

**Harbor Porpoise Bycatch
in the Northeast Multispecies Sink Gillnet Fishery
and the
Mid-Atlantic Coastal Gillnet Fishery
in 1998 and during January-May 1999**

by

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ABSTRACT

This report provides estimates of the bycatch of harbor porpoise (*Phocoena phocoena*) in USA Atlantic coast commercial sink/bottom gillnet fisheries in 1998 and during January through May 1999. The incidental coast-wide catch of harbor porpoise was estimated to be 778 animals in 1998 and 207 animals during January-May 1999. In the Northeast multispecies sink gillnet fishery, the estimated bycatch of harbor porpoise in 1998 was 332 animals (CV = 46%, 95% CI = 170-728) and 154 animals (CV= 42%, 95% CI =5-248) during January-May 1999. In the Mid-Atlantic coastal gillnet fishery, estimated bycatch in 1998 was 446 harbor porpoise (CV = 36 %, 95% CI = 294-894) and 53 harbor porpoise (CV = 54%, 95% CI = 3-106) in January-May 1999.

INTRODUCTION

The Harbor porpoise (*Phocoena phocoena*) is the most common cetacean species incidentally caught in commercial fishing gear off the northeastern coast of the United States, largely due to takes in gillnet fisheries. During 1993-1997, the average annual bycatch of harbor porpoise in USA gillnet fisheries was 1,519 animals, with 1,161 animals taken in the Northeast multispecies sink gillnet fishery and 358 in the Mid-Atlantic coastal gillnet fishery (Waring *et al.* 1999). This high annual take - relative to the Potential Biological Removal level (PBR = 483 animals) - led to the formation of Harbor Porpoise Take Reduction Teams in both the Gulf of Maine and Mid-Atlantic regions and the implementation of a Take Reduction Plan (TRP) on 1 December 1998. The major goal of the TRP is to reduce the bycatch of harbor porpoise to below PBR within six months after plan implementation. The TRP uses three general means to reduce incidental takes of harbor porpoise in gillnet fisheries: (1) complete gillnet fishery area closures; (2) partial gillnet fishery area closures which only allow fishing by gillnets equipped with acoustic deterrent devices ("pingers"); and (3) gear modifications.

The Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service (NMFS) has monitored harbor porpoise bycatch in USA Atlantic coastal sink/bottom gillnet fisheries since the early 1990s (Bravington and Bisack 1996; Bisack 1997; Waring *et al.* 1999). Bycatch estimates are developed by NEFSC staff and reviewed by the Atlantic Scientific Review Group during preparation of the annual *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Report* (SAR). Each SAR typically reports bycatch estimates that predate the publication of the SAR by two years (*e.g.*, the SAR published in 1998 reported bycatch estimates for 1996). However, the bycatch estimation process had to be accelerated in 1999 to evaluate whether the TRP met the six-month goal of reducing harbor porpoise bycatch to below PBR.

In this report, estimates are provided of harbor porpoise bycatch in 1998 and during January-May 1999. Separate estimates are presented for the Northeast multispecies sink gillnet fishery and for the Mid-Atlantic coastal gillnet fishery.

NORTHEAST MULTISPECIES SINK GILLNET FISHERY

The 1998 (January-December) and 1999 (January-May) estimates of harbor porpoise bycatch in the Northeast multispecies sink gillnet fishery were 332 (CV=46%, 95% CI=170-728) and 154 (CV=42%, 95% CI=5-248) animals, respectively. Table 1 summarizes the marine mammal time/area restrictions and closures in place in 1998 and 1999. Table 2 summarizes additional time/area restrictions in the multispecies fishery during 1999 implemented under Framework Adjustments 26 and 27 to the Northeast Multispecies Fishery Management Plan.

Methods

Methods used to estimate harbor porpoise bycatch in 1998 and 1999 were similar to those used to estimate bycatch in 1996 and 1997. Three databases were used: (1) the NEFSC Sea Sampling [Fishery Observer Program] database was used to estimate the average bycatch of harbor porpoise

per observed ton of fish caught; (2) the Northeast Dealer Report database was used to determine the total quantity (in weight) of all species landed in the Northeast multispecies sink gillnet fishery; and (3) the Northeast Vessel Trip Report (VTR) database was used to allocate (prorate) the sink gillnet landings in the Northeast Dealer Report database into spatially/temporally defined strata (season/port group or area/closures). These strata were defined by fishery characteristics and harbor porpoise migratory patterns. Due to changes in reporting requirements implemented in 1994, a port group stratification was developed as an alternative to the historical stratification of fish landings by Statistical Area. Port groups were defined by Bisack (1997) who reviewed the Northeast sink gillnet fishery characteristics and harbor porpoise migratory patterns. As harbor porpoise takes in some new areas beginning in 1997, two new area strata were to the analysis: (1) an East Cape Cod port group; and (2) an offshore area.

