTION

Pursuant to the 1994 amendments of the Marine Mammal Protection Act (MMPA), Section 117 states that estimates of annual human-caused mortality and serious injury to marine mammal stocks must be reported in annual stock assessment reports (SAR) for each stock of marine mammal that occurs in waters under US jurisdiction. In part to respond to this mandate, the Northeast Fisheries Science Center (NEFSC) Northeast Fisheries Observer Program (NEFOP) was initiated in 1989 to document the bycatch of marine mammals taken incidentally in commercial fishing operations (Waring et al. 2004). Since the initiation of the observer program, the estimation of total incidental takes for harbor porpoise (*Phocoena phocoena*) has been the focus of much attention due to frequent observations of incidental takes occurring in the Northeast sink gillnet (NESG) fishery (NMFS 1998). This attention led to the development of a stratification method designed to estimate the total annual incidental takes of harbor porpoise (Bisack 1993; Smith et al. 1993; Bravington and Bisack 1996; Bisack 1997; Rossman and Merrick 1999; Bisack 2003). The regional scope of the NEFOP was expanded into the Mid-Atlantic (MA) region in 1995 to learn more about marine mammal interactions occurring in MA gillnet fisheries.

Rossman and Merrick (1999) documented the methods used to estimate harbor porpoise bycatch in the NESG and Mid-Atlantic gillnet (MAG) fisheries. These methods were subsequently used to estimate the bycatch of other marine mammal species bycaught in the NESG and MAG fisheries (Blaylock et al. 1995; Waring et al. 1997; Waring et al. 2004; Belden et al. 2006; Belden 2007; Belden and Orphanides 2007).

The NESG fishery extends from Maine to Connecticut and is dominated by bottom-tending sink gillnets. Less than 1% of the fishery utilize a drift gillnet (not tending the ocean bottom). Monofilament twine is typically used with stretched mesh sizes ranging from 6 to 12 inches (Waring et al. 2004). According to data collected by the NEFOP from 1999 through 2008, string lengths ranged from 150 to over 10,000 feet, though most were about 3,000 feet. Mesh size and string lengths varies by the primary fish species targeted for catch (Waring et al. 2004).

The MAG fishery generally ranges from Connecticut to North Carolina and utilizes both drift and sink gillnets. These nets are most frequently attached to the bottom, although unanchored drift or sink nets are also utilized to target specific species. Monofilament twine is again the dominant material and is used with stretched mesh sizes typically ranging from 2.5 to 12 inches (Waring et al. 2004). According to data collected by the NEOP from 1999 through 2008, string lengths ranged from 100 to over 10,000 feet, though typically were between 1,000 and 1,500 feet. The mesh sizes and string lengths vary by the primary fish species targeted for catch (Waring et al. 2004).

After the 2005 bycatch estimates, the division between the Northeast and Mid-Atlantic changed from a system based on vessel home port (divided at the Connecticut-Rhode Island border) to one based on reported fishing location. For the 2006, 2007, and 2008 bycatch estimates, the NESG and MAG fisheries were defined by a division at 72°30'W longitude, extending south to the NC/SC border. This change will be further discussed in this report.

The present analysis of the 2007 and 2008 data uses the same general ratio estimator methodology that was used to calculate cetacean and seal bycatch for the 2006 NESG and MAG fisheries (Belden and Orphanides 2007). However, there have been a few minor changes in the stratification and how the total fishery effort was calculated. These changes and the resulting bycatch estimates are described in this report. As in previous years, bottlenose dolphin (*Tursiops truncatus*) bycatch is not estimated. Bottlenose dolphin estimates can be found in the upcoming 2010 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Reports (Waring et al. in prep.).

METHODS

Data Sources

Three databases were used to estimate the total marine mammal incidental takes in 2007 and 2008: the NEFOP database, Allocated Commercial Landings, and Northeast Vessel Trip Reports (VTR). The NEFOP data were used to estimate the bycatch rate of marine mammals caught in the 2007 and 2008 Northeast and Mid-Atlantic gillnet fisheries. The NEFOP has two types of sampling protocols when observing gillnet fishing trips: (1) complete fish sampled trips where the observer samples the catch for fish discard information, thus the observer is not able to watch the net as it is being hauled in and so might miss an incidental take; and (2) limited fish sampled trips where the observer watches the net for incidental takes as it is being hauled in and thus should not miss any incidental takes.

In the NESG and MAG fishery, hauls observed from both trip sampling protocols were used to estimate the 2007 and 2008 bycatch rates for all species, as had been done for the 2006 MAG common dolphin (*Delphinus delphis*) bycatch estimates (Belden and Orphanides 2007) and all species in the 2006 NESG fisheries. Historically, only limited fish sampling trips were used in the MAG fishery to estimate the bycatch rates of most marine mammal species. However, because of increased bycatch observed on complete trips (see results section for details), the 2007 and 2008 Mid-Atlantic estimates were calculated using both complete and limited trips.

Using data from both types of sampling protocols avoids discarding many observed incidental takes and increases the sample sizes to provide more robust estimates.

The Allocated Commercial Landings and Northeast Vessel Trip Reports (VTR) were used to calculate the total landings of all finfish caught in the 2007 and 2008 Northeast and Mid-Atlantic gillnet fisheries. Though this approach differs from previous years, it should provide a more accurate calculation by significantly limiting the amount of proration applied to the commercial landings data. This approach should also provide a more accurate split between the Northeast and Mid-Atlantic fisheries because in most instances the VTR locations are linked directly with the commercial landings data.

The Allocated Commercial Landings data merges the VTR logbook and Northeast Dealer Report data by trip, wherever possible (71% and 70% of VTR gillnet trips in 2007 and 2008, respectively, were matched to Northeast Dealer Report data). Thus the gear characteristic information of the VTR logbooks was linked with the near census of landings in the Dealer Report data (Wigley et al. 2008).

In the cases where VTR and Allocated trips were successfully matched one to one, the Allocated landings, locations, and other characteristics for these trips were used in this analysis. In the cases where the VTR and Allocated trips could not be matched one to one, a proration scheme was used which was based on strata defined by state, season, and year, as was done in previous years (e.g., Belden and Orphanides 2007). That is, for strata where the total Allocated landings were greater than total VTR landings, the landings of each VTR trip in that strata was multiplied by a raising factor that ensured the total VTR landings for that strata equaled the total Allocated landings for that same strata. Thus, it was assumed that the available VTR trips were spatially and temporally representative of the trips that did not provide VTR logbooks or under-reported landings in their VTR logbooks. In the cases where the VTR landings in a particular stratum were larger than landings in the corresponding stratum in the Allocated data (16% and 9% of all VTR trips in 2007 and 2008, respectively), the Allocated landings were retained unless no Allocated landings were present for those strata, in which case the VTR landings were used. This approach respects the assumption that the commercial Northeast Dealer Report landings data represents a near census of all landings in the fishery, while still allowing for a limited amount of flexibility that ensures that the spatial and temporal distribution of landings is representative of effort in the VTR. The resulting landings combining the VTR and Allocated data will be referred to as the prorated metric tons of landings.

