



Northeast Fisheries Science Center Reference Document 07-08

# **Estimates of Cetacean and Pinniped Bycatch in the 2005 Northeast Sink Gillnet and Mid-Atlantic Coastal Gillnet Fisheries**

by Dana Belden

May 2007

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U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Science Center  
Woods Hole, Massachusetts

May 2007

## Northeast Fisheries Science Center Reference Documents

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**This document's publication history is as follows:** manuscript submitted for review April 6, 2007; manuscript accepted through technical review May 4, 2007; manuscript accepted through policy review May 7, 2007; and final copy submitted for publication May 7, 2007. This document may be cited as:

Belden D. 2007. Estimates of cetacean and pinniped bycatch in the 2005 northeast sink gillnet and mid-Atlantic coastal gillnet fisheries. U.S. Dep. Commer., *Northeast Fish. Sci. Cent. Ref. Doc.* 07-08; 16 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026.

## Table of Contents

Abstract.....	iv
Introduction.....	1
Methods.....	1
Data sources.....	1
Analysis.....	2
Results.....	3
References.....	4

## List of Tables

Table 1.	2005 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.....	5
Table 2.	2005 mid-Atlantic coastal gillnet totals for observed trips, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.....	6
Table 3.	2005 common dolphin bycatch estimate.....	7
Table 4.	2005 harbor porpoise bycatch estimate.....	8
Table 5.	2005 Risso's dolphin bycatch estimate.....	9
Table 6.	2005 white-sided dolphin bycatch estimate.....	10
Table 7.	2005 gray seal bycatch estimate.....	11
Table 8.	2005 harbor seal bycatch estimate.....	12
Table 9.	2005 harp seal bycatch estimate.....	13
Table 10.	2005 New Jersey totals for observed trips, observed hauls, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.....	14
Table 11.	2005 mid-Atlantic harbor porpoise bycatch estimate.....	14
Table 12.	2005 mid-Atlantic harbor seal bycatch estimate.....	14

## List of Figures

Figure 1.	Location of 2005 observed hauls and VTR trips for New Jersey in the winter.....	15
Figure 2.	Location of all 2005 observed hauls from Connecticut and the South of Cape Cod port group and VTR trips from Connecticut.....	16

## **Abstract**

This report provides incidental take estimates for six marine mammal species taken in the 2005 Northeast Sink Gillnet (NESG) and Mid-Atlantic Coastal Gillnet (MACG) fisheries and documents the methodology used to produce the estimates. For the NESG fishery, the estimated take was 26 common dolphins (CV = 80%), 630 harbor porpoises (CV = 23 %), 15 Risso's dolphins (CV = 93%), 59 Atlantic white-sided dolphins (CV = 49%), 574 gray seals (CV = 44%), 719 harbor seals (CV = 20%), and 35 harp seals (CV = 68%). For the MACG fishery, the estimated 2005 takes included 470 harbor porpoises (CV = 51%) and 63 harbor seals (CV = 67%).

## 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 U.S. 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 by commercial fishing operations (Waring et al. 2004). 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 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 in an effort to learn more about marine mammal interactions occurring in MA gillnet fisheries.

Rossman and Merrick (1999) document the methods used to estimate harbor porpoise bycatch in the NESG and MACG fisheries. These methods 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. 2004; Belden et al. 2006).

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 6–12 inches. String lengths range from 600–10,500 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 2.5–12 inches. String lengths range from 150–8400 feet. The mesh size and string length vary by the primary fish species targeted for catch (Waring et al. 2004).

To calculate cetacean and seal bycatch for the 2005 NESG and MACG fisheries, the same ratio estimator methodology was used as was documented in Belden et al. (2006). However, there were a few changes in the stratification; these changes and the resulting bycatch estimates are described in this report.

## METHODS

### Data Sources

Three databases were used to estimate the total marine mammal takes in 2005: 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 in which 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 in which 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.

Second, the Northeast (NE) Dealer Report landings database was used to determine the total landings in 2005 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).

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: 2 unknown dolphins; 3 unknown porpoise/dolphins; and 14 unknown seals. These animals were not included in the bycatch estimates for the strata they were caught in.

