Northeast Fisheries Science Center Reference Document 06-13

Estimates of Cetacean and Seal Bycatch in the 2004 Northeast Sink Gillnet and Mid-Atlantic Coastal Gillnet Fisheries

by Dana L. Belden, Christopher D. Orphanides,
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Abstract

This report provides incidental take estimates for six marine mammal species taken in the 2004 Northeast Sink Gillnet (NESG) and Mid-Atlantic Coastal Gillnet (MACG) fisheries, and documents the methodology used to produce the estimates. The total estimated marine mammal takes in the 2004 NESG (2,292 animals, coefficient of variation [CV] = 18%) and MACG (231 animals, CV = 60%) fisheries was 2,523 animals (CV = 17%). For the NESG fishery, the species included in this estimate are: 655 harbor porpoises (CV = 36%); 7 Atlantic white-sided dolphins (CV = 98%); 498 gray seals (CV = 35%); 786 harbor seals (CV = 34%); 303 harp seals (CV = 30%); and 43 hooded seals (CV = 95%). For the MACG fishery, the species included in this estimate are: 135 harbor porpoises (CV = 91%); 68 gray seals (CV = 92%); and 28 harbor seals (CV = 77%).

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.

The Northeast Fisheries Science Center (NEFSC) sea sampling observer program (SSOP), presently known as the Northeast Fisheries Observer Program (NEFOP), was initiated in 1989 to document the bycatch of marine mammals taken incidentally to commercial fishing operations (Waring et al. 2003). Since the initiation of the observer program, the estimation of total 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 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 SSOP was expanded into the mid-Atlantic (MA) region in 1995 as an effort to learn more about marine mammal interactions occurring in MA gillnet fisheries.

Rossman and Merrick (1999) documents the methods used to estimate harbor porpoise bycatch in the NESG and Mid-Atlantic Coastal Gillnet (MACG) fisheries. The methods used to estimate harbor porpoise bycatch have also been used by the NEFSC to estimate the bycatch of other marine mammals observed bycaught in the NESG and MACG fisheries (Blaylock et al. 1995, Waring et al. 1997, Waring et al. 2003). However, to date there has been no documentation of the methods used to estimate takes for all marine mammals incidentally bycaught in both the NESG and MACG fisheries to support the estimates that have been reported in the marine mammal SARs.

The NESG fishery extends from Maine to Rhode Island and is dominated by bottom-tending sink gillnets. Less than 1% of the fishery utilizes a drift gillnet (not tending the ocean bottom). Monofilament twine is typically used with stretched mesh sizes ranging from 6 to 12 inches. String lengths range from 600 to 10,500 feet. Mesh size and string length vary by the primary fish species targeted for catch. The MACG fishery 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 ranging from 2.5 to 12 inches. String lengths range from 150 to 8400 feet. The mesh size and string length vary by the primary fish species targeted for catch (Waring et al. 2003).

The purpose of this manuscript is to first document incidental take estimates for all marine mammals that were observed in the NESG and MACG fisheries during 2004. Secondly, this manuscript's purpose is to discuss the shortcomings of a 10-year-old method that was spatially and temporally designed to estimate harbor porpoise takes, but has been used to estimate takes on a variety of other marine mammal species. Suggestions are provided for improvements to reflect current fishing patterns in gillnet fisheries and improved data collection.

METHODS

Data Sources

Three databases were used to estimate the total marine mammal takes in 2004: the NEFOP database, Northeast Dealer Reports, and Northeast Vessel Trip Reports.

First, the NEFOP database provided data on the observed bycatch of marine mammals. The NEFOP has two types of sampling protocols when observing fishing trips: (1) complete fish sampled trips where the observer samples the catch for fish discard information (the observer is not able to watch the net as it is being hauled) and (2) limited fish sampled trips where the observer watches the net for incidental takes as it is being hauled. In the NESG fishery only, hauls observed from both trip sampling protocols were used to estimate the bycatch rates from observed incidental takes. Only limited fish sampling trips were used in the MACG fishery to estimate the bycatch rates. For purposes of this manuscript a "take" is defined as any observed incidental take where the animal's condition was recorded as either alive with injuries or dead (fresh or under various stages of decomposition). All incidental takes are identified to species whenever possible by the fishery observer. There were several incidental takes that were not identified to species: one unknown dolphin species; four unknown porpoise/dolphin species; and nine unknown seal species. These animals were not included in the bycatch estimates for the strata they were caught in.

Second, the Northeast (NE) Dealer Report landings database was used to determine the total landings in 2004 of all finfish caught in the Northeast gillnet fishery.

Lastly, the NE Vessel Trip Report (VTR) database was used to assign (prorate) the NE Dealer Report landings from the NESG fishery to spatial and temporal strata historically used to estimate takes of harbor porpoise in the NESG fishery (Rossman and Merrick 1999, Bisack 2003).

The level of sampling (observer coverage) for each stratum was calculated by dividing the observed tons of fish caught by the prorated tons of fish recorded in the dealer database. This value represented the fraction of total landings that were sampled.

Analysis

The strata defined in Rossman and Merrick (1999) was used to estimate takes in 2004. The NESG data was stratified temporally by season, spatially by port group-area and time/area closures, and by bycatch avoidance techniques via the use of pingers (Table 1; Figure 1). Seasons are defined as: winter (January to May), summer (June to August), and fall (September to December). Fishing effort observed in time/area closures was analyzed in separate time/area closure strata. The MACG data were not stratified, but were examined by month and state for each bycaught species. See Figure 2 for the time/area closures for the MA region.

The number of marine mammal takes (B) is the product of the observed bycatch rate multiplied by the total effort in each stratum (S). The bycatch rate for each stratum is defined as the number of observed takes divided by the observed tons (effort) of fish landed.

$$B = \sum_{i=1}^{S} \frac{number\ \ observed\ \ takes_i}{observed\ \ effort_i} \bullet total\ \ effort_i$$

There is a possibility that strings could be either equipped or not equipped with pingers in the NESG fishery. Therefore, a weighted bycatch rate was calculated for strata where there were hauls with and without pingers. The weighted bycatch rate was calculated as the sum of two weighted bycatch rates -- one from hauls with pingers and one from hauls without pingers -- within a stratum. Each bycatch rate was weighted by the proportion of hauls sampled with or without pingers within its respective stratum.

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

RESULTS

For the NESG fishery, observer coverage was 3%, 8%, and 10% during the winter, summer, and fall seasons, respectively (Table 2). The total annual coverage for the NESG fishery was 6% (Table 2). There were 110 observed incidental takes of marine mammals: 27 harbor porpoise, one Atlantic white-sided dolphin, 21 gray seals, 45 harbor seals, 15 harp seals, and one hooded seal (Figures 3-4). For the MACG fishery, observer coverage was 2%, 2%, and 3% during the winter, summer, and fall, respectively (Table 3). The total annual coverage was 2% in the MACG fishery. There were four observed incidental takes of marine mammals: two harbor porpoise, one gray seal, and one harbor seal (Figures 5-6).

For the NESG fishery there were 19,083.59 tons of fish landed with the seasonal breakdown as follows: winter (53%); summer (24%); and fall (23%; Table 2). For the MACG fishery there were 14,627.14 tons of fish landed with the seasonal breakdown, which is the same as that used in the NESG fishery, as follows: winter (50%); fall (31%); and summer (19%; Table 3).