Analysis

An “incidental take” is defined as any observed incidentally caught marine mammal that was recorded as either alive with injuries or dead (fresh or under various stages of decomposition). Incidental takes not identified to species were not included in the bycatch estimates. This included 2 unknown porpoise/dolphin animals, 1 unknown toothed whale, and 18 unknown seals in 2007, and 6 unknown seals in 2008.

The level of sampling (observer coverage) within each stratum was calculated by dividing the observed metric tons (mtons) of landings by the prorated metric tons of landing recorded in the effort datasets. This value represented the fraction of total landings that were sampled.

Data Stratification

The strata as defined in Rossman and Merrick (1999) were used to estimate NESG fishery incidental takes, as has been done since 1999. That is, the NESG fishery data were stratified temporally by season, spatially by port group-area and time/area closures (Figure 1), and also by the presence/absence of pingers (Tables 1 and 2). Seasons were defined as winter (January to May), summer (June to August), and fall (September to December). The temporal/spatial/pinger strata were based on the harbor porpoise take reduction plan (NMFS 1998) and the migration patterns of the harbor porpoise. When estimating the 2007 gray seal (*Halichoerus grypus*) NESG bycatch, the summer Offshore port stratum was combined with the summer East of Cape Cod port stratum because the observed bycatch event in the Offshore port stratum occurred on the only observed haul in this strata and the recorded location for this haul fit well with the typical distribution of trips from the East of Cape Cod port group. A similar pooling of strata was used in the 2005 pinniped estimate calculations when incidental takes were observed on a stratum's only observed haul (Belden 2007).

Prior to 2006, the MAG and NESG fisheries were defined for the purposes of these bycatch estimates by port landed, where Connecticut (CT) and states south and west were included in the MAG fishery, and Rhode Island (RI) and states north and east were included in the NESG fishery. For the 2006, 2007, and 2008 bycatch analyses, the division of the NESG and MAG fisheries was determined by the recorded locations of the gillnet gear. For the 2006-2008 bycatch estimates, the 72°30'W longitude line (Figure 1) was used to divide the two fisheries (Belden and Orphanides 2007). As a result, trips landing in CT, NY, and NJ which fished east of 72°30'W were included in the NESG fishery and were within the South of Cape Cod port group, while data from trips which fished west of this line were included in the MAG fishery (Tables 1 - 4).

The MAG bycatch estimates for 2007 harbor porpoises and harp seals (*Pagophilus groenlandicus*), and for 2008 harbor seals (*Phoca vitulina*) and harp seals, were calculated using strata defined by state and season, where the season was January-April. Some past year's MAG marine mammal estimates (e.g., Belden et al. 2006) were calculated using state and month strata (instead of state and season strata) because spatial/temporal patterns of the fishers and marine mammals were not well known. Now, however, more information on the spatial/temporal patterns of these animals is known so it is possible to create strata that are more representative of the fisheries and the migration patterns of these marine mammals, resulting in more robust and representative bycatch estimates.

Then again, there is still relatively little known about the fine scale seasonal distribution for some rarely incidentally taken species such as Risso's dolphin (*Grampus griseus*). Risso's dolphin estimates for 2007 were calculated using November effort from Maryland, Delaware, and Virginia. Effort from three states and only one month was used because fishing effort from these three states occurred in the same general area (Figure 2), and because November appears to represent a transitional period where Risso's dolphin habitat shifts further offshore (Waring et al.

2009). Therefore, there was more certainty in the spatial distribution of the Risso's dolphin during November than if adjacent months were pooled. In addition, pooling the data spatially resulted in a more robust and representative estimate than just using state and month, which would have resulted in a small sample size of observed hauls.

The 2008 MAG harbor porpoise bycatch estimate approach was modified somewhat from past approaches to include stratification by mesh size categories (< 6.535", 6.535-9.150", and > 9.150"), along with stratification by season (Jan-Apr) and state (NJ) (Figure 3), as has been done for the 2005, 2006, and 2007 estimates (Belden 2007; Belden and Orphanides 2007). Including mesh size in the Mid-Atlantic harbor porpoise stratification was suggested by Orphanides (2009) in a thorough examination of the most appropriate means to estimate harbor porpoise bycatch in the northwestern Atlantic U.S. gillnet fisheries. Harbor porpoise bycatch rates were shown to be different in nets with different mesh sizes (Orphanides 2009; Palka et al. 2008a), as has also been shown for other marine mammals (Palka and Rossman 2001) and sea turtles (Murray 2009).

Bycatch Rates

The estimated number of marine mammal incidental takes (B) is the sum of the estimated number of incidental takes within each stratum (S):

$$B = \sum_{i=1}^S \frac{\text{number observed takes}_i}{\text{observed effort}_i} \bullet \text{total effort}_i$$

The estimated number of incidental takes within a stratum is the product of the observed bycatch rate within that stratum multiplied by the total effort within that stratum. The observed bycatch rate within a stratum is defined as the number of incidental takes observed within a stratum divided by the observed mtons of landings (effort) in that stratum.

Some gillnets in the NESG fishery are equipped with pingers, and the bycatch rate of nets with pingers differs from the rate of nets without pingers (Palka et al. 2008b). To accommodate this difference, a weighted bycatch rate (WBR) was calculated for strata that have both hauls with and without pingers. Within a stratum, two weighted bycatch rates were first calculated, one from hauls with pingers (WBRp) and one from hauls without pingers (WBRnp):

$$WBRp = \left(\frac{\text{observed takes}_{\text{with.pingers}}}{\text{observed effort}_{\text{with.pingers}}} \right) * \text{observed hauls}_{\text{with.pingers}}$$

$$WBRnp = \left(\frac{\text{observed takes}_{\text{no.pingers}}}{\text{observed effort}_{\text{no.pingers}}} \right) * \text{observed hauls}_{\text{no.pingers}}$$

Next, within a stratum, a total weighted bycatch rate (WBR) was calculated that incorporates hauls both with and without pingers:

$$WBR = \frac{WBR_p + WBR_{np}}{\text{total hauls}}$$

Standard bootstrapping techniques were used to derive the confidence intervals and coefficients of variation (CV) for the bycatch estimates for each stratum. The re-sampling unit used was an entire trip rather than individual hauls to ensure that any within trip dependence was carried over into the estimated CV (Bisack 2003).