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 2005. 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). Seasons are defined as: winter (January–May), summer (June–August), and fall (September–December). However, there was one change to the NESG analysis. The Harbor Porpoise Take Reduction Plan’s Offshore Closure area requires pinger use during November–May for vessels within the NESG fishery. In previous analyses (e.g. Belden et al. 2006), effort for this period was split into two seasonal strata: fall (September–December) and winter (January–May). In 2005, however, there were only six observed trips in the Offshore Closure area: five in November and December (fall) and one in May (winter). Using one observed trip in a bycatch rate estimate for the winter Offshore Closure area would result in an unrepresentative bycatch rate for this stratum. A more representative rate is available from pooling the one May trip with offshore port group data from the adjacent months to create a new summer season, defined as May–August (Table 1). This change affected the estimated bycatch for harbor and gray seals. Fishing effort observed in time/area closures was analyzed in separate time/area closure strata.

As indicated in Belden et al. (2006), MACG bycatch estimates have been calculated by month for each state. In 2005, observer and VTR trip locations indicate New Jersey MACG trips during January–April fished in a similar area (Figure 1), so a winter season (January–April) was used for the 2005 analyses (Table 2) of harbor porpoise and harbor seal takes in Jew Jersey waters.

Connecticut (CT) gillnet fishing effort has historically been included in the mid-Atlantic region bycatch analyses. Spatial analysis of 2005 VTR and observer data indicated that CT vessels fish in the same time and area as vessels from the Northeast region fishing in the South of Cape Cod port group (Figure 2); therefore, CT trips were included in the 2005 Northeast South



of Cape Cod port group bycatch estimates (Table 1). This change affected the estimated bycatch of harbor porpoise, white-sided dolphin, gray seal, harbor seal, and harp seal.

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.

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

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

The overall observer coverage in the NESG was 7.3%, ranging from 4.2% in the fall to 11.48% in the winter (Table 1). This level is slightly higher than in previous years. Four common dolphins, 51 harbor porpoises, 1 Risso's dolphin, 5 white-sided dolphins, 2 unknown dolphins, 3 unknown porpoise/dolphins, 33 gray seals, 70 harbor seals, 3 harp seals, and 14 unknown seals taken were observed taken in the 2005 NESG fishery. Unidentified animals were not included in this analysis.

The 2005 estimated total takes of cetaceans in the NESG fishery was 26 (CV = 80%) common dolphins (Table 3), 630 (CV = 23%) harbor porpoise (Table 4), 15 (CV = 93%) Risso's dolphin (Table 5), and 59 (CV = 49%) white-sided dolphin (Table 6). The 2005 estimated total takes of pinnipeds in the NESG fishery was 574 (CV = 44%) gray seal (Table 7), 719 (CV = 20%) harbor seal (Table 8), and 35 (CV = 68%) harp seal (Table 9).

The 2005 observer coverage for the MASG fishery was 2% (Table 2). The 2005 observer coverage for the winter off of New Jersey was 3.2% (Table 10). There were 15 harbor porpoise, 2 harbor seals, 2 bottlenose dolphins, 2 unknown dolphins, and 3 unknown seals observed taken in the MASG fishery in 2005. The unidentified animals are not included in this analysis.

The 2005 estimated total takes for cetaceans in the MASG fishery was 470 (CV = 51%) harbor porpoise (Table 11). Bottlenose dolphin bycatch is estimated by a different method (Palka and Rossman, 2001) and therefore is not reported here. The 2005 estimated total takes for pinnipeds in the fishery was 63 (CV = 67%) harbor seal (Table 12).

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Table 1. 2005 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.