Observed sea sampling hauls were divided into two types: (1) hauls in which the gillnets were equipped with "pingers"; and (2) gillnet hauls without "pingers". The two data sets were then further categorized by season/port group-area/closure (Table 3). When a harbor porpoise take occurred in an area that was only open to fishing with pingered nets, only observed hauls with pingers were used to compute the bycatch rate. Observed hauls with pingers that occurred outside of 'pinger-only' areas were not included in the bycatch rate calculations for those areas. Occasionally a harbor porpoise is taken in a pingered net in an unregulated ('no pingers') area - and vice versa. In these cases, both pingered and nonpingered hauls were used to compute a weighted mean bycatch rate for the time/area stratum in which the take occurred. The weighted bycatch rate from the pooled hauls was then used to estimate the mortality. For example, during fall 1998, one harbor porpoise was observed taken in a net with an active pinger in the South Cape stratum where pingers were not required. Therefore, the pingered hauls from this stratum (n=6) were pooled with the non-pingered hauls (n=152). The mean harbor porpoise bycatch rate for the stratum was then weighted by the total hauls (n=158).

The Northeast dealer database is presently considered the most reliable source of information on the quantity of commercial fish landings. Since May 1994 however, the dealer database has lacked the spatial information (i.e. area fished) needed to determine where fish were caught in the ocean. The VTR database, which contains spatial information was therefor used to allocate the dealer landings by area. VTR information on month, latitude, longitude, port landed, and catch was utilized to prorate the sink gillnet landings recorded in the dealer database to the port group-area or closure strata used in estimating bycatch. The VTR landings data were grouped by month/port group-area/closure and then pooled by the season/port group-area strata. The seasonal proportion of fish landed was determined for each stratum and multiplied by the dealer reported landings from the same stratum (Table 4). Total harbor porpoise bycatch was estimated by multiplying the observed harbor porpoise bycatch rate for each stratum by the prorated dealer reported landings assigned to that stratum and then summing over strata. Bootstrapping techniques (Bravington and Bisack 1996) were used to compute coefficients of variation (CVs) and 95% confidence intervals (CIs) for each of the strata specific bycatch estimates.

Results

1998 Harbor Porpoise Bycatch

A total of eleven harbor porpoise were observed taken in the Northeast multispecies sink gillnet fishery during 1998 (Table 5). Seven were taken during the winter season, zero during the summer and four during the fall. Nine of the eleven animals were taken on nets without pingers (Figure 3). No observed takes occurred on pingered nets during the winter. Two animals were taken on pingered nets during the fall (Figure 4). One of these two pingered takes occurred in a stratum (South Cape) not closed or regulated by pingers.

The total annual bycatch of harbor porpoise taken in the 1998 sink gillnet fishery was 332 (CV=46%, 95 %CI=170-728) animals. Observed coverage of the commercial fishery was 3.5% and 5.7% during the winter and fall seasons, respectively. An estimated 240 (CV=55%, 95% CI=98-609) animals were killed during the winter and 92 (CV=89%, 95% CI=4-283) during the fall. Approximately twice as many tons of fish were landed during fall than winter. Winter accounted for the majority (240/332=72%) of the harbor porpoise takes, and during this season approximately half (47%) of the porpoises were caught in offshore waters. During the summer season, harbor porpoise are typically not in the region, therefore bycatch is negligible or zero.

1999 (January-May) Harbor Porpoise Bycatch

A total of five harbor porpoise were observed taken in the Northeast multispecies sink gillnet fishery during the winter (Jan-May) (Table 6). Four of the animals were taken on one trip, in 3 separate hauls, in nets fished without pingers in the unregulated offshore stratum (Figure 5). The remaining animal as was caught on a pingered net in the pinger regulated South Cape closure area (Figure 6).