RESULTS

Northeast sink gillnet fishery 2007

The overall annual observer coverage in the NESG was 7.1%, ranging from 4.4% in the summer to 11.1% in the winter (Table 1). This level is roughly double the coverage level in 2006, which was 3.6%, ranging from 1.3% in the summer to 6.1% in the winter (Belden and Orphanides 2007). One common dolphin, 35 harbor porpoises, 2 unknown porpoise/dolphins, 80 gray seals, 6 harbor seals, 11 harp seals, 18 unknown seals, and 1 unknown toothed whale were observed incidentally taken in the 2007 NESG fishery. Unidentified animals were not included in the bycatch estimates.

The 2007 NESG estimated total incidental takes of cetaceans included 11 (CV = 94%) common dolphins (Table 5) and 395 (CV = 38%) harbor porpoises (Table 6). The 2007 estimated total incidental takes of pinnipeds in the NESG fishery included 889 (CV = 24%) gray seals (Table 7), 93 (CV = 49%) harbor seals (Table 8), and 119 (CV = 36%) harp seals (Table 9).

2008

The overall annual observer coverage in the NESG was 4.6%, ranging from 3.9% in the summer to 6.1% in the winter (Table 2). Two common dolphins, 4 white-sided dolphins (*Lagenorhynchus acutus*), 30 harbor porpoises, 31 gray seals, 9 harbor seals, 14 harp seals, and 6 unknown seals were observed incidentally taken in the 2008 NESG fishery. Also, two humpback whale (*Megaptera novaeangliae*) interactions were observed, but NESG fishery bycatch estimates were not calculated because the extent of any possible injuries, or lack thereof, could not be determined. Unidentified animals were not included in the bycatch estimates.

The 2008 estimated total incidental takes of cetaceans in the NESG fishery included 34 (CV = 77%) common dolphins (Table 10), 81 (CV = 57%) white-sided dolphins (Table 11), and 666 (CV = 48%) harbor porpoises (Table 12). The 2008 estimated total incidental takes of pinnipeds in the NESG fishery included 618 (CV = 23%) gray seals (Table 13), 243 (CV = 41%) harbor seals (Table 14), and 238 (CV = 38%) harp seals (Table 15).

Mid-Atlantic gillnet fishery

2007

The 2007 observer coverage for the MAG fishery using both complete and limited trips was 4.1% (Table 3). The 2007 observer coverage for Jan-Apr off of NJ was 2.6% (Table 16). The 2007 observer coverage for Jan-Apr off of VA was 1.7% (Table 16). The observer coverage off of MD, VA, and DE during November was 3.0% (Table 16)

There were 1 harbor porpoise, 1 Risso's dolphin, and 1 harp seal observed incidentally taken in the MAG fishery in 2007. All 2007 Mid-Atlantic bycatch events occurred on complete hauls. The observed hauls for the 2007 winter harbor porpoise time-area strata included 18 complete hauls, and 73 limited hauls. The 2007 Mid-Atlantic harp seal time-area strata included 10 complete hauls and 60 limited hauls. The 2007 Mid-Atlantic Risso's dolphin time-area strata included 15 complete hauls and 65 limited hauls.

The 2007 estimated total incidental takes for cetaceans in the MAG fishery included 59 (CV = 104%) harbor porpoises (Table 17) and 34 (CV = 73%) Risso's dolphins (Table 18). The 2007 estimated total incidental takes for pinnipeds in the MASG fishery was 38 (CV = 90%) harp seals (Table 19).

2008

The 2008 observer coverage for the MAG fishery using both complete and limited trips was 2.8% (Table 4). The 2008 observer coverage for Jan-Apr off of NJ (used for harp and harbor seal estimates) was 2.3%, and the 2008 observer coverage for the Jan-Apr harbor porpoise strata (NJ large mesh) was 2.6% (Table 20).

There were 9 harbor porpoises, 4 harp seals, and 2 harbor seals observed incidentally taken in the MAG fishery in 2008. Mid-Atlantic 2008 bycatch on complete hauls included 4 out of 9 observed harbor porpoise incidental takes, 1 out of 4 observed harp seal incidental takes, and 1 out of 2 harbor seal incidental takes. The observed hauls for the 2008 winter harbor porpoise time-area strata included 11 complete hauls and 38 limited hauls. The 2008 Mid-Atlantic NJ winter season (the estimating strata for harp and harbor seals) included 17 complete hauls and 44 limited hauls.

The 2008 estimated total incidental takes for cetaceans in the MAG fishery included 350 (CV= 75%) harbor porpoises (Table 21), 176 (CV= 74%) harp seals (Table 22), and 88 (CV=74%) harbor seals (Table 23).

DISCUSSION

The calculation of the 2007 and 2008 cetacean and pinniped gillnet bycatch estimates involved several small changes from past estimate approaches, while still largely using the same structure. Perhaps the most important difference is the utilization of the Allocated Commercial Landings

data in this analysis. Being able to link VTR trips to Dealer Reported effort should significantly improve the accuracy of the total effort calculations for the Northeast and Mid-Atlantic fisheries.

Another change involves the modification of the Mid-Atlantic harbor porpoise bycatch stratification. Including mesh size categories as strata should result in more realistic estimates, particularly for areas with low bycatch rates (Orphanides 2009). Mesh size has been shown to influence the bycatch rate, with larger mesh sizes generally having higher bycatch rates (Palka and Rossman 2001; Orphanides 2009; Murray 2009). Because harbor porpoise bycatch appears to be driven primarily by time of year and area (Palka et al. 2008a; Orphanides 2009), using single states for the Mid-Atlantic bycatch stratification can sometimes ignore fishing in the same general time and area that should be included when calculating the bycatch rate and effort. However, for 2008 NJ effort, the spatial separation from other states was nearly complete (Figure 3), and there was enough effort in NJ alone to avoid pooling effort that would have been spatially unrepresentative and may have had a different bycatch rate. In order to avoid future confusion on whether to group states or not, modifying the location strata to replace states or port groupings with strata based directly on actual reported fishing locations and historic bycatch patterns should be considered.

Another change that should be considered for future bycatch estimates is the effect of complete and limited trips on bycatch estimates. Historically, the Mid-Atlantic observer effort consisted primarily of limited trips, and very few incidental takes were observed on the small number of complete trips. Under this situation, it made sense to use only limited trips when estimating bycatch in the Mid-Atlantic. However, in the Mid-Atlantic in recent years the number of observed incidental takes on complete trips has increased and thus both complete and limited trips have been used in the bycatch estimate. It is unknown whether this increase is the result of a random effect, or whether there is an unknown factor driving the increase on these types of trips, and this should be further examined. Despite the recent increase in observed bycatch on Mid-Atlantic complete trips, it should also be investigated whether the observed bycatch rate on complete trips is statistically lower over time than that on limited trips. This is possible because on complete trips the observer is not dedicated to watching for incidental protected species takes. If there is a statistical difference, then, it might be appropriate to employ a correction factor for complete trips. More fully investigating incidental takes on complete and limited Mid-Atlantic trips would ensure that the most appropriate methods are used for future Mid-Atlantic bycatch estimates.