<b>2005 Winter (Jan-May)</b>	<b>Observed Trips</b>	<b>Observed Hauls</b>	<b>Observed Tons</b>	<b>Prorated Dealer Tons</b>	<b>Coverage (Tons) %</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0	0.00	0.00	0.00
Southern Maine	0	0	0.00	0.25	0.00
New Hampshire	0	0	0.00	18.09 <sup>b</sup>	0.00
North of Boston	60	267	21.67	90.69	23.89
South of Boston	33	145	11.73	536.84	2.19
South Of Cape Cod <sup>c</sup>	21	95	48.35	1294.02	3.74
East Of Cape Cod	14	68	18.47	269.63	6.85
Offshore	0	0	0.00	2.11	0.00
<b>Closure Strata</b>					
Offshore Closure <sup>d</sup>	0	0	0.00	0.00	0.00
Cashes Ledge Closure	0	0	0.00	35.84 <sup>b</sup>	0.00
Midcoast Closure	7	29	1.60	53.10	3.01
Mass Bay Closure	55	150	11.56	95.42	12.11
Cape Cod Bay Closure	0	0	0.00	0.00	0.00
South Cape Closure	34	120	29.57	653.49	4.52
Great S. Channel Closure	0	0	0.00	0.00	0.00
Subtotal <sup>c&amp;d</sup>	225	878	143.93	3466.16	4.15
<b>Summer (Jun-Aug)</b>					
<b>Port Group-Area Strata</b>					
Northern Maine	0	0	0.00	58.18 <sup>b</sup>	0.00
Southern Maine	42	170	50.83	199.99	25.42
New Hampshire	66	251	67.12	526.37 <sup>b</sup>	12.75
North of Boston	98	409	68.96	1125.44	6.13
South of Boston	52	249	31.91	1937.63	1.65
South Of Cape Cod <sup>c</sup>	17	106	30.03	1269.69	2.37
East Of Cape Cod	68	301	171.05	1536.62	11.13
Offshore <sup>d</sup>	8	58	21.78	1052.74	2.07
<b>Closure Strata</b>					
Northeast Closure	0	0	0.00	0.00	0.00
Great S. Channel Closure	0	0	0.00	9.19	0.00
Subtotal <sup>c&amp;d</sup>	350	1540	440.70	7299.17	6.04
<b>Fall (Sep-Dec)</b>					
<b>Port Group-Area Strata</b>					
Northern Maine	0	0	0.00	0.22 <sup>b</sup>	0.00
Southern Maine	5	28	8.80	22.22	39.60
New Hampshire	13	45	9.85	65.96 <sup>b</sup>	14.93
North of Boston	88	279	60.19	603.97	9.97
South of Boston	31	164	23.59	1220.07	1.93
South Of Cape Cod <sup>c</sup>	39	201	41.21	515.57	7.99
East Of Cape Cod	80	370	114.64	699.86	16.38
Offshore	13	123	66.50	147.52	45.08
<b>Closure Strata</b>					
Northeast Closure	0	0	0.00	0.24 <sup>b</sup>	0.00
Offshore Closure	5	33	20.40	105.14	19.40
Midcoast Closure	144	562	140.59	868.21	16.19
Mass Bay Closure	27	80	10.61	150.53	7.05
South Cape Closure	19	122	34.43	225.22	15.29
Subtotal <sup>c</sup>	464	2007	530.81	4624.73	11.48
2005 Total <sup>c&amp;d</sup>	1039	4425	1115.44	15390.06	7.25

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> VTR tons instead of dealer prorated tons (no dealer tons reported)

<sup>c</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes

<sup>d</sup> Totals recalculated for summer/offshore portname stratum due to moving info from winter/offshore closure for statistics of incidental takes

Table 2. 2005 mid-Atlantic coastal gillnet totals for observed trips, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.