The preliminary bycatch estimate of harbor porpoise caught in the fishery during January through May 1999 is 154 (CV=42%, 95% CI=5-248) animals. Observed coverage of the commercial fishery during this period was 2.8%. Approximately one quarter (1130/5360=21%) of the fish landings came from the offshore closure area where observer coverage was 3.4%. Another quarter (1240/5360=23%) of the fish landings came from the South cape area where observer coverage was less than 1%..

MID-ATLANTIC COASTAL GILLNET FISHERY

The 1998 and 1999 (January-May) harbor porpoise bycatch estimates for the Middle Atlantic coastal gillnet fishery were 446 (CV=36%, 95% CI=294-894) and 53 (CV=54%, 95% CI=3-106) animals, respectively. Gear restrictions and time and area closures implemented during 1999 are listed in Table 7.

METHODS

Methods used to estimate harbor porpoise bycatch in 1998 and 1999 were generally consistent with the methodology used to estimate bycatch in 1996 and 1997. However separate consideration was given to the two gillnet gear types (drift coastal gillnet and bottom coastal gillnet) observed in the Mid-Atlantic region.

Two sources of data were used to estimate harbor porpoise bycatch mortality in the Mid-Atlantic coastal gillnet fishery: 1) The NEFSC Sea Sampling [Fishery Observer Program] database was used to estimate the mean bycatch rate of harbor porpoise per observed ton of fish caught; (2) the Northeast Dealer Report database was used to determine the total quantity (in weight) of all species landed within the coastal gillnet fishery.

Prior to 1999, 50% of observed fishing trips were limited fish sampling trips (all hauls in a trip are observed for marine mammals). During 1999 the protocol used to in the Northeast multispecies sink gillnet fishery was applied to this fishery (i.e. 80% of all trips are limited fish sampling). Only limited fish sampling trips were used in the 1999 bycatch analysis. The 1998 analysis used both limited and complete sampling trips. Both the observer and dealer data sets were subdivided into strata defined by gear type, month, port, county and state. Observer coverage details of the Mid-Atlantic gillnet fisheries during 1998 and 1999 are provided in the Appendix.

Prior to 1998, two gillnet gear types (drift coastal gillnet and bottom coastal gillnet) were combined in estimating the mean bycatch rate of harbor porpoise in the Mid-Atlantic coastal gillnet fishery. Drift coastal gillnets have a smaller mesh size than bottom coastal gillnets and are typically utilized to catch mostly shad and menhaden. Bottom coastal gillnet catches are mostly mixed groundfish (primarily monkfish and dogfish). As the two gear types have different catch compositions and possibly different harbor porpoise bycatch rates, bycatch estimates were derived separately for each gear type.

Bycatch estimates are a product of the observed harbor porpoise bycatch rate multiplied by the dealer reported landings (within strata). Standard bootstrapping techniques were used to compute coefficients of variation and 95% confidence intervals for the bycatch estimates.

Results

1998 Harbor Porpoise Bycatch

A total of 51 observed harbor porpoise takes occurred in the Mid-Atlantic bottom coastal sink gillnet fishery in 1998 (Table 8). All of the takes occurred in two strata off the states of New Jersey and Maryland. Off the coast of New Jersey, 47 harbor porpoise were taken between February and May, and one in December. Three animals were caught off the coast of Maryland in February and March (Figure 8). No harbor porpoise takes were observed in the drift coastal gillnet fishery (Figure 9).

The total annual bycatch estimate of harbor porpoise by the bottom coastal sink gillnet fishery was 446 (CV=36%, 95% CI=294-894). Coverage of this fishery during the first quarter within Ocean county New Jersey and Worcester county Maryland was 14% and 13, respectively (see Appendix). An estimate of 416 animals were taken by fishing effort that came from the state of New Jersey. An estimate of 30 animals were taken by fishing effort that came from the state of Maryland. Only 18% of the effort (tons of fish) from Ocean County New Jersey was landed during the first quarter of the year. This is when the harbor porpoise bycatch occurred. In contrast, 69% of the fishing effort from Worcester county Maryland was landed during the first quarter, also when the harbor porpoise bycatch occurred.

1999 (January-May) Harbor Porpoise Bycatch

In contrast to the 1998 analysis, all the observed harbor porpoise (3) were taken by the drift coastal gillnet fishery (Table 9). No harbor porpoise were observed taken within the bottom coastal sink gillnet fishery (Figure 10). All the animals were taken from one strata, Worcester county Maryland, during the month of March (Figure 11).