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FIGURES

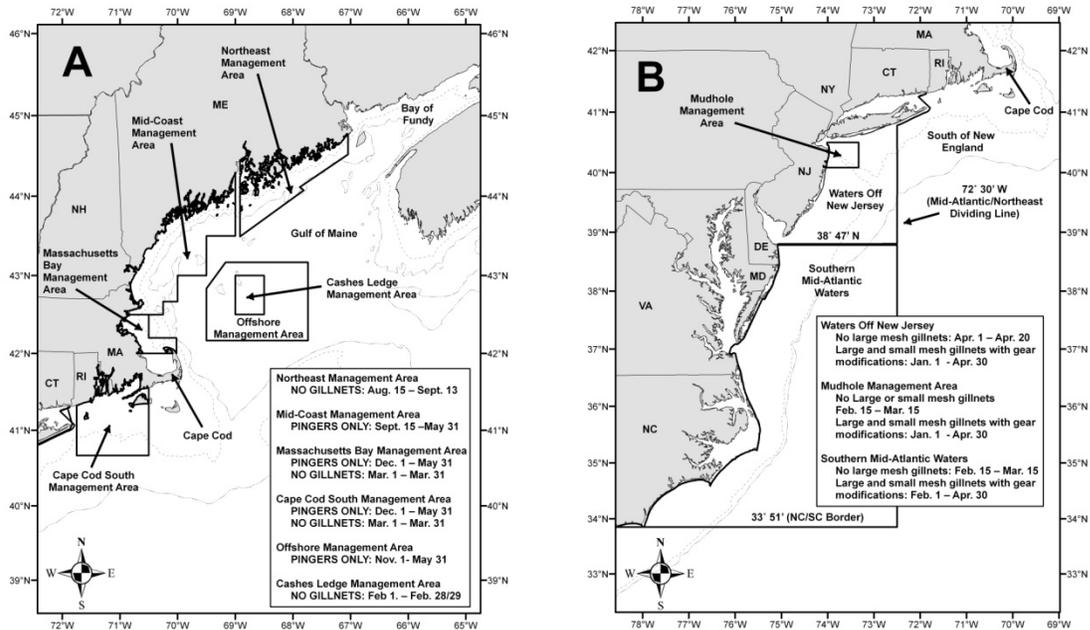


Figure 1. Gillnet fishery and harbor porpoise management areas for (A) Northeast region and (B) Mid-Atlantic region. Dashed light gray lines depict 50 and 100 m depth contours (Orphanides 2009).

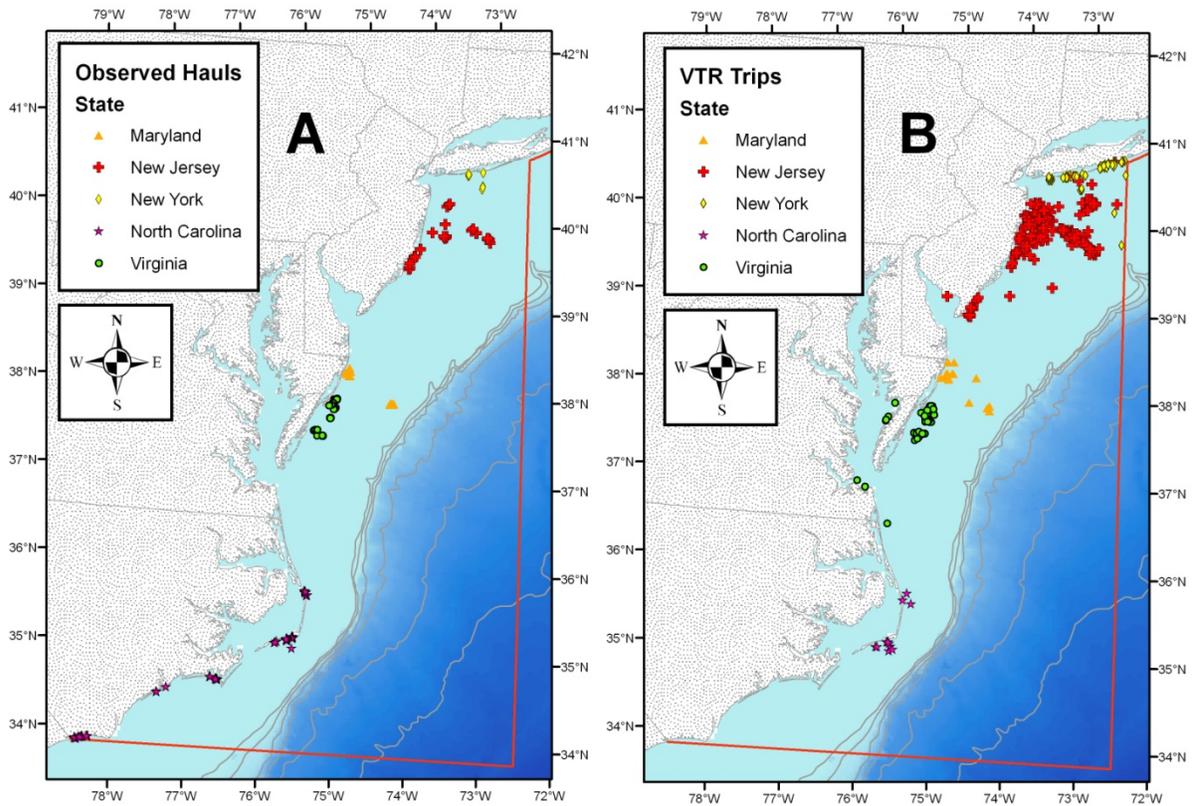


Figure 2. November 2007 Mid-Atlantic NEFOP observed hauls (A) and VTR trips (B) by state. Red line indicates Mid-Atlantic border at 72°30'W longitude and NC/SC border. Gray lines indicate ocean depth contours at 200, 500, 1000, 2000, 3000, and 4000 m.