In the NESG fishery only one of the 11 observed harbor porpoise takes that were in time/area closures requiring pingers was actually caught in a net equipped with pingers (Table 4). Outside of the NESG time/area closures, three of the 16 observed harbor porpoise takes were caught in nets equipped with pingers (Table 4). The only observed Atlantic white-sided dolphin take was in a NESG time/area closure and was caught in a net equipped with pingers (Table 5). One of the four observed gray seal takes in NESG time/area closures requiring pingers was taken in a net equipped with pingers (Table 6). Eight of the 17 observed harbor seal takes in NESG time/area closures requiring pingers were caught in nets equipped with pingers (Table 7). All three of the observed harp seal takes in NESG time/area closures requiring pingers were caught

in nets not equipped with pingers (Table 8). The one observed hooded seal take in NESG time/area closures requiring pingers was caught in a net not equipped with pingers (Table 9).

The 2004 estimated total takes of cetaceans in the NESG and the MACG fisheries was 797 animals (CV = 33%). The NESG fishery had 655 (CV = 36%) harbor porpoise (Table 4) and 7 (CV = 98%) Atlantic white-sided dolphin estimated takes (Table 5). The MACG fishery had 135 (CV = 91%) harbor porpoise estimated takes (Table 10). One incidental take of a bottlenose dolphin in the NESG Fishery was also observed, but takes of Atlantic bottlenose dolphins are analyzed with different methods that are not reported here (Palka and Rossman, 2001).

The majority (81%) of the NESG fishery harbor porpoise takes occurred in the winter, with 19% in the fall, and no takes observed in the summer (though some summer incidental takes have been observed in previous years). During the winter, the South of Cape Cod port group-area and the South Cape closure had 46% and 20% of the entire NESG fishery estimated harbor porpoise takes, respectively (66% of the regions annual total for harbor porpoise) During the fall season 67% of harbor porpoise takes from the NESG fishery occurred in the Mid-Coast closure area (13% of the region's annual total for harbor porpoise). The only observed take of an Atlantic white-sided dolphin occurred in the fall in the Mid-Coast closure area.

In the MACG fishery the total estimated takes for harbor porpoise in April off the coast of Virginia was 135 animals (Table 10).

The 2004 estimated total takes of seals in the NESG and MACG fisheries was 1,726 (CV = 20%). For the NESG fishery, this included 498 gray seals (CV = 35%; Table 6); 786 harbor seals (CV = 34%; Table 7); 303 harp seals (CV = 30%; Table 8); and 43 hooded seals (CV = 95%; Table 9). For the MACG fishery, the species included in this estimate are: 68 gray seals (CV = 92%) and 28 harbor seals (CV = 77%; Table 10).

The majority of the NESG gray seal takes (89%) occurred in the winter season, with the remaining takes occurring in the summer (6%) and fall (5%). The South of Cape Cod port group-area had 45% of the estimated takes in winter, the South Cape time/area closure had 31% of the takes in winter, and the remaining 24% of the estimated takes took place in the remaining port group-areas in other seasons (Table 6).

For harbor seals in the NESG fishery, 43% of the estimated takes occurred in the summer, 37% occurred in the winter, and the remaining 20% occurred in the fall. The South of Cape Cod port group-area in the winter had 28% of the annual estimated takes, the New Hampshire port group-area in the summer had 28% of the annual estimated takes, the Mid-Coast time/area closure in the fall had 18% of the annual estimated takes, and the remaining 26% of estimated takes occurred in the remaining time/area closures and port group-areas in all seasons (Table 7).

All of the estimated harp seal takes in the NESG fishery took place in the winter season. North of Boston (39%) and South of Cape Cod (38%) port group-areas had the majority of the estimated harp seal takes. The remaining 20% of the takes occurred in the Massachusetts Bay time/area closure and 3% in the East Cape port group-area (Table 8).

All of the estimated hooded seal takes in the NESG fishery occurred in the winter season in the South Cape time/area closure (Table 9).

There were two pinniped species caught in the MACG fishery, where an estimated 68 gray seals were caught in April off Virginia and an estimated 28 harbor seals were caught in December off New Jersey (Table 10).

DISCUSSION

The current stratification method (ratio estimator) being used to estimate marine mammal bycatch in U.S. gillnet fisheries has been in use for some time. The current methodology was established as an acceptable method to estimate harbor porpoise takes in the NESG fishery (Bravington and Bisack, 1996). However, since this method was developed, spatial patterns of the NESG fishery and sampling of the fishery by the NEFOP has changed, and self reported fishery dependent data collection (VTR) has improved. In addition, there are potential problems with this approach when applied to other species. Each issue is discussed below.

For all marine mammal take estimates, one of the potential problems with the current methodology involves a bias associated with using observed hauls from complete fish sampling trips as well as marine mammal sampling trips to estimate takes. Observers on a complete fish sampling trip are engaged in sampling the catch for fish discards during the haul back and are not watching the net as it is being hauled in. Consequently, they may not see marine mammals that fall out of the net before it reaches the deck (NEFOP Observer Manual, http://www.nefsc.noaa.gov/femad/fishsamp/fsb/). In contrast, observed trips dedicated to sampling for marine mammal interactions have observers watching the gear at all times. See Table 11 for the complete breakdown of trips, hauls, and incidental takes by trip types.

In 2002 the NEFOP was charged with increasing the sampling of fish discards for the NESG fishery. As a result the number of complete fish sampling trips in the NESG fishery increased from ~10% in 2002 to ~60% and ~91% in 2003 and 2004, respectively. Based on this change, it was decided that both complete fish sampling and marine mammal sampling trips would need to be used to compute the marine mammal bycatch rates for the NESG fishery, starting with the take estimates calculated from the 2003 data, which were reported in the 2005 SAR. These take estimates have not been corrected to account for the potential bias associated with trips dedicated to fish sampling (Table 11). We anticipate updating the work of Bravington and Bisack (1996) utilizing new data from recent years to develop revised correction factors. Prior to 2003 only limited fish sampling trips were used to estimate marine mammal bycatch in the NESG fishery. The increase in trips sampled for fish discards did not impact the MACG fishery as bycatch rates from the MACG fishery were only derived from limited sampling trips.

For both cetacean and pinniped bycatch estimates, the following methodology issues require further attention: (1) the stratification and proration scheme used for estimating takes in NE fisheries may need to be revised to account for improved VTR data reporting and the spatio-temporal patterns of animals other than harbor porpoise; (2) the observer data are likely over-stratified, which means that the data may not reflect the changes that have occurred in fishing

patterns which also influences the accuracy and precision of estimated bycatch rates; and (3) the port-based stratification scheme may no longer reflect current fishing patterns. The current stratification method was specifically designed to estimate takes of harbor porpoise in the NESG fishery. Therefore, this method may not be appropriate for other cetacean or pinniped species due to their different spatial/temporal patterns within the habitat of the Northeast region. In addition, the effectiveness of pingers was tested by experimental design and proven to successfully deter harbor porpoise away from gillnets (Kraus et al. 1997). The weighting of bycatch rates for other species incidentally bycaught in gillnets implies that pingers are also effective in deterring these other species. However, reports on the effectiveness of pingers to deter or attract other small cetaceans and pinnipeds are varied and some were inconclusive (Dawson 1998, IWC 1999, Jefferson and Curry 1996). Therefore, the use of weighted bycatch rates for species other than harbor porpoise bycaught in nets with and/or without pingers should be considered on a case-by-case basis, given the information that is available in the literature for each individual species.