<b>2005</b>	<b>Observed</b>	<b>Observed</b>	<b>Prorated Dealer</b>	<b>Coverage</b>
<b>Winter (Jan - May)</b>	<b>Trips</b>	<b>Tons</b>	<b>Tons</b>	<b>(Tons) %</b>
New York	0	0.00	253.23	0%
New Jersey	22	26.48	1246.60	2%
Delaware	0	0.00	70.09	0%
Maryland	1	0.34	95.14	0%
Virginia	37	23.30	817.18	3%
North Carolina	117	91.68	4724.6	2%
<b>Subtotal</b>	<b>177</b>	<b>141.8</b>	<b>7206.84</b>	<b>2%</b>
<b>Summer (Jun - Aug)</b>	<b>Trips</b>	<b>Tons</b>	<b>Tons</b>	<b>(Tons) %</b>
New York	3	1.44	588.43	0%
New Jersey	26	28.29	1321.12	2%
Delaware	0	0.00	40.28	0%
Maryland	0	0.00	26.64	0%
Virginia	21	11.94	392.80	3%
North Carolina	21	2.60	39.28	7%
<b>Subtotal</b>	<b>71</b>	<b>44.27</b>	<b>2408.55</b>	<b>2%</b>
<b>Fall (Sept - Dec)</b>	<b>Trips</b>	<b>Tons</b>	<b>Tons</b>	<b>(Tons) %</b>
New York	6	4.31	168.87	3%
New Jersey	69	52.50	1267.65	4%
Delaware	0	0.00	45.32	0%
Maryland	6	0.72	90.12	1%
Virginia	67	19.22	448.54	4%
North Carolina	78	54.86	1358.47	4%
<b>Subtotal</b>	<b>226</b>	<b>131.61</b>	<b>3378.97</b>	<b>4%</b>
<b>Annual Totals</b>	<b>474</b>	<b>317.68</b>	<b>12994.36</b>	<b>2%</b>

Table 3. 2005 common dolphin bycatch estimate.

<b>2005</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Winter (Jan-May)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	0		0		
<b>Summer (Jun-Aug)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	1 <sup>b</sup>	0.015	8	95.75	0.00 - 24.50
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	1		8	95.75	0.00 - 24.50
<b>Fall (Sep-Dec)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
South Cape Closure	3 <sup>b</sup>	0.081 <sup>c</sup>	18	105.83	0.00 - 63.28
Subtotal	3		18	105.83	0.00 - 63.28
2005 Total	4		26	80.00	0.00 - 73.38

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 4. 2005 harbor porpoise bycatch estimate.

<b>2005 Winter (Jan-May)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	4 <sup>b</sup>	0.186 <sup>c</sup>	17	49.00	3.97 - 35.56
South of Boston	0	0.000	0		
South Of Cape Cod <sup>d</sup>	10 <sup>b</sup>	0.189 <sup>c</sup>	245	50.03	50.78 - 537.71
East Of Cape Cod	3 <sup>b</sup>	0.162	44	58.48	3 - 100.33
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d</sup>	17		306	41.24	106.58 - 604.54
<b>2005 Summer (Jun-Aug)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	1 <sup>b</sup>	0.015	8	96.50	1 - 24.52
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod <sup>d</sup>	1 <sup>b</sup>	0.035	44	99.57	1 - 148.95
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d</sup>	2		52	86.08	2 - 160.06
<b>2005 Fall (Sep-Dec)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	8 <sup>b</sup>	0.144 <sup>c</sup>	87	48.31	20.44 - 179.73
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	2 <sup>b</sup>	0.017	12	73.25	2 - 31.93
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	9 <sup>a</sup> ,10 <sup>b</sup>	0.135 <sup>c</sup>	117	26.60	62.12 - 185.15
Mass Bay Closure	3 <sup>a</sup>	0.375 <sup>c</sup>	56	9.30	47.28 - 67.87
South Cape Closure	0	0.000	0		
Subtotal	32		272	19.72	178.68 - 388.71
2005 Total <sup>d</sup>	51		630	22.83	390.26 - 974.45

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

<sup>d</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes

Table 5. 2005 Risso's dolphin bycatch estimate.

<b>2005</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Winter (Jan-May)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	1 <sup>b</sup>	0.054	15	93.00	0.00 - 47.45
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	1		15	93.00	0.00 - 47.45
<b>Summer (Jun-Aug)</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>	
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	0		0		
<b>Fall (Sep-Dec)</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>	
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Subtotal	0		0		
2005 Total	1		15	93.00	0.00 - 47.45

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

Table 6. 2005 white-sided dolphin bycatch estimate.