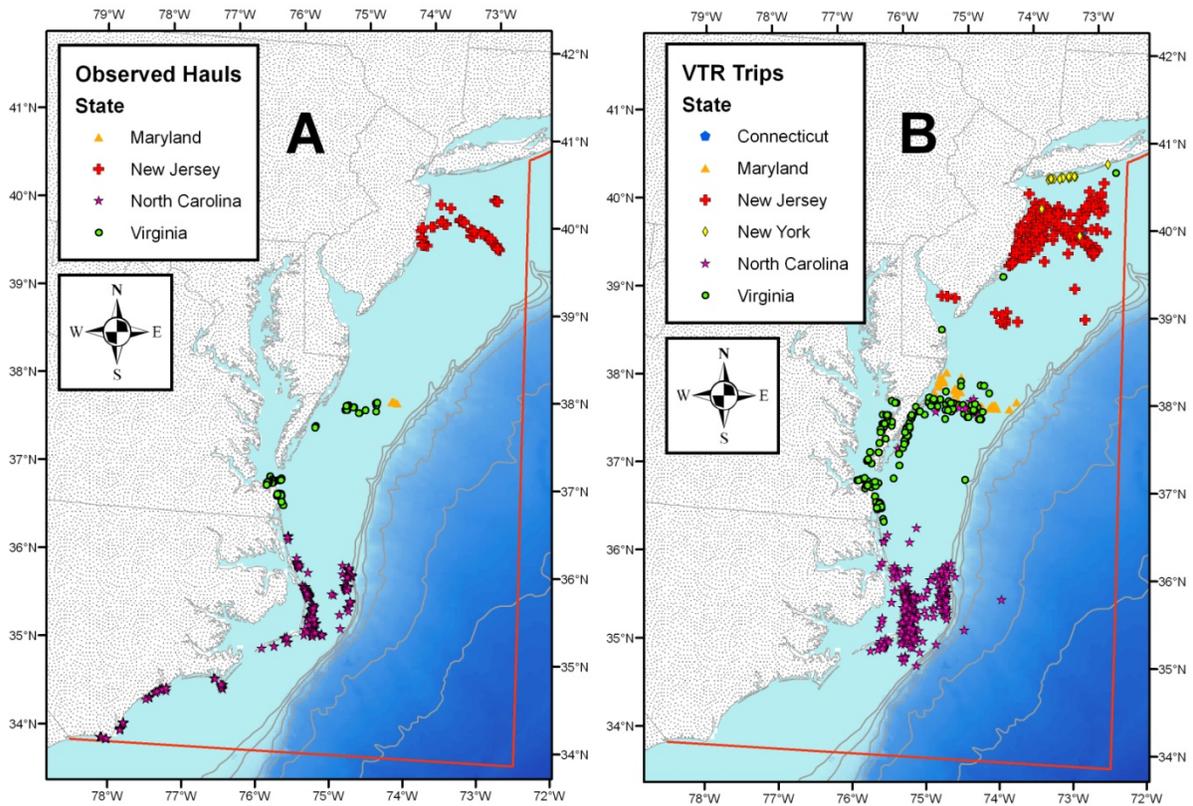


Figure 3. January-April 2008 Mid-Atlantic NEFOP observed hauls (A) and VTR trips (B) by state. Red line indicates Mid-Atlantic border at 72°30'W longitude and NC/SC border. Gray lines indicate ocean depth contours at 200, 500, 1000, 2000, 3000, and 4000 m.

TABLES

Table 1. Using both limited and complete observed trips, 2007 Northeast sink gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and port group or closure strata.

2007 Winter (Jan-May) Port Group-Area Strata	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Northern Maine	0	0 (0)	0	5.50	0.00
Southern Maine	0	0 (0)	0	28.87	0.00
New Hampshire	0	0 (0)	0	0.29	0.00
North of Boston	41	203 (185)	17.61	263.24	6.69
South of Boston	26	108 (61)	9.71	108.43	8.96
South of Cape Cod	49	204 (160)	184.11	1602.32	11.49
East of Cape Cod	18	68 (37)	48.39	355.05	13.63
Offshore	3	36 (0)	21.16	112.38	18.83
Closure Strata					
Offshore Closure	10	152 (91)	51.53	334.39	15.41
Cashes Ledge Closure*	0	2 (0)	0.17	0.05	100.00
Midcoast Closure	10	26 (16)	5.05	67.61	7.47
Mass Bay Closure	28	79 (71)	7.77	134.77	5.77
Cape Cod Bay Closure	0	0 (0)	0	8.35	0.00
South Cape Closure	61	198 (162)	46.43	450.64	10.30
Great S. Channel Closure	0	0 (0)	0	46.05	0.00
Subtotal	246	1076 (783)	391.93	3517.94	11.14

* The two hauls observed in the winter Cashes Ledge Closure stratum were from a trip split between this area and the winter Offshore strata (6 hauls). The trip was assigned to the winter Offshore stratum, resulting in a zero for the number of observed trips in the winter Cashes Ledge Closure stratum. Similarly, observed metric tons in the winter Cashes Ledge Closure stratum was greater than the recorded prorated metric tons for this area as some of the prorated metric tons was likely recorded as belonging to a different stratum. The coverage level for this stratum was assumed to be 100%, though subtotals for the season, and totals for the year were calculated using the recorded metric tons for these strata.

Table 1, continued. Using both limited and complete observed trips, 2007 Northeast sink gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and port group or closure strata.

Summer (Jun-Aug)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Port Group-Area Strata					
Northern Maine	0	0 (0)	0	81.59	0.00
Southern Maine	9	26 (0)	10.47	615.17	1.70
New Hampshire	16	62 (0)	9.04	330.60	2.73
North of Boston	10	33 (0)	6.56	585.10	1.12
South of Boston	11	59 (0)	4.55	136.85	3.32
South of Cape Cod	27	122 (83)	39.70	1487.37	2.67
East of Cape Cod	55	234 (0)	215.85	2900.42	7.44
Offshore	1	1 (0)	0.85	349.89	0.24
Closure Strata					
Northeast Closure	0	0 (0)	0	0	-
Great S. Channel Closure	0	0 (0)	0	15.23	0.00
Subtotal	129	537 (83)	287.02	6502.22	4.41
Fall (Sep-Dec)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Port Group-Area Strata					
Northern Maine	0	0 (0)	0	20.88	0.00
Southern Maine	5	20 (2)	16.87	172.10	9.80
New Hampshire	3	11 (11)	1.26	48.42	2.60
North of Boston	18	55 (52)	15.12	411.73	3.67
South of Boston	10	50 (9)	12.39	143.58	8.63
South of Cape Cod	48	249 (168)	79.33	912.24	8.70
East of Cape Cod	52	245 (55)	93.27	886.88	10.52
Offshore	9	108 (7)	80.51	372.79	21.60
Closure Strata					
Northeast Closure	0	0 (0)	0	0	-
Offshore Closure	0	6 (0)	2.77	89.27	3.10
Midcoast Closure	78	281 (169)	129.97	2289.47	5.68
Mass Bay Closure	13	26 (17)	4.29	211.12	2.03
South Cape Closure	4	26 (19)	6.70	229.29	2.92
Subtotal	240	1077 (509)	442.48	5787.77	7.65
2007 Total	615	2690 (1375)	1121.43	15807.93	7.09

Table 2. Using both limited and complete observed trips, 2008 Northeast sink gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and port group or closure strata.