In conclusion, we are in the process of evaluating our take estimation methodology to determine whether the current method can be improved given the changes in the data. For cetaceans, we are looking to combine the NESG and MACG data into a predictive model that will improve stratification as well as the accuracy and precision of our take estimates. For pinnipeds, we hope to design a new stratification method that utilizes pinniped spatio/temporal patterns in relation to the fishery.

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Table 1. Port group-areas for the Northeast U.S.

Port Group-Area	Town, County, State, or Area
Northern Maine	Washington County, Hancock County, Penobscot County, Waldo County, and Knox County
Southern Maine	Lincoln County, Sagahadoc County, Cumberland County, Oxford County, Kennebec County, York County
New Hampshire	New Hampshire
North of Boston	Essex County
South of Boston	Suffolk County, Plymouth County, Norfolk County, Provincetown, Sandwich, Barnstable, Wellfleet
East of Cape Cod	Chatham, Harwich, Falmouth, Woods Hole, Hyannis
South of Cape Cod	Dukes County, Vineyard Haven, New Bedford, Bristol, Fall River, Dartmouth, Westport, Fairhaven, Nantucket, Rhode Island
Offshore	Represents area outside of offshore closed boundaries

Table 2. 2004 Northeast sink gillnet totals for observed trips, observed hauls, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.

2004 Winter (Jan-May)	Observed Trips	Observed Hauls	Observed Tons	Prorated Dealer Tons	Coverage (Tons) %
Port Group-Area Strata					
Northern Maine	0	0	0.00	0.00	0%
Southern Maine	0	0	0.00	17.82	0%
New Hampshire	0	0	0.00	0.36	0%
North of Boston	118	387	49.43	598.63	8%
South of Boston	32	226	22.97	237.72	10%
South Cape Cod	35	191	126.70	4809.49	3%
East Cape	21	106	45.58	412.68	11%
Offshore	2	5	1.98	287.79	1%
Closure Strata					
Offshore Closure	3	34	5.45	910.87	1%
Cashes Ledge Closure	1	14	7.30	16.22	45%
Midcoast Closure	16	30	5.39	266.64	2%
Mass Bay Closure	44	93	7.26	148.64	5%
Cape Cod Bay Closure	0	0	0.00	0.00	0%
South Cape Closure	38	177	46.45	2388.42	2%
Great S. Channel Closure	0	0	0.00	21.57	0%
Subtotal	310	1263	318.51	10116.85	3%
Summer (Jun-Aug)	**Observed Trips**	**Observed Hauls**	**Observed Tons**	**Prorated Dealer Tons**	**Coverage (Tons) %**
Port Group-Area Strata					
Northern Maine	0	0	0.00	20.24	0%
Southern Maine	16	65	34.72	665.64	5%
New Hampshire	49	150	31.11	566.16	5%
North of Boston	139	573	73.95	920.96	8%
South of Boston	69	396	38.28	80.39	48%
South Cape	20	79	15.42	615.14	3%
East Cape	60	298	134.90	1071.29	13%
Offshore	4	43	23.36	655.42	4%
Closure Strata					
Northeast Closure	0	0	0.00	0.05[a]	0%
Great S. Channel Closure	0	0	0.00	6.75	0%
Subtotal	357	1604	351.74	4602.04	8%
Fall (Sep-Dec)	**Observed Trips**	**Observed Hauls**	**Observed Tons**	**Prorated Dealer Tons**	**Coverage (Tons) %**
Port Group-Area Strata					
Northern Maine	0	0	0.00	3.47[a]	0%
Southern Maine	6	38	14.98	180.21	8%
New Hampshire	6	20	3.39	111.22	3%
North of Boston	71	259	55.11	491.97	11%
South of Boston	59	251	30.79	52.83	58%
South Cape	15	79	26.78	527.98	5%
East Cape	54	254	75.20	357.87	21%
Offshore	7	52	18.20	386.74	5%
Closure Strata					
Northeast Closure	0	0	0.00	0.00	0%
Offshore Closure	4	39	26.92	264.38	10%
Midcoast Closure	185	665	148.47	1645.66	9%
Mass Bay Closure	91	194	34.99	57.11	61%
South Cape Closure	6	29	7.65	285.26	3%
Subtotal	504	1880	442.48	4364.70	10%
2004 Total	1171	4747	1112.73	19083.59	6%

[a] VTR tons instead of dealer prorated tons (no dealer tons reported)

Table 3. 2004 mid-Atlantic totals for observed trips, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.

2004 Winter (Jan-May)	Observed Trips	Observed Tons	Prorated Dealer Tons	Coverage (Tons) %
New York	8	2.88	140.91	2%
New Jersey	52	41.08	1138.43	4%
Delaware	0	0.00	52.42	0%
Maryland	7	5.09	185.08	3%
Virginia	52	32.85	2776.81	1%
North Carolina	90	81.52	2960.90	3%
Subtotal	209	163.42	7254.55	2%
Summer (Jun-Aug)	**Observed Trips**	**Observed Tons**	**Prorated Dealer Tons**	**Coverage (Tons) %**
New York	19	8.76	350.16	3%
New Jersey	29	27.87	1043.16	3%
Delaware	0	0.00	0.00	0%
Maryland	1	0.00	12.19	0%
Virginia	28	11.37	1252.41	1%
North Carolina	19	1.86	188.83	1%
Subtotal	96	49.86	2846.75	2%
Fall (Sept-Dec)	**Observed Trips**	**Observed Tons**	**Prorated Dealer Tons**	**Coverage (Tons) %**
New York	14	7.21	120.71	6%
New Jersey	58	48.18	976.80	5%
Delaware	1	0.10	1.22	8%
Maryland	7	5.02	97.25	5%
Virginia	20	9.63	2152.18	0%
North Carolina	113	41.68	1177.68	4%
Subtotal	213	111.82	4525.84	3%
2004 Totals	518	325.1	14627.14	2%