The total annual (through May) bycatch estimate of Harbor Porpoise by the drift coastal gillnet fishery was 53 (CV=54%, 95% C.=3-106). Coverage of this fishery during the first quarter within Worcester county Maryland was 5%.

LITERATURE CITED

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Table 1. Marine mammal time and area closures and restrictions for the Northeast multispecies sink gillnet fishery during 1998 and 1999.

1998*	Pingers Required	1999*	Pingers Required
Northeast August 15 - September 13	N (Complete Closure)	Northeast August 15-September 13	N (Complete Closure)
Midcoast March 25 - April 25, September 15 - December 31	Y Y	Midcoast September 15 - May 31, 2000	Y
Mass Bay March 1- March 30 December 1 - 31	N (Complete Closure) Y	Mass Bay January 1 - May 31 Except March 1-31	Y N (Complete Closure)
South Cape March 1- March 30 December 1 - 31	N (Complete Closure) Y	South Cape January 1 - May 31 Except March 1-31	Y N (Complete Closure)
Offshore December 1-31	Y	Offshore January 1- May 31 November 1 - December 31	Y Y
Cashes Ledge December 1 - 31	Y	Cashes Ledge January 1 - May 31 Except February 1 -28/29 November 1 - December 31	Y N (Complete Closure) Y

* See Figure 1 for map of closure areas.

Table 2. Fishery related time/area closures in effect during the last four months of the 1998 fishing year (January 1, 1999-April 30, 1999) and the 1999 fishing year (May 1, 1999-April 30, 2000), implemented under Frameworks 26 and 27 to the Northeast Multispecies Fisheries Management Plan.

Closure Area *	Time Period
GM2 and GM3a	May 1-May 31, 1999
GM2	April 1-April 30, 2000
GM3b	May 1-June 30, 1999
GM4	June 1-June 30, 1999
Cashes Ledge	July 1-Oct 31, 1999
MB1	February 1-29, 1999 Oct 1-Nov 30, 1999 March 1-April 30, 2000
GM1	February 1-29, 1999 March 1-April 30, 2000
Inshore Closure Areas I and II	April 1- 30, 1999
WGOM	Year Round

* See Figure 2 for map of closure areas.

Table 3: Port group-areas closure stratification used to estimate harbor porpoise bycatch in the Northeast multispecies sink gillnet fishery.

	1998	1999
	Winter/Summer/Fall	Winter/Summer/Fall
Port Group-Area	Northern Maine	Northern Maine
	Southern Maine	Southern Maine
	New Hampshire	New Hampshire
	North of Boston	North of Boston
	South of Boston	South of Boston
	South of Cape Cod	South of Cape Cod
	East of Cape Cod	East of Cape Cod
	Offshore Area	Offshore Area*
Closures**	Northeast	Northeast
	Midcoast	Midcoast
	Mass Bay	Mass Bay
	South Cape	South Cape
	-	Offshore
	-	Cashes Ledge
	Cape Cod Bay	Cape Cod Bay
	Great South Channel	Great South Channel

* Represents the area outside of the offshore closure boundaries.

**See Figure 1 for location of these closures.

Table 4. The 1998 and 1999 dealer reported fish landings (tons) and vessel trip report (VTR) effort allocation percentages by season/port group-area/closure. Only the seasons where harbor porpoise takes were observed are present.

% VTR Landings In Each Stratum Associated With The Port Group - Area								
Season	Port Group-Area	Total Dealer Reported Landings (Tons)	Port Group - Area (within itself)	Midcoast Closure	Mass Bay Closure	South Cape Closure	Offshore Area	Total Percentage within Port Group-Area
1998 Winter	N. Maine	34	1.0					1.0
	S. Maine	319	.14	.01			.85	1.0
	New Hampshire	638	.35	.14			.51	1.0
	N. Boston	1334	.60	.03	.00		.37	1.0
	S. Boston	615	.99	.00	.00		.01	1.0
	E. Cape Cod	380	.96				.04	1.0
	S. Cape Cod	1294	.98				.00	.02
1998 Fall	N. Maine	.12	1.0					1.0
	S. Maine	434	.21	.08			.71	1.0
	New Hampshire	889	.16	.49			.35	1.0
	N. Boston	2465	.49	.31			.20	1.0
	S. Boston	1209	.90	.00			.10	1.0
	E. Cape Cod	1894	.99				.01	1.0
	S. Cape Cod	1560	.97				.03	1.0

Table 4 (continued).