2008 Winter (Jan-May)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Northern Maine	0	0 (0)	0	1.05	0.00
Southern Maine	1	4 (0)	0.16	6.78	2.36
New Hampshire	0	0 (0)	0	7.31	0.00
North of Boston	39	159 (139)	15.01	304.83	4.92
South of Boston	20	106 (64)	7.88	147.39	5.35
South of Cape Cod	31	133 (104)	63.54	1429.83	4.44
East of Cape Cod	25	135 (27)	54.27	615.84	8.81
Offshore	1	11 (0)	6.02	107.34	5.61
Closure Strata					
Offshore Closure	10	164 (38)	48.83	314.68	15.52
Cashes Ledge Closure	0	0 (0)	0	7.60	0.00
Midcoast Closure	15	55 (37)	18.68	204.39	9.14
Mass Bay Closure	15	62 (53)	5.92	212.32	2.79
Cape Cod Bay Closure	0	0 (0)	0	0.85	0.00
South Cape Closure	31	107 (71)	20.25	550.03	3.68
Great S. Channel Closure	0	0 (0)	0	30.90	0.00
Subtotal	188	936 (533)	240.56	3941.14	6.10
Summer (Jun-Aug)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Port Group-Area Strata					
Northern Maine	0	0 (0)	0	72.25	0.00
Southern Maine	10	41 (0)	17.00	665.54	2.55
New Hampshire	27	88 (0)	31.21	607.92	5.13
North of Boston	17	70 (0)	25.38	1107.85	2.29
South of Boston	17	58 (0)	8.86	269.02	3.29
South of Cape Cod	11	47 (16)	32.27	1799.28	1.79
East of Cape Cod	32.00	138 (0)	154.17	2199.97	7.01
Offshore	2	24 (0)	8.74	457.53	1.91
Closure Strata					
Northeast Closure	0	0 (0)	0	0	-
Great S. Channel Closure	0	0 (0)	0	4.72	0.00
Subtotal	116	466 (16)	277.63	7184.08	3.86

Table 2, continued. Using both limited and complete observed trips, 2008 Northeast sink gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and port group or closure strata.

Fall (Sep-Dec)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric tons	Prorated Metric Tons	Coverage (Metric Tons) %
Port Group-Area Strata					
Northern Maine	0	0 (0)	0	35.56	0.00
Southern Maine	3	19 (0)	12.01	259.45	4.63
New Hampshire	7	18 (0)	6.01	143.75	4.18
North of Boston	18	56 (38)	12.46	660.41	1.89
South of Boston	18	61 (21)	14.52	160.39	9.05
South of Cape Cod	30	185 (104)	85.32	1104.15	7.73
East of Cape Cod	39	171 (98)	59.36	1072.90	5.53
Offshore	3	45 (37)	20.04	231.12	8.67
Closure Strata					
Northeast Closure	0	0 (0)	0	0	-
Offshore Closure	3	42 (17)	21.82	135.06	16.16
Midcoast Closure	56	204 (131)	64.36	2652.75	2.43
Mass Bay Closure	10	18 (10)	4.60	258.75	1.78
South Cape Closure	3	14 (10)	8.37	141.52	5.91
Subtotal	190	833 (466)	308.87	6855.81	4.51
2008 Total	494	2235 (1015)	827.06	17981.03	4.60

Table 3. Using both limited and complete observed trips, 2007 Mid-Atlantic state gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and state.

Winter (Jan-May)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
New Hampshire	0	0 (0)	0	0.99	0.00
Massachusetts	0	0 (0)	0	1.42	0.00
Rhode Island	0	0 (0)	0	2.59	0.00
New York	2	3 (3)	0.04	92.62	0.04
New Jersey	41	148 (107)	40.82	671.12	6.08
Delaware	1	4 (4)	0.09	7.41	1.21
Maryland	4	25 (25)	0.77	100.22	0.77
North Carolina	173	1078 (1046)	157.44	2242.98	7.02
Virginia	42	149 (114)	38.86	1992.97	1.95
Subtotal	263	1407 (1299)	238.02	5112.32	4.66
Summer (June-Aug)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
New Hampshire	0	0 (0)	0	1.46	0.00
Rhode Island	0	0 (0)	0	0.16	0.00
New York	17	75 (75)	7.36	187.07	3.93
New Jersey	64	176 (150)	52.66	523.65	10.06
Delaware	0	0 (0)	0	0	-
Maryland	0	0 (0)	0	7.20	0.00
North Carolina	17	95 (95)	1.68	74.41	2.26
Virginia	6	21 (21)	0.09	435.2	0.02
Subtotal	104	367 (321)	61.79	1229.15	5.03
Fall (Sept-Dec)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Massachusetts	0	0 (0)	0	0.38	0.00
New York	12	52 (44)	6.77	116.84	5.79
New Jersey	64	228 (192)	47.74	1107.79	4.31
Delaware	0	0 (0)	0	0	-
Maryland	7	47 (39)	3.35	60.04	5.58
North Carolina	75	484 (479)	15.42	751.97	2.05
Virginia	21	136 (126)	14.19	980.43	1.45
Subtotal	179	947 (880)	87.47	3017.45	2.90
Annual Totals	546	2721 (2520)	387.28	9358.92	4.14

Table 4. Using both limited and complete observed trips, 2008 Mid-Atlantic state gillnet totals for observed trips, observed hauls, limited hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage, by season and state.