Table 4. 2004 Northeast sink gillnet harbor porpoise take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata						
Northern Maine	0	0.000	0.00	0		
Southern Maine	0	0.000	17.82	0		
New Hampshire	0	0.000	0.36	0		
North of Boston	3[a], 3[b]	0.147[c]	598.63	88	47%	18 - 182
		0.898[d], 0.065[e]				
South of Boston	0	0.000	237.72	0		
South Cape Cod	8[b]	0.063	4809.49	303	67%	8 - 764
East Cape	1[b]	0.022	412.68	9	104%	1 - 31
Offshore	0	0.000	287.79	0		
Closure Strata						
Offshore Closure	0	0.000	910.87	0		
Cashes Ledge Closure	0	0.000	16.22	0		
Midcoast Closure	0	0.000	266.64	0		
Mass Bay Closure	0	0.000	148.64	0		
Cape Cod Bay Closure	0	0.000	0.00	0		
South Cape Closure	3[b]	0.054[c]	2388.42	129	71%	3 - 338
		0.000[d], 0.116[e]				
Great S. Channel Closure	0	0.000	21.57	0		
Subtotal	24		10116.85	529	42%	182 - 1034
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4602.04	0		
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	3.47[a]	0		
Southern Maine	0	0.000	180.21	0		
New Hampshire	0	0.000	111.22	0		
North of Boston	0	0.000	491.97	0		
South of Boston	0	0.000	52.83	0		
South Cape	0	0.000	527.98	0		
East Cape	1[b]	0.013	357.87	5	101%	1 - 16
Offshore	0	0.000	386.74	0		
Closure Strata						
Northeast Closure	0	0.000	0.00	0		
Offshore Closure	0	0.000	264.38	0		
Midcoast Closure	1[a],6[b]	0.051[c]	1645.66	84	54%	13 - 192
		0.024[d], 0.056[e]				
Mass Bay Closure	0	0.000	57.11	0		
South Cape Closure	1[b]	0.129[c]	285.26	37	143%	1 - 172
		0.000[d], 0.144[e]				
Subtotal	3		4364.70	126	56%	30 - 307
2004 Total	27		19083.59	655	36%	273 - 1160

[a] Observed take from haul equipped with pingers.

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

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

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

Table 5. 2004 Northeast sink gillnet Atlantic white-sided take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Subtotal	0		10116.85	0		
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4602.040	0		
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	3.47[a]	0		
Southern Maine	0	0.000	180.21	0		
New Hampshire	0	0.000	111.22	0		
North of Boston	0	0.000	491.97	0		
South of Boston	0	0.000	52.83	0		
South Cape	0	0.000	527.98	0		
East Cape	0	0.000	357.87	0		
Offshore	0	0.000	386.74	0		
Closure Strata						
Northeast Closure	0	0.000	0.00	0		
Offshore Closure	0	0.000	264.38	0		
Midcoast Closure	1[a]	0.004[c]	1645.66	7	98%	1 - 22
		0.024[d], 0.000[e]		0		
Mass Bay Closure	0	0.000	57.11	0		
South Cape Closure	0	0.000	285.26	0		
Subtotal	1		4364.70	7	98%	1 - 22
2004 Total	1		19083.59	7	98%	1 - 22

[a] Observed take from haul with active pingers.

[b] Observed take from haul with inactive pingers.

[c] A weighted bycatch rate (pingered and nonpingered hauls hauls observed were used to calculate a weighted bycatch rate)

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

Table 6. 2004 Northeast sink gillnet gray seal take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata						
Northern Maine	0	0.000	0.00	0		
Southern Maine	0	0.000	17.82	0		
New Hampshire	0	0.000	0.36	0		
North of Boston	6[b]	0.117[c]	598.63	70	46%	13 - 137
		0.000[d]; 0.130[e]				
South of Boston	0	0.000	237.72	0		
South Cape Cod	6[b]	0.047	4809.49	226	63%	35 - 569
East Cape	0	0.000	412.68	0		
Offshore	0	0.000	287.79	0		
Closure Strata						
Offshore Closure	0	0.000	910.87	0		
Cashes Ledge Closure	1[b]	0.137	16.22	2	0%	2 - 2
Midcoast Closure	0	0.000	266.64	0		
Mass Bay Closure	0	0.000	148.64	0		
Cape Cod Bay Closure	0	0.000	0.00	0		
South Cape Closure	1[a],2[b]	0.062[c]	2388.42	148	58%	1 - 343
		0.049[d]; 0.077[e]				
Great S. Channel Closure	0	0.000	21.57	0		
Subtotal	16		10116.85	446	39%	231 - 850
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	20.24	0		
Southern Maine	0	0.000	665.64	0		
New Hampshire	0	0.000	566.16	0		
North of Boston	1[b]	0.013[c]	920.96	12	97%	1 - 38
		0.000[d]; 0.014[e]				
South of Boston	0	0.000	80.39	0		
South Cape	0	0.000	615.14	0		
East Cape	2[b]	0.015	1071.29	16	71%	2 - 42
Offshore	0	0.000	655.42	0		
Closure Strata						
Northeast Closure	0	0.000	0.05[a]	0		
Great S. Channel Closure	0	0.000	6.75	0		
Subtotal	3		4602.04	28	56%	3 - 63
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	3.47[a]	0		
Southern Maine	0	0.000	180.21	0		
New Hampshire	0	0.000	111.22	0		
North of Boston	0	0.000	491.97	0		
South of Boston	0	0.000	52.83	0		
South Cape	1[b]	0.036[c]	527.98	19	114%	1 - 77
		0.000[d]: 0.044[e]				
East Cape	1[b]	0.013	357.87	5	90%	1 - 16
Offshore	0	0.000	386.74	0		
Closure Strata						
Northeast Closure	0	0.000	0.00	0		
Offshore Closure	0	0.000	264.38	0		
Midcoast Closure	0	0.000	1645.66	0		
Mass Bay Closure	0	0.000	57.11	0		
South Cape Closure	0	0.000	285.26	0		
Subtotal	2		4364.70	24	92%	2 - 79
2004 Total	21		19083.59	498	35%	231 - 902

[a] Observed take from haul equipped with pingers.

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

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

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

Table 7. 2004 Northeast sink gillnet harbor seal take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata						
Northern Maine	0	0.000	0.00	0		
Southern Maine	0	0.000	17.82	0		
New Hampshire	0	0.000	0.36	0		
North of Boston	0	0.000	598.63	0		
South of Boston	0	0.000	237.72	0		
South Cape Cod	6[b]	0.047	4809.49	226	103%	6 - 768
East Cape	0	0.000	412.68	0		
Offshore	0	0.000	287.79	0		
Closure Strata						
Offshore Closure	0	0.000	910.87	0		
Cashes Ledge Closure	0	0.000	16.22	0		
Midcoast Closure	0	0.000	266.64	0		
Mass Bay Closure	1[b]	0.140[c]	148.64	21	97%	1 - 71
		0.000[d]; 0.148[e]				
Cape Cod Bay Closure	0	0.000	0.00	0		
South Cape Closure	1[b]	0.018[c]	2388.42	43	105%	1 - 153
		0.000[d]; 0.039[e]				
Great S. Channel Closure	0	0.000	21.57	0		
Subtotal	8		10116.85	290	83%	8 - 837
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	20.24	0		
Southern Maine	3[b]	0.086	665.64	57	97%	3 - 210
New Hampshire	12[b]	0.386	566.16	219	34%	83 - 377
North of Boston	5[b]	0.065[c]	920.96	60	42%	12 - 113
		0.000[d]; 0.069[e]				
South of Boston	0	0.000	80.39	0		
South Cape	0	0.000	615.14	0		
East Cape	0	0.000	1071.29	0		
Offshore	0	0.000	655.42	0		
Closure Strata						
Northeast Closure	0	0.000	0.05[a]	0		
Great S. Channel Closure	0	0.000	6.75	0		
Subtotal	20		4602.04	336	28%	181 - 554
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata						
Northern Maine	0	0.000	3.47[a]	0		
Southern Maine	1[b]	0.067	180.21	12	167%	1 - 75
New Hampshire	0	0.000	111.22	0		
North of Boston	0	0.000	491.97	0		
South of Boston	0	0.000	52.83	0		
South Cape	0	0.000	527.98	0		
East Cape	1[b]	0.013	357.87	5	100%	1 - 17
Offshore	0	0.000	386.74	0		
Closure Strata						
Northeast Closure	0	0.000	0.00	0		
Offshore Closure	0	0.000	264.38	0		
Midcoast Closure	8[a],7[b]	0.087[c]	1645.66	143	44%	46 - 286
		0.194[d]; 0.065[e]				
Mass Bay Closure	0	0.000	57.11	0		
South Cape Closure	0	0.000	285.26	0		
Subtotal	17		4364.70	160	41%	65 - 311
2004 Total	45		19083.59	786	34%	394 - 1386

[a] Observed take from haul equipped with pingers.