Season	Port Group-Area	Total Dealer Reported Landings (Tons)	Port Group-Area (within itself)	Midcoast Closure	Mass Bay Closure	South Cape Closure	Offshore Area	Offshore Closure	Cashes Ledge Closure	Great South Channel	Total Percentage within Port Group-Area
1999 Winter	N. Maine	36	.38				.12	.50			1.0
	S. Maine	435	<.01				.60	.40			1.0
	New Hampshire	517	<.01	.11			.06	.80	.03		1.0
	N. Boston	1124	.32	.10	.05		.07	.46			1.0
	S. Boston	382	.74	<.01	.25			.01			1.0
	E. Cape Cod	858	.97							.03	1.0
	S. Cape Cod	2008	.62			.38					1.0

Table 5. 1998 harbor porpoise bycatch estimates for the Northeast multispecies sink gillnet fishery by season/port group-area/closure.

Winter (Jan-May)	Observed Tons	Prorated Dealer Tons	Coverage (Tons) %	Observed Takes	Bycatch Rate (Takes/Ton)	Estimated Takes	C.V.	95% C.I.
Port Group Strata								
Northern Maine	-	33.80	0.00	-	-	-		
Southern Maine	-	43.68	0.00	-	-	-		
New Hampshire	4.08	221.74	1.84	0	0.000	0		
North of Boston	38.59	798.43	4.83	2	0.052	41	75%	0-114
South of Boston	39.66	608.41	6.52	1	0.025	15	104%	0-54
South Cape	37.14	1273.28	2.92	2	0.054	69	64%	0-158
East Cape	21.09	365.11	5.78	0	0.000	0		
Offshore Area	19.41	1113.64	1.74	2	0.103	115	103%	0-459
Closure Strata								
Midcoast Closure	1.25	135.48(135.43) ^b	0.92	0	0.000	0		
Mass Bay Closure	-	7.36	0.00	-	-	-		
Cape Cod Bay Closure	-	0.00	-	-	-	-		
South Cape Closure	-	0.81	0.00	-	-	-		
Great S. Channel Closure	-	13.12	0.00	-	-	-		
Subtotal	161.21	4614.86	3.49	7		240	55%	98-609
Summer (Jun-Aug)								
Port Group Strata								
Northern Maine	0.93	206.99	0.45	0	0.000	0		
Southern Maine	-	368.49	0.00	-	-	-		
New Hampshire	50.85	1104.49	4.60	0	0.000	0		
North of Boston	68.88	3418.71	2.01	0	0.000	0		
South of Boston	51.34	1359.85	3.78	0	0.000	0		
South Cape	30.33	645.90	4.70	0	0.000	0		
East Cape	43.37	1265.66	3.43	0	0.000	0		
Offshore Area	8.04	1475.50	0.54	0	0.000	0		
Closure Strata								
Northeast Closure	-	-	-	-	-	-		
Great S. Channel Closure	-	21.57	0.00	-	-	-		
Subtotal	253.73	9867.16	2.57	0	0.00	0.00		

Fall (Sep-Dec)	Observed Tons	Prorated Dealer Tons	Coverage (Tons)%	Observed Takes	Bycatch Rate Take/Ton	Estimated Takes	C.V.	95% C.I.
Port Group Strata								
Northern Maine	-	0.12	0.00	-	-	-		
Southern Maine	0.28	91.34	0.30	0	0.000	0		
New Hampshire	12.71	146.48	8.67	2	0.157	23	102%	0-92
North of Boston	122.76	1197.12(1196.6)a	10.25	0	0.000	0		
South of Boston	57.25	1086.63	5.27	0	0.000	0		
South Cape	95.52	1512.93(1511.85)a	6.31	0 (1) ^c	0 (0.035) ^e	53	104%	1-202
East Cape	105.25	1880.55	5.60	0	0.000	0		
Offshore Area	12.82	1280.55	1.00	0	0.000	0		
Closure Strata								
Midcoast Closure	77.52	1255.64(1251.83)b	6.17	(1) ^c	(0.013) ^d	16	103%	0-58
Subtotal	484.10	8451.36	5.73	4		92	89%	4-283
1998 Total				11		332	46%	170-728

^a Dealer tons landed with sea sampled landings from pingered hauls removed.