Winter (Jan-May)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Rhode Island	0	0 (0)	0	1.34	0.00
New York	1	1 (1)	0	36.88	0.00
New Jersey	32	93 (68)	26.37	887.81	2.97
Delaware	0	0 (0)	0	0	-
Maryland	2	9 (5)	3.53	189.4	1.86
North Carolina	77	438 (406)	56.29	1898.98	2.96
Virginia	36	117 (95)	39.13	1516.33	2.58
Subtotal	148	658 (575)	125.32	4530.74	2.77
Summer (June-Aug)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Massachusetts	0	0 (0)	0	0.67	0.00
Connecticut	0	0 (0)	0	1.43	0.00
New York	5	14 (14)	2.39	117.99	2.03
New Jersey	24	70 (57)	17.79	430	4.14
Delaware*	0	0 (0)	0	0	-
Maryland	0	0 (0)	0	2.63	0.00
North Carolina	2	9 (9)	0.15	83.82	0.18
Virginia	2	6 (6)	0.02	588.07	0.00
Subtotal	33	99 (86)	20.35	1224.61	1.66
Fall (Sept-Dec)	Observed Trips	Observed Hauls (Limited Hauls)	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Rhode Island	0	0 (0)	0	0.11	0.00
Connecticut	0	0 (0)	0	1.63	0.00
New York	3	11 (11)	0.27	73.37	0.37
New Jersey	40	149 (96)	35.67	715.46	4.99
Delaware	0	0 (0)	0	0	-
Maryland	10	75 (75)	7.77	87.99	8.83
North Carolina	73	532 (532)	18.93	757.48	2.50
Virginia	46	265 (260)	30.67	1230.7	2.49
Subtotal	172	1032 (974)	93.31	2866.74	3.25
Annual Totals	353	1789 (1635)	238.98	8622.09	2.77

* Some effort was observed in Delaware during the summer season; however it was inshore (in Delaware Bay), which was not included in these analyses. Unallocated dealer data also contained limited summertime Delaware landings, however corresponding data was not available in the VTR and thus it was unknown whether this effort took place in the inshore waters.

Table 5. 2007 common dolphin bycatch estimate in the NESG.

2007 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	1 [§]	0.02471 [♦]	11.14	94%	1-32
Great S. Channel Closure					
Subtotal	1		11.14	94%	1-32
Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	0		0		

[§] Observed take from haul not equipped with pingers.

[♦] A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 5, continued. 2007 common dolphin bycatch estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal					
2007 Total	1		11.14	94%	1-32

Table 6. 2007 harbor porpoise bycatch estimate in the NESG.

2007 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod	14 [§]	0.07459 [♦]	119.52	44%	17-222
East of Cape Cod	7 [§]	0.14466	51.36	50%	7-101
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure	1 [§]	0.14089 [♦]	9.53	847%	1-168
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	11	0.24379 [♦]	109.86	70%	11-260
Great S. Channel Closure					
Subtotal	33		290.27	44%	42-539
Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	1 [§]	0.15244	89.19	88%	1-243
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	1		89.19	88%	1-243

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 6, continued. 2007 harbor porpoise bycatch estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure	1*	0.00694 [‡]	15.89	102%	1-48
Mass Bay Closure					
South Cape Closure					
Subtotal	1		15.89	102%	1-48
2007 Total	35		395.35	38%	104-686

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 7. 2007 gray seal bycatch estimate in the NESG.

2007 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	1 [§]	0.05644 [♦]	14.86	104%	1-45
South of Boston	2	0.20347 [♦]	22.06	70%	2-52
South of Cape Cod	17 [§]	0.09057 [♦]	145.12	33%	51-239
East of Cape Cod	9 [§]	0.18599	66.04	43%	9-121
Offshore					
Closure Strata					
Offshore Closure	2 [*]	0.04171 [♦]	13.95	91%	2-39
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	22	0.38502 [♦]	173.51	51%	22-345
Great S. Channel Closure					
Subtotal	53		435.54	24%	230-641
Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod	4 [§]	0.10076	149.87	118%	4-497
East of Cape Cod [†]	22 [§]	0.10152	294.46	22%	168-420
Offshore [†]					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	26		444.33	42%	74-814

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate).

† Summer Offshore port group-area strata was combined with the Summer East of Cape Cod port group-area-strata for the purposes of the NESG gray seal estimate because only one haul was observed there.

Table 7, continued. 2007 gray seal bycatch estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod	1 [§]	0.01072	9.51	106%	1-29
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	1		9.51	106%	1-29
2007 Total	80		889.38	24%	466-1313

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate).

† Summer Offshore port group-area strata was combined with the Summer East of Cape Cod port.

Table 8. 2007 harbor seal bycatch estimate in the NESG.

2007 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod	2 [§]	0.01066 [♦]	17.08	71%	2-41
East of Cape Cod					
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	1 [§]	0.01538 [♦]	6.93	115%	1-23
Great S. Channel Closure					
Subtotal	3		24.01	60%	3-52
Summer (Jun-Aug)					
	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire	1 [§]	0.11258 [♦]	37.22	95%	1-107
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	1		37.22	95%	1-107

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 8, continued. 2007 harbor seal bycatch estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure	2*	0.01387*	31.75	75%	2-78
Mass Bay Closure					
South Cape Closure					
Subtotal	2		31.75	75%	2-78
2007 Total	6		92.98	49%	6-182

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 9. 2007 harp seal bycatch estimate in the NESG.

2007 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.	
Port Group-Area Strata						
Northern Maine						
Southern Maine						
New Hampshire						
North of Boston	2 [§]	0.11288 [♦]	29.71	68%	2-69	
South of Boston						
South of Cape Cod	7 [§]	0.03729 [♦]	59.75	54%	7-123	
East of Cape Cod						
Offshore						
Closure Strata						
Offshore Closure						
Cashes Ledge Closure						
Midcoast Closure						
Mass Bay Closure	1 [§]	0.17055 [♦]	22.99	82%	1-60	
Cape Cod Bay Closure						
South Cape Closure	1 [§]	0.01538 [♦]	6.93	129%	1-24	
Great S. Channel Closure						
Subtotal	11		119.38	36%	35-204	
		Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Summer (Jun-Aug)						
Port Group-Area Strata						
Northern Maine						
Southern Maine						
New Hampshire						
North of Boston						
South of Boston						
South of Cape Cod						
East of Cape Cod						
Offshore						
Closure Strata						
Northeast Closure						
Great S. Channel Closure						
Subtotal	0		0			

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 9, continued. 2007 harp seal bycatch estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	0		0		
2007 Total	11		119.38	36%	35-204

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 10. 2008 common dolphin estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South Of Cape Cod	1 [§]	0.01554 [◆]	22.22	104%	1-67
East Of Cape Cod	1 [§]	0.01843	11.35	100%	1-34
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure					
Great S. Channel Closure					
Subtotal	2		33.57	77%	2-84
	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Summer (Jun-Aug)					
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South Of Cape Cod					
East Of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	0		0		

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 10, continued. 2008 common dolphin estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	0		0		
2008 Total	2		33.57	77%	2-84

Table 11. 2008 white sided dolphin estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod	1 [§]	0.01554 [◆]	22.22	107%	1-69
East of Cape Cod	1 [§]	0.01843	11.35	101%	1-34
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure					
Great S. Channel Closure					
Subtotal	2		33.57	79%	2-85
Summer (Jun-Aug)					
	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	0		0		

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 11, continued. 2008 white sided dolphin estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire	2 [§]	0.33278	47.84	78%	1-121
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	2		47.84	78%	1-121
2008 Total	4		81.41	57%	4-172