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

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

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

Table 8. 2004 Northeast sink gillnet harp seal take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata						
Northern Maine	0	0.000	0.00	0		
Southern Maine	0	0.000	17.82	0		
New Hampshire	0	0.000	0.36	0		
North of Boston	4[a],4[b]	0.196[c]	598.63	117	35%	47 - 203
		1.197[d]; 0.087[e]				
South of Boston	0	0.000	237.72	0		
South Cape Cod	3[b]	0.024	4809.49	115	59%	3 - 277
East Cape	1[b]	0.022	412.68	9	108%	1 - 35
Offshore	0	0.000	287.79	0		
Closure Strata						
Offshore Closure	0	0.000	910.87	0		
Cashes Ledge Closure	0	0.000	16.22	0		
Midcoast Closure	0	0.000	266.64	0		
Mass Bay Closure	3[b]	0.419[c]	148.64	62	70%	3 - 157
		0.000[d]; 0.443[e]				
Cape Cod Bay Closure	0	0.000	0.00	0		
South Cape Closure	0	0.000	2388.42	0		
Great S. Channel Closure	0	0.000	21.57	0		
Subtotal	15		10116.85	303	30%	140 - 503
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4602.04	0		
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**		**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4364.70	0		
2004 Total	15		19083.59	303	30%	140 - 503

[a] Observed take from haul equipped with pingers.

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

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

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

Table 9. 2004 Northeast sink gillnet hooded seal take estimates.

2004 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata						
Northern Maine	0	0.000	0.00	0		
Southern Maine	0	0.000	17.82	0		
New Hampshire	0	0.000	0.36	0		
North of Boston	0	0.000	598.63	0		
South of Boston	0	0.000	237.72	0		
South Cape Cod	0	0.000	4809.49	0		
East Cape	0	0.000	412.68	0		
Offshore	0	0.000	287.79	0		
Closure Strata						
Offshore Closure	0	0.000	910.87	0		
Cashes Ledge Closure	0	0.000	16.22	0		
Midcoast Closure	0	0.000	266.64	0		
Mass Bay Closure	0	0.000	148.64	0		
Cape Cod Bay Closure	0	0.000	0.00	0		
South Cape Closure	1[b]	0.018[c]	2388.42	43	95%	1 - 140
Great S. Channel Closure	0	0.000[d]; 0.039[e] 0.000	21.57	0		
Subtotal	1		10116.85	43	95%	1 - 140
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Prorated Dealer Tons**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4602.04	0		
Fall (Sep-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**		**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Subtotal	0		4364.70	0		
2004 Total	1		19083.59	43	95%	1 - 140

[a] Observed take from haul equipped with pingers.

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

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

[d] Bycatch rate from hauls equipped with pingers

[e] Bycatch rate from hauls not equipped with pingers

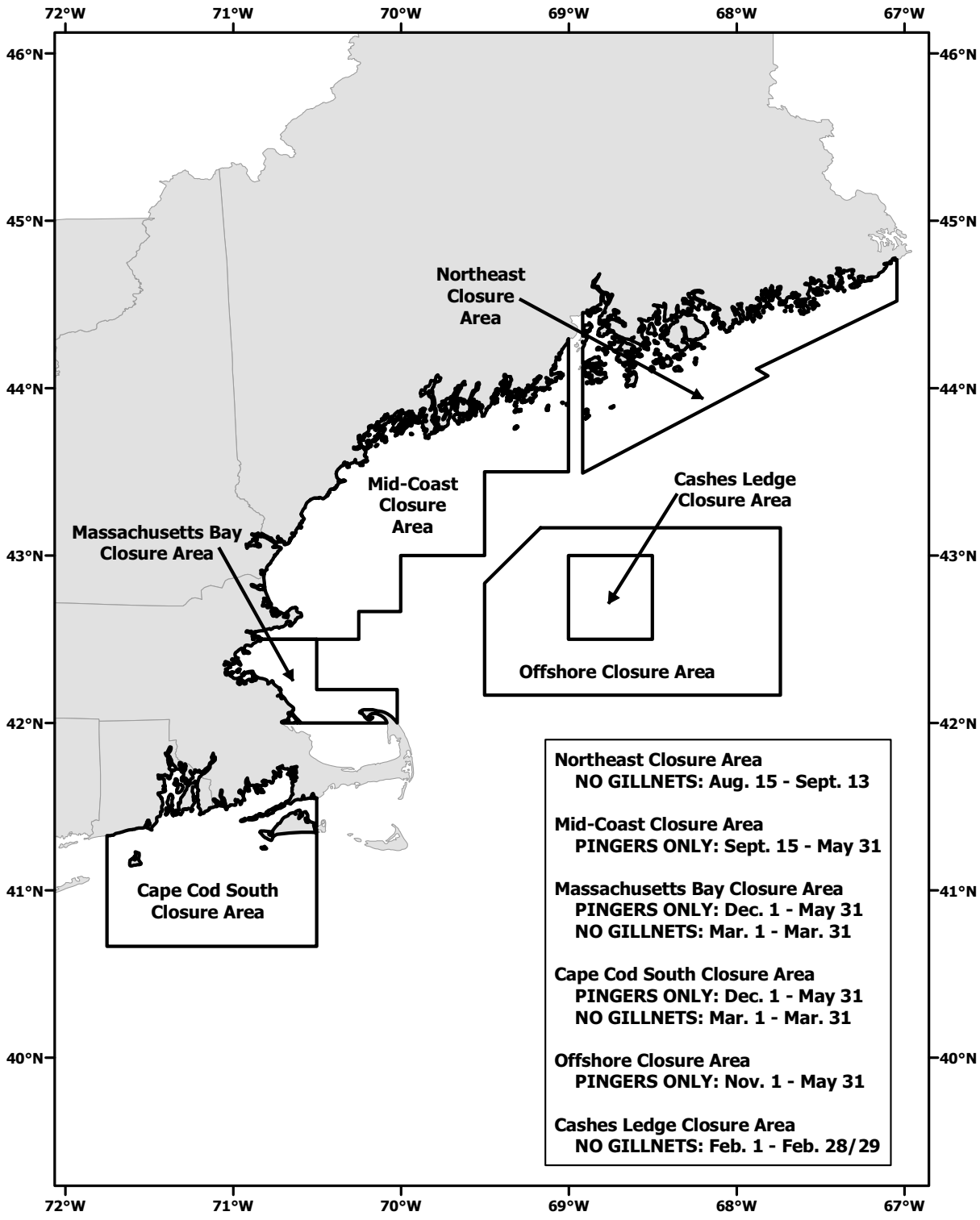
Table 10. 2004 mid-Atlantic coastal gillnet take estimates.