<b>2005</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Winter (Jan-May)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod <sup>d</sup>	1 <sup>b</sup>	0.019 <sup>c</sup>	25	91.88	1 - 74.69
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d</sup>	1		25	91.88	1 - 74.69
<b>Summer (Jun-Aug)</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Takes</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	1 <sup>b</sup>	0.020 <sup>c</sup>	4	105.75	1 - 14.23
New Hampshire	1 <sup>b</sup>	0.015	8	100.25	1 - 26.47
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	2		12	77.33	2 - 33.74
<b>Fall (Sep-Dec)</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Takes</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	2 <sup>b</sup>	0.036 <sup>c</sup>	22	68.55	2 - 56.85
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Subtotal	2		22	68.55	2 - 56.85
2005 Total <sup>d</sup>	5		59	48.93	10.97 - 124.25

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

<sup>d</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes



Table 7. 2005 gray seal bycatch estimate.

<b>2005</b>	<b>Observed</b>	<b>Bycatch Rate</b>	<b>Estimated</b>	<b>C.V.</b>	<b>95%</b>
<b>Winter (Jan-May)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	2 <sup>b</sup>	0.093 <sup>c</sup>	8	76.13	2 - 21.46
South of Boston	0	0.000	0		
South Of Cape Cod <sup>c</sup>	11 <sup>b</sup>	0.207 <sup>c</sup>	268	88.91	11 - 816.12
East Of Cape Cod	3 <sup>b</sup>	0.162	44	53.05	3 - 86.29
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure <sup>d</sup>	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d&amp;e</sup>	16		320	74.95	27.09 - 868.69
<b>Summer (Jun-Aug)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	1 <sup>b</sup>	0.015	8	97.88	1 - 25.46
North of Boston	4 <sup>b</sup>	0.057 <sup>c</sup>	64	48.28	15.28 - 132.86
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	5 <sup>b</sup>	0.029	45	43.58	9.62 - 87.05
Offshore <sup>d</sup>	1 <sup>b</sup>	0.046	48	115.98	1 - 183.81
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d</sup>	11		165	40.15	63.94 - 308.79
<b>Fall (Sep-Dec)</b>	<b>Takes</b>	<b>(Take/Ton)</b>	<b>Takes</b>	<b>(%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	1 <sup>b</sup>	0.042	51	98.71	1 - 166.62
South Of Cape Cod <sup>c</sup>	1 <sup>b</sup>	0.025	13	96.46	1 - 43.45
East Of Cape Cod	2 <sup>b</sup>	0.017	12	71.25	2 - 31.81
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	1 <sup>a</sup> ,1 <sup>b</sup>	0.014 <sup>c</sup>	12	73.42	2 - 32.59
Mass Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Subtotal <sup>c</sup>	6		88	59.80	12.87 - 209.46
2005 Total <sup>d&amp;e</sup>	33		574	44.21	204.54 - 1146.44

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

<sup>d</sup> Totals recalculated for summer/offshore portname stratum due to moving info from winter/offshore closure for statistics of incidental takes (the seasons were changed for this species - winter is from January to April and summer is from May to August)

<sup>e</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes

Table 8. 2005 harbor seal bycatch estimate.

<b>2005 Winter (Jan-May)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod <sup>c</sup>	1 <sup>b</sup>	0.019 <sup>c</sup>	25	104.92	1 - 86.25
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure <sup>d</sup>	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d&amp;e</sup>	1		25	104.92	1 - 86.25
<b>2005 Summer (Jun-Aug)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	4 <sup>b</sup>	0.078 <sup>c</sup>	16	82.06	4 - 47.00
New Hampshire	24 <sup>b</sup>	0.358	188	34.19	78.21 - 331.97
North of Boston	14 <sup>b</sup>	0.199 <sup>c</sup>	224	38.01	82.44 - 424.71
South of Boston	0	0.000	0		
South Of Cape Cod <sup>c</sup>	1 <sup>b</sup>	0.035	44	94.66	1 - 139.13
East Of Cape Cod	0	0.000	0		
Offshore <sup>d</sup>	1 <sup>b</sup>	0.046	48	123.02	1 - 188.06
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d&amp;e</sup>	44		520	24.63	306.18 - 806.26
<b>2005 Fall (Sep-Dec)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	1 <sup>b</sup>	0.114	3	83.00	1 - 8.84
New Hampshire	0	0.000	0		
North of Boston	5 <sup>b</sup>	0.090 <sup>c</sup>	54	86.00	5 - 171.39
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	4 <sup>b</sup>	0.035	24	62.25	4 - 57.73
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	1 <sup>a</sup> ,9 <sup>b</sup>	0.067 <sup>c</sup>	58	50.72	14.15 - 126.59
Mass Bay Closure	0	0.000	0		
South Cape Closure	2 <sup>a</sup> ,3 <sup>b</sup>	0.157 <sup>c</sup>	35	83.51	11.20 - 128.18
Subtotal	25		174	37.98	83.63 - 329.49
2005 Total <sup>d&amp;e</sup>	70		719	20.39	479.22 - 1058.24