^b Dealer tons landed with sea sampled landings from non-pingered hauls removed.

^c Takes from hauls with active pingers.

^d Take per ton for pingered hauls only.

^e Weighted bycatch rate applied to fall South Cape stratum (both pingered, n=6, and nonpingered, n=152, hauls combined).

Table 6. 1999 Winter (January-May)* harbor porpoise bycatch estimates for the Northeast multispecies sink gillnet fishery by season/port group-area/closure.

Winter (Jan-May)	Observed Tons	Dealer Tons	Coverage (Tons)%	Observed Takes	Bycatch Rate Take/Ton	Estimated Takes	95% C.V.	95% C.I.
Port Group-Area								
Northern Maine	-	13.69	-	-	-	-		
Southern Maine	-	0.16	-	-	-	-		
New Hampshire	0.01	2.18	0.00	0	0.000	0		
North of Boston	23.76	359.52	6.61	0	0.000	0		
South of Boston	19.75	282.87	6.98	0	0.000	0		
South Cape	3.26	1239.95	0.00	0	0.000	0		
East Cape	26.12	831.86	3.14	0	0.000	0		
Offshore Area	7.32	371.36	1.97	4	0.077 ^c	117	45.00%	4-137
Closure Strata								
Offshore Closure	38.54	1130.46	3.41	0	0.000	0		
Cashes Ledge Closure	1.18	16.68	7.08	0	0.000	0		
Midcoast Closure	1.49	163.02	0.91	0	0.000	0		
Mass Bay Closure	8.88	154.27	5.75	0	0.00	0		
Cape Cod Bay Closure	-	0.00	-	-	-	-		
South Cape Closure	22.11	768.21	2.88	1 ^e	0.05 ^d	38	99.00%	1-127
Great S. Channel Closure	0.57	26.19	2.17	-	-	-		
Subtotal	152.42	5360.42	2.84	5		154	42.00%	5-248

^c Takes from hauls with active pingers.

^d Take per ton for pingered hauls only.

^e Weighted bycatch rate applied to one pooled offshore stratum (offshore area+offshore and cashes ledge closures combined equal the pooled offshore stratum).

* An estimate for the first quarter of 1999 (Jan.-Apr.) was also produced to meet the requirements of a civil action against the NMFS. The first quarter estimate of harbor porpoise bycatch = 104 animals.

Table 7. Marine mammal gear restrictions and time and area closures in place for the Mid-Atlantic coastal gillnet fishery during 1999.

Area ¹	Time	Mesh Size Restrictions
Mudhole	February 15-March 15	Closed to all large ² and small ³ mesh gillnets.
New Jersey	January 1-April 30	Large and small mesh gillnets allowed.
	April 1-20	Closed to all large mesh gillnets.
Southern Mid-Atlantic	February 1-April 30	Large and small mesh gillnets allowed.
	February 15-March 15	Closed to all large mesh gillnets.

¹ See Figure 7 for map of these areas.

² Large mesh is defined as mesh ≥ 7.0 inches.

³ Small mesh is defined as mesh ≥ 5.0 inches and < 7.0 inches.

Table 8. 1998 harbor porpoise bycatch estimates for the Mid-Atlantic coastal sink gillnet fishery by port, county state, and month.

Port	County	State	Month	Observed Tons	Dealer Tons	Coverage (Tons) %	Observed Takes	Bycatch Rate Take/Ton	Estimated Takes	C.V.	95% C.I.
Ocean City	Worcester	MD	Feb-Mar ^a	62	621	0.10	3	0.048	30	74%	3-87
Pt. Pleasant	Ocean	NJ	Feb-Apr ^b	58	480	0.12	46	0.796	382	23%	234-581
Pt. Pleasant	Ocean	NJ	May	27	222	0.12	1	0.037	8	96%	1-27
Pt. Pleasant	Ocean	NJ	Dec	7	184	0.04	1	0.143	26	482%	1-427
Total								51	446	36%	294-894

^a Months February and March were pooled after a chi-square analysis showed no significant difference among the harbor porpoise bycatch rates for these months.

^b Months February through April were pooled after a chi-square analysis showed no significant difference among the harbor porpoise bycatch rates for these months.