2004 Species	Month	State	Observed Takes	Bycatch Rate (Take/Ton)	Prorated Dealer Tons	Estimated Takes	C.V. (%)	95% C.I.
harbor porpoise	April	Virginia	2	0.23	585.40	135	91%	2 - 423
gray seal	April	Virginia	1	0.117	585.40	68	92%	1 - 210
harbor seal	December	New Jersey	1	0.132	210.41	28	77%	1 - 68

Table 11. 2004 observed trips, observed hauls, and observed incidental take species by trip type. There were several multi-gear trips observed which had no observed incidental takes: NE had 2 trips (3 hauls) and the MA had 5 trips (20 hauls).

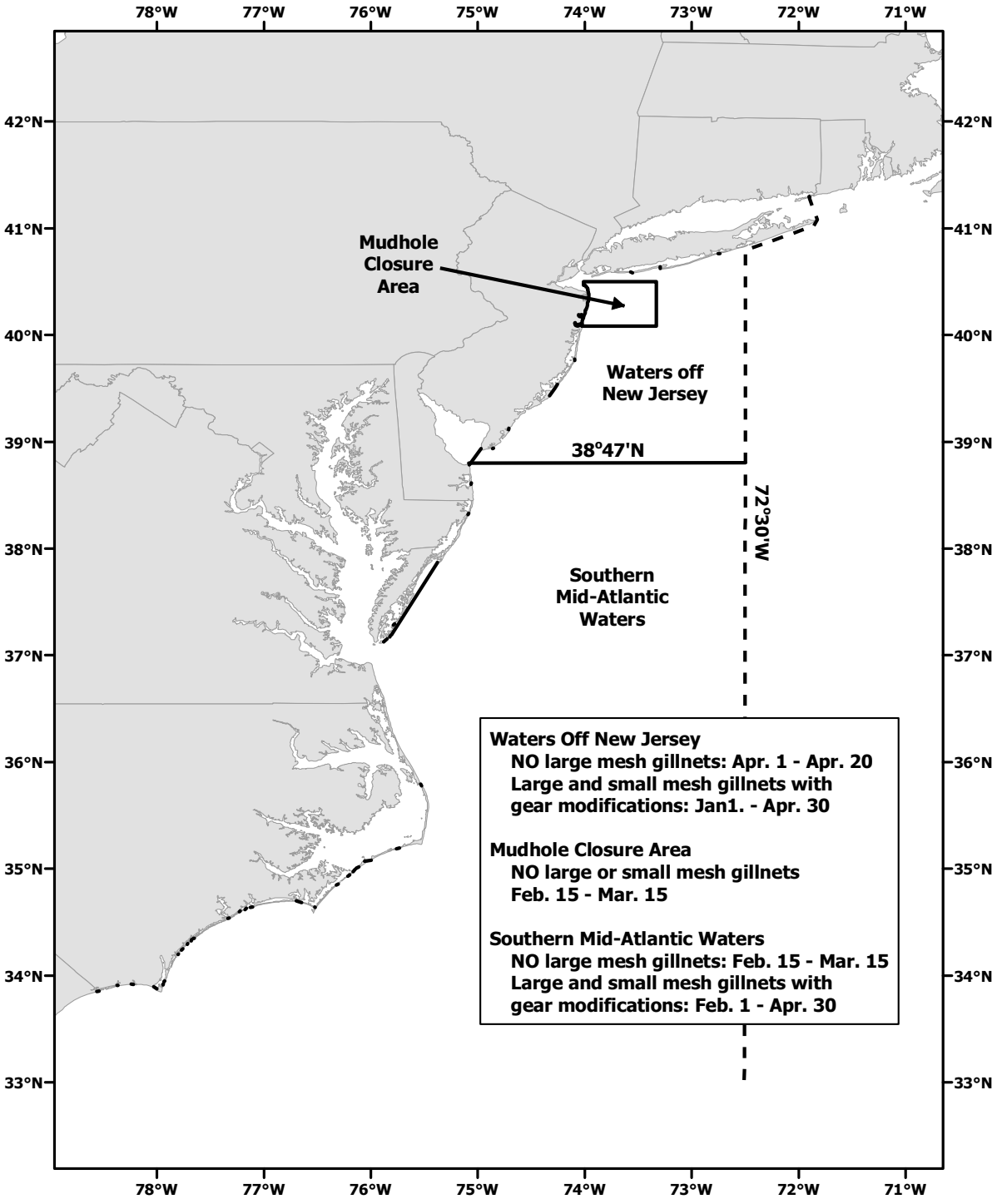
NE 2004	**Complete**		**Limited**		**Totals**
Trips	1038		102		1140
Hauls	4319		425		4744
Species		**Overall Bycatch**		**Overall Bycatch**	
harbor porpoise	19	0.004	8	0.019	27
Atlantic white-side dolphin	1	0.000	0	0.000	1
harbor seal	39	0.009	6	0.016	45
gray seal	14	0.003	7	0.019	21
harp seal	13	0.003	2	0.005	15
hooded seal	0	0.000	1	0.002	1
Totals	86		24		110
MA 2004	**Complete**		**Limited**		**Totals**
Trips	49		518		567
Hauls	224		2369		2593
Species		**Overall Bycatch**		**Overall Bycatch**	
harbor porpoise	0	0.000	2	0.0008	2
harbor seal	0	0.000	1	0.0004	1
gray seal	0	0.000	1	0.0004	1
Totals	0		4		4

Figure 1. 2004 Northeast harbor porpoise time/area closures.



For a complete description of the HPTRP, see CFR 50 229.33
or visit the HPTRP web site at http://www.nero.noaa.gov/porptrp

Figure 2. Mid-Atlantic harbor porpoise time/area closures.



- Inshore exemption lines are depicted as thick, solid lines
- For a complete description of the HPTRP, including coordinates of exempted waters and details about gear modification requirements, see 50 CFR 229.34 or visit the HPTRP web site at http://ww.nero.noaa.gov/porptrp
- Note that the southern boundary of the Southern Mid-Atlantic Waters Closure Area is the NC/SC border (33°51'N)

Figure 3. 2004 Northeast sink gillnet VTR trips and observed trips.