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

<sup>d</sup> Totals recalculated for summer/offshore portname stratum due to moving info from winter/offshore closure for statistics of incidental takes (the seasons were changed for this species - winter is from January to April and summer is from May to August)

<sup>e</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes

Table 9. 2005 harp seal bycatch estimate.

<b>2005 Winter (Jan-May)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	1 <sup>b</sup>	0.046 <sup>c</sup>	4	102.50	1 - 13.48
South of Boston	0	0.000	0		
South Of Cape Cod <sup>d</sup>	1 <sup>b</sup>	0.019 <sup>c</sup>	25	92.04	1 - 77.07
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Offshore Closure	0	0.000	0		
Cashes Ledge Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
Cape Cod Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal <sup>d</sup>	2		29	80.10	2 - 82.37
<b>2005 Summer (Jun-Aug)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	0	0.000	0		
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Great S. Channel Closure	0	0.000	0		
Subtotal	0		0		
<b>2005 Fall (Sep-Dec)</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. (%)</b>	<b>95% C.I.</b>
<b>Port Group-Area Strata</b>					
Northern Maine	0	0.000	0		
Southern Maine	0	0.000	0		
New Hampshire	0	0.000	0		
North of Boston	0	0.000	0		
South of Boston	0	0.000	0		
South Of Cape Cod	0	0.000	0		
East Of Cape Cod	1 <sup>b</sup>	0.009	6	96.17	1 - 19.75
Offshore	0	0.000	0		
<b>Closure Strata</b>					
Northeast Closure	0	0.000	0		
Offshore Closure	0	0.000	0		
Midcoast Closure	0	0.000	0		
Mass Bay Closure	0	0.000	0		
South Cape Closure	0	0.000	0		
Subtotal	1		6	96.17	1 - 19.75
2005 Total <sup>d</sup>	3		35	67.80	3 - 87.32

<sup>a</sup> Observed take from haul equipped with pingers.

<sup>b</sup> Observed take from haul not equipped with pingers.

<sup>c</sup> A weighted bycatch rate (observed hauls with and without pingers were used to calculate a weighted bycatch rate)

<sup>d</sup> Totals recalculated for South of Cape Cod portname stratum due to moving Connecticut observed hauls from MA to NE for statistics of incidental takes

Table 10. 2005 New Jersey totals for observed trips, observed hauls, observed tons of fish landed, prorated dealer tons of fish landed, and percent observer coverage by season.

<b>2005 Winter</b>	<b>2005 State</b>	<b>Observed Trips</b>	<b>Observed Hauls</b>	<b>Observed Tons</b>	<b>Prorated Dealer Tons</b>	<b>Coverage (Tons) %</b>
Jan-Apr	New Jersey	18	58	23.86	746.88	3.19
<b>Total</b>		18	58	23.86	746.88	3.19

Table 11. 2005 mid-Atlantic harbor porpoise bycatch estimate.

<b>2005 Winter</b>	<b>2005 State</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. %</b>	<b>95% C.I.</b>
Jan-Apr	New Jersey	15	0.629	470	51.08	57.89 - 1002.77
<b>Total</b>		15		470	51.08	57.89 - 1002.77

Table 12. 2005 mid-Atlantic harbor seal bycatch estimate.

<b>2005 Winter</b>	<b>2005 State</b>	<b>Observed Takes</b>	<b>Bycatch Rate (Take/Ton)</b>	<b>Estimated Takes</b>	<b>C.V. %</b>	<b>95% C.I.</b>
Jan-Apr	New Jersey	2	0.084	63	67	2 - 157.35
<b>Total</b>		2		63	67	2 - 157.35

Figure 1. Location of 2005 observed hauls and VTR trips for New Jersey in the winter (Jan.–Apr.).