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 12. 2008 harbor porpoise estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	5*	0.33487♦	102.08	49%	5-200
South of Boston	1§	0.13097♦	19.30	97%	1-56
South of Cape Cod	8§	0.12431♦	177.74	54%	8-366
East of Cape Cod	6§	0.11056	68.09	54%	6-140
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure	4	0.23013♦	47.04	621%	4-620
Mass Bay Closure	1*	0.16892	36.87	106%	1-111
Cape Cod Bay Closure					
South Cape Closure					
Great S. Channel Closure					
Subtotal	25		450.12	70%	25-1073
Summer (Jun-Aug)					
	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	0		0		

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 12, continued. 2008 harbor porpoise estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	2 [§]	0.19832 [♦]	130.97	68%	2-305
South of Boston	1 [*]	0.14692 [♦]	23.56	149%	1-93
South of Cape Cod					
East of Cape Cod	1 [§]	0.01685	18.08	102%	1-54
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure	1 [§]	0.01624 [♦]	43.08	106%	1-133
Mass Bay Closure					
South Cape Closure					
Subtotal	5		215.69	49%	5-424
2008 Total	30		665.81	48%	48-1321

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 13. 2008 gray seal estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	2 [§]	0.12951 [♦]	39.48	75%	2-98
South of Boston	1 [§]	0.13097 [♦]	19.30	87%	1-52
South of Cape Cod	6 [§]	0.09323 [♦]	133.30	52%	6-268
East of Cape Cod	2 [§]	0.03685	22.69	68%	2-53
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	1	0.04847 [♦]	26.66	113%	1-86
Great S. Channel Closure					
Subtotal	12		241.43	35%	78-405
2008 Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	1 [§]	0.03940	43.65	78%	1-111
South of Boston					
South of Cape Cod	1 [§]	0.03099	55.76	56%	1-116
East of Cape Cod	7 [§]	0.04540	99.88	61%	7-220
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	9		199.29	39%	47-351

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 13, continued. 2008 gray seal estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod	7 [§]	0.11792	126.52	49%	7-249
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure	3*	0.35842	50.72	129%	1-179
Subtotal	10		177.24	51%	10-354
2008 Total	31		617.96	23%	336-900

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 14. 2008 harbor seal estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	2 [§]	0.12951 [♦]	39.48	57%	2-84
South of Boston					
South of Cape Cod					
East of Cape Cod	2 [§]	0.03685	22.69	61%	2-50
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure					
Great S. Channel Closure					
Subtotal	4		62.17	43%	10-114
Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine	1 [§]	0.09028 [♦]	60.08	112%	1-192
New Hampshire	1 [§]	0.03204	19.48	105%	1-60
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	2		79.56	89%	2-219

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 14, continued. 2008 harbor seal estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	1 [§]	0.09916 [♦]	65.49	80%	1-168
South of Boston					
South of Cape Cod					
East of Cape Cod	2 [§]	0.03369	36.15	72%	2-87
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	3		101.64	59%	3-217
2008 Total	9		243.37	41%	55-501

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 15. 2008 harp seal estimate in the NESG.

2008 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston	2*	0.14061♦	42.86	80%	2-110
South of Boston					
South of Cape Cod	4§	0.06215♦	88.86	43%	14-163
East of Cape Cod	7§	0.12898	79.43	86%	7-218
Offshore					
Closure Strata					
Offshore Closure					
Cashes Ledge Closure					
Midcoast Closure					
Mass Bay Closure					
Cape Cod Bay Closure					
South Cape Closure	1§	0.04847♦	26.66	128%	1-94
Great S. Channel Closure					
Subtotal	14		237.81	38%	63-413
Summer (Jun-Aug)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Great S. Channel Closure					
Subtotal	0		0		

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

♦ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 15, continued. 2008 harp seal estimate in the NESG.

Fall (Sep-Dec)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
Northern Maine					
Southern Maine					
New Hampshire					
North of Boston					
South of Boston					
South of Cape Cod					
East of Cape Cod					
Offshore					
Closure Strata					
Northeast Closure					
Offshore Closure					
Midcoast Closure					
Mass Bay Closure					
South Cape Closure					
Subtotal	0		0		
2008 Total	14		237.81	38%	63- 413

* Observed take from haul equipped with pingers.

§ Observed take from haul not equipped with pingers.

◆ A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 16. For 2007 species/time/area specific Mid-Atlantic strata, totals of observed trips, observed hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage by season.

Species Applicability	Time Period	State(s)	Observed Trips	Observed Hauls	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Harbor Porpoise	Jan-Apr 2007	VA	26	91	21.34	1250.23	1.71%
Harp Seal	Jan-Apr 2007	NJ	16	70	9.95	379.32	2.62%
Risso Dolphin	Nov 2007	MD, VA, DE	8	80	4.46	150.47	2.96%

Table 17. 2007 Mid-Atlantic harbor porpoise bycatch estimate in the MACG.

2007 Season	State	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Winter (Jan-Apr)	VA	1	0.04686	58.59	104%	1-177

Table 18. 2007 Mid-Atlantic Risso's dolphin bycatch estimate in the MACG.

2007 Month	States	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
November	MD, VA, DE	1	0.22422	33.74	73%	1-82

Table 19. 2007 Mid-Atlantic harp seal bycatch estimate in the MACG.

2007 Season	State	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Winter (Jan-Apr)	NJ	1	0.10050	38.12	90%	1-106

Table 20. For 2008 species/time/area specific mid-Atlantic strata, totals of observed trips, observed hauls, observed metric tons of fish landed, prorated metric tons of fish landed, and percent observer coverage by season.

Species Applicability	Time Period	State(s)	Mesh Size	Observed Trips	Observed Hauls	Observed Metric Tons	Prorated Metric Tons	Coverage (Metric Tons) %
Harbor Porpoise	Jan-April 2008	NJ	Large	16	49	11.24	436.90	2.57%
Harp and Harbor Seals	Jan-April 2008	NJ	All	20	61	12.03	530.49	2.27%

Table 21. 2008 Mid-Atlantic harbor porpoise bycatch estimate in the MACG.

2008 Months/Season	State	Mesh	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Winter (Jan-April)	NJ	Large	9	0.80071	349.83	75%	9-866

Table 22. 2008 Mid-Atlantic harp seal bycatch estimate in the MACG.

2008 Months/Season	State	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Winter (Jan-April)	NJ	4	0.33250	176.39	74%	4-433

Table 23. 2008 Mid-Atlantic harbor seal bycatch estimate in the MACG.

2008 Months/Season	State	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Winter (Jan- April)	NJ	2	0.16625	88.19	74%	2-216

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