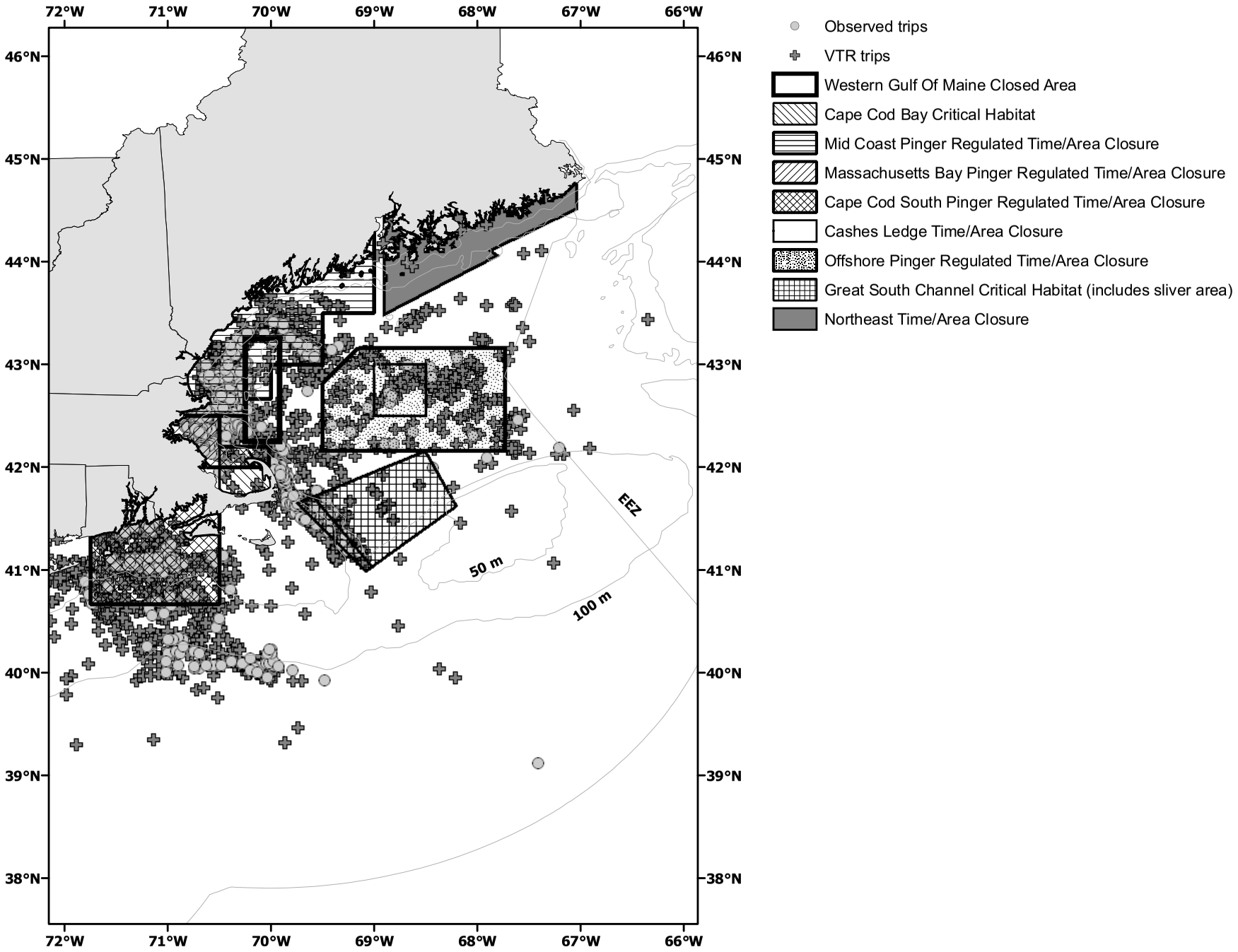


Figure 4. 2004 Northeast sink gillnet observed incidental takes.

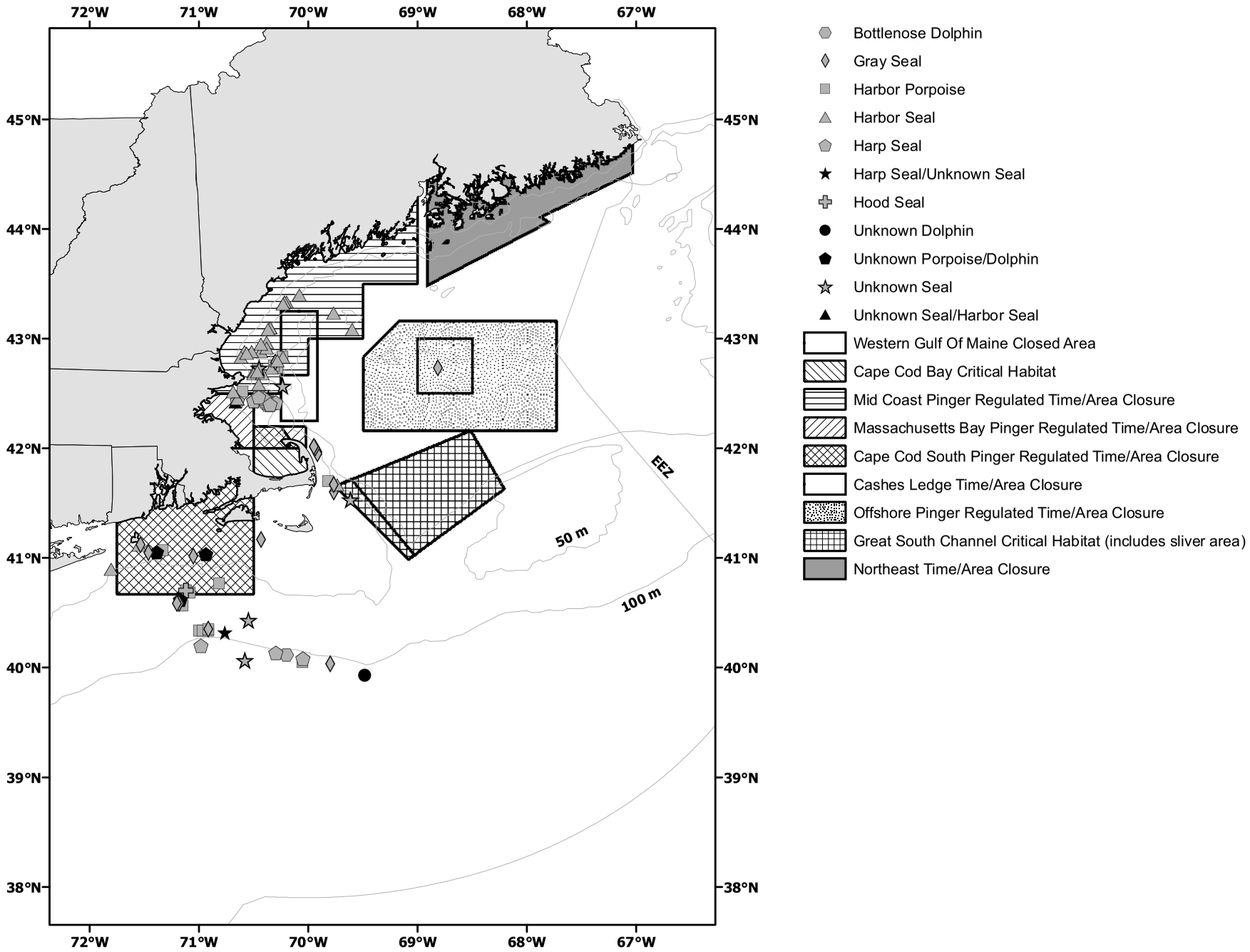


Figure 5. 2004 mid-Atlantic coastal gillnet VTR trips and observed trips.