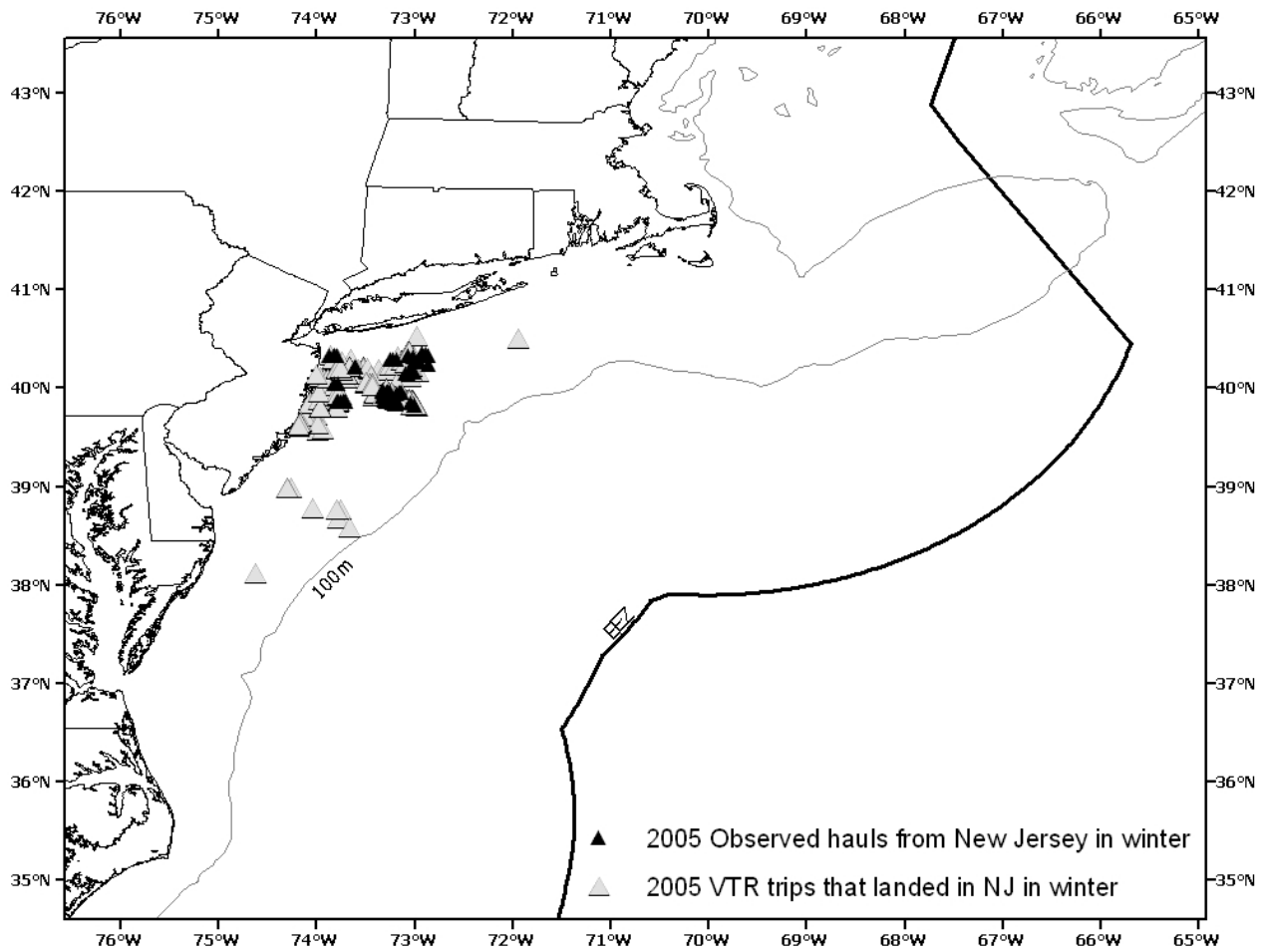
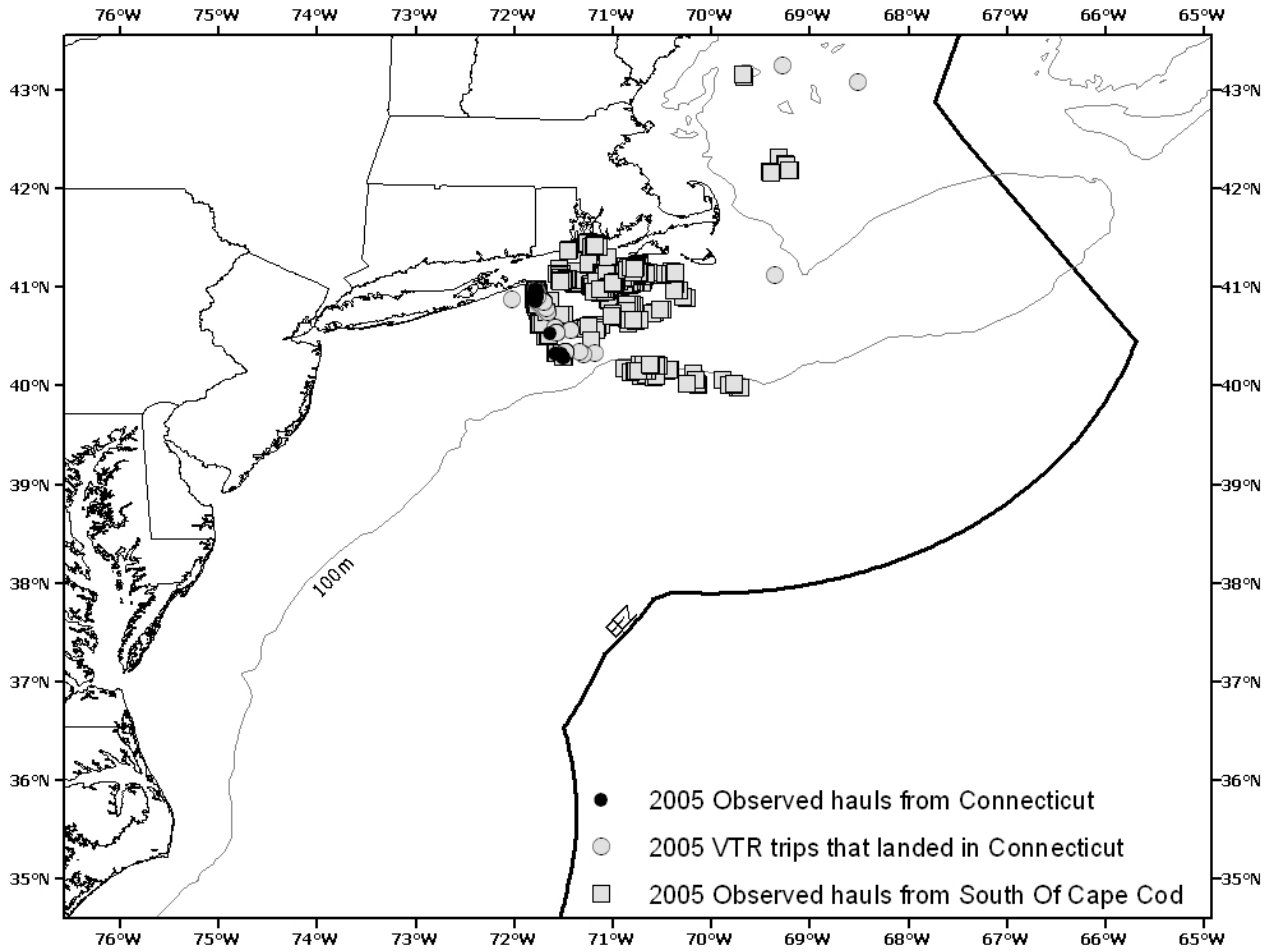


Figure 2. Location of all 2005 observed hauls from Connecticut and the South of Cape Cod port group and VTR trips from Connecticut.



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