Table 9. The 1999 (Jan-May) harbor porpoise bycatch estimates for the Mid-Atlantic drift coastal gillnet fishery by port, county, state, and month.

Port	County	State	Month	Observed Tons	Dealer Tons	Coverage (Tons)%	Observed Takes	Bycatch Rate Take/Ton	Estimated Takes	C.V.	95% C.I.
Ocean City	Worcester	MD	Mar.	1	16	6.34	3	3.359	53	54%	3-106
Total							3	Total	53	54%	3-106

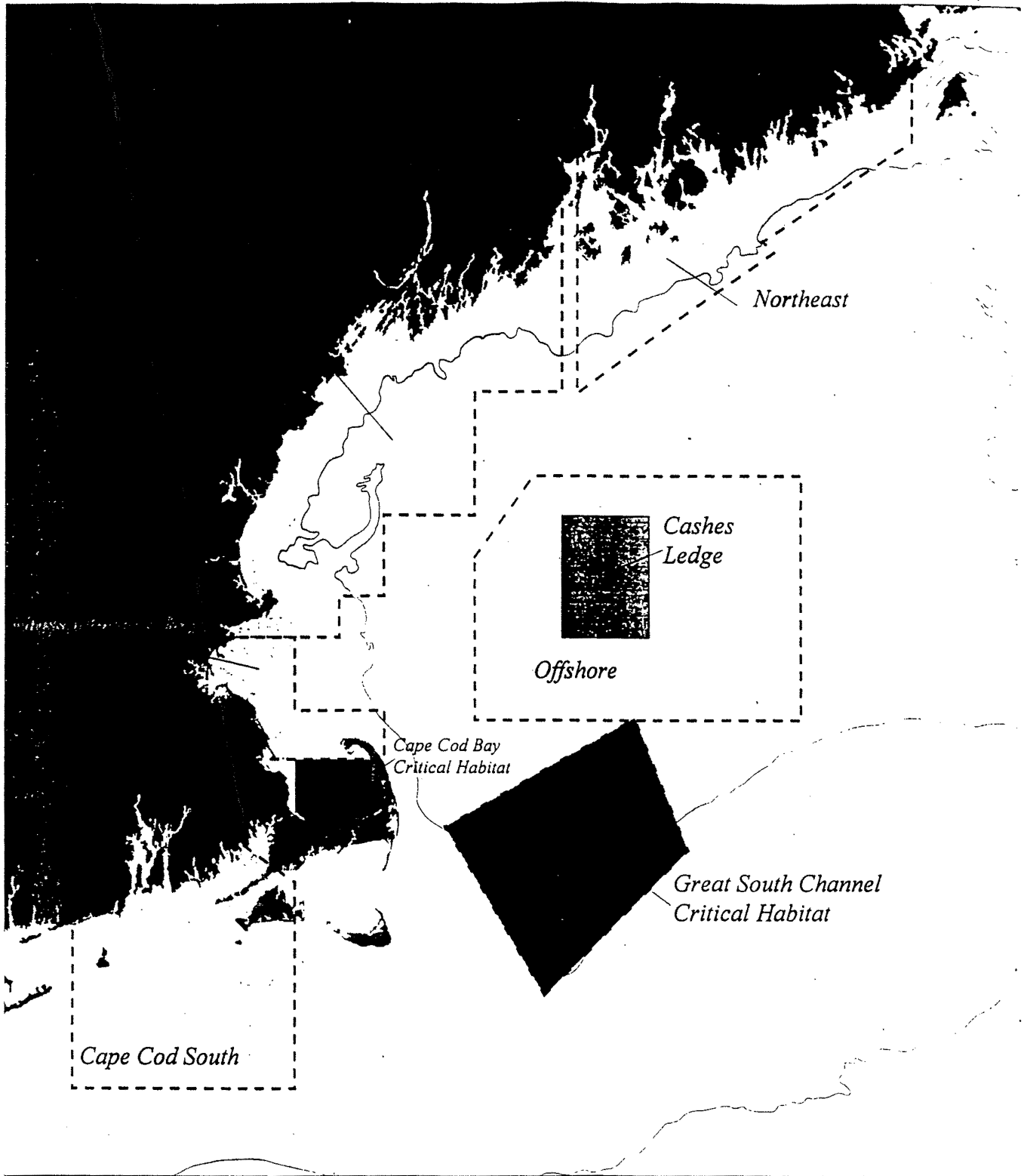


Figure 1. Marine mammal closure areas in effect under the Harbor Porpoise Take Reduction Plan (HPTRP).

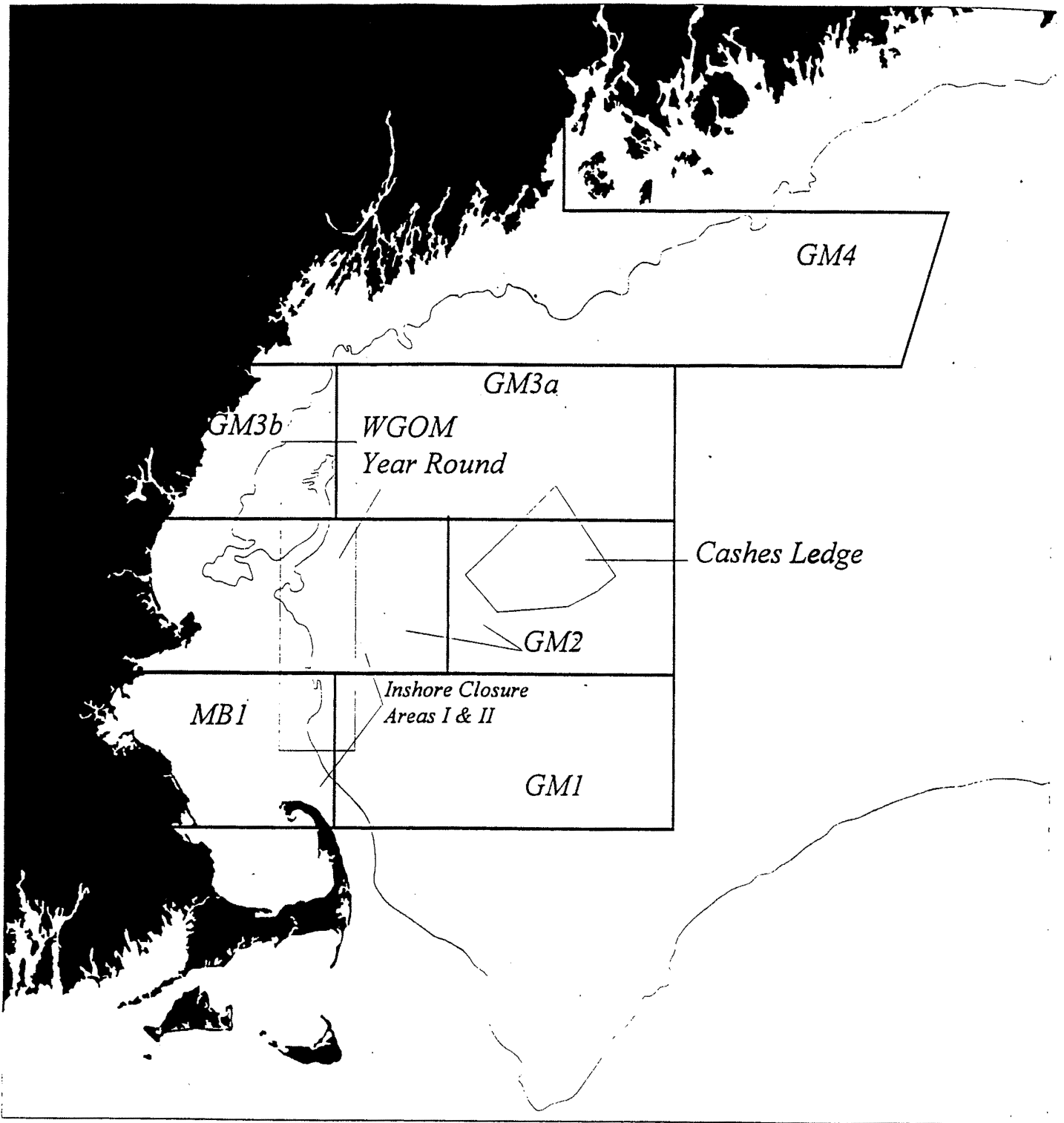


Figure 2. Fishery related time and area closures in effect from January 1 - December 31, 1999, implemented under Frameworks 26 and 27 to the Northeast Multispecies Fishery Management Plan.