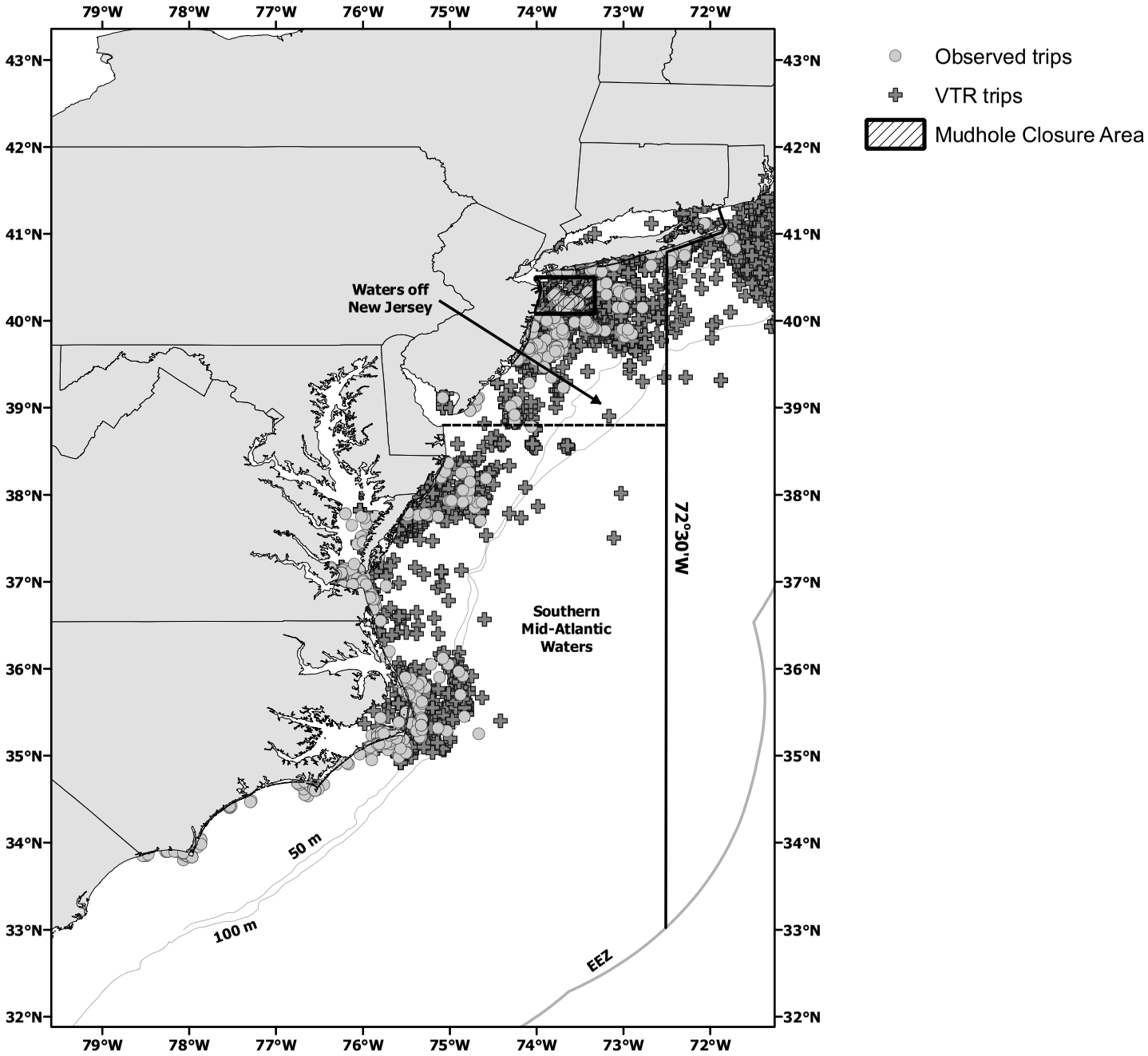
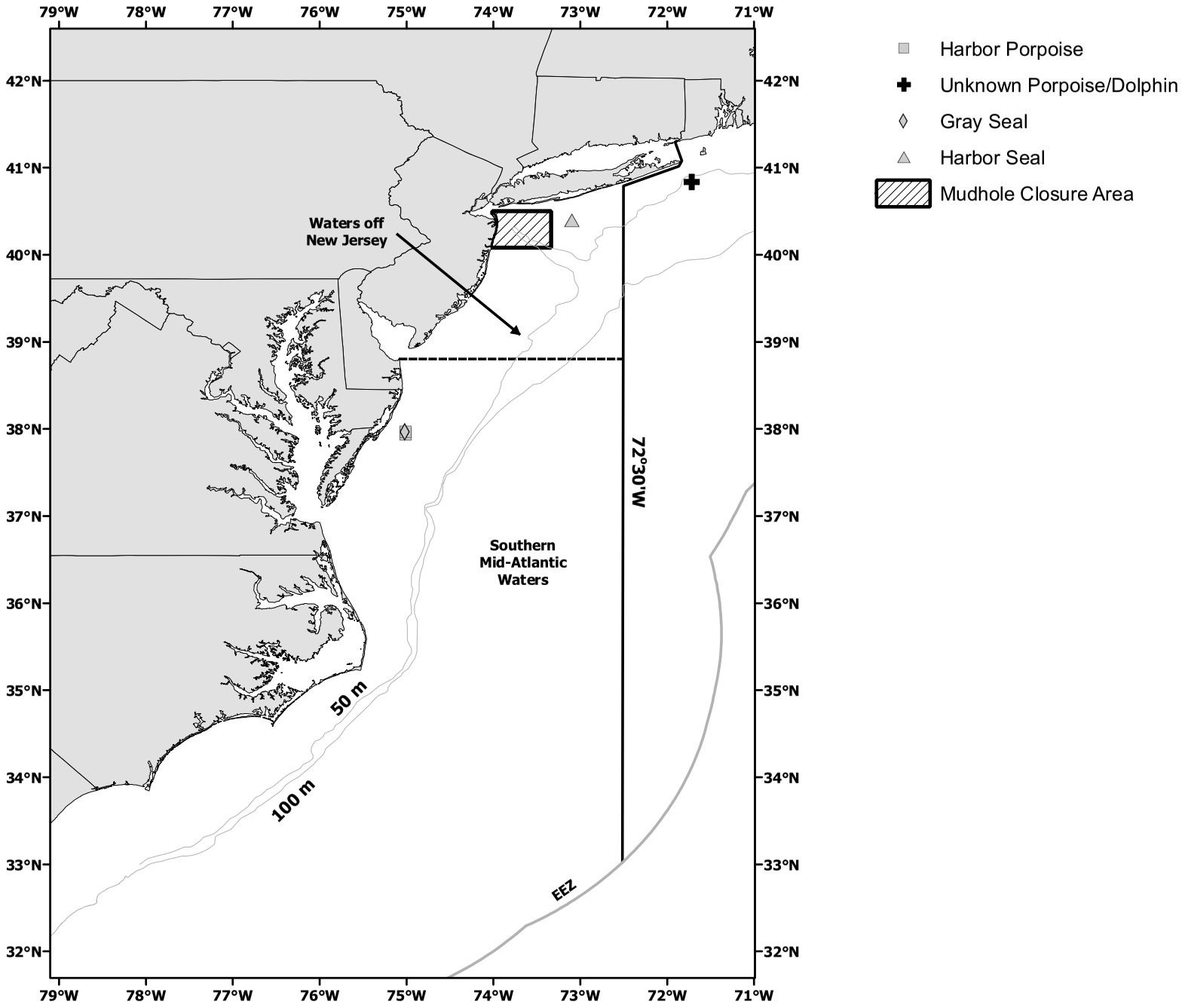


Figure 6. 2004 mid-Atlantic coastal gillnet observed incidental takes.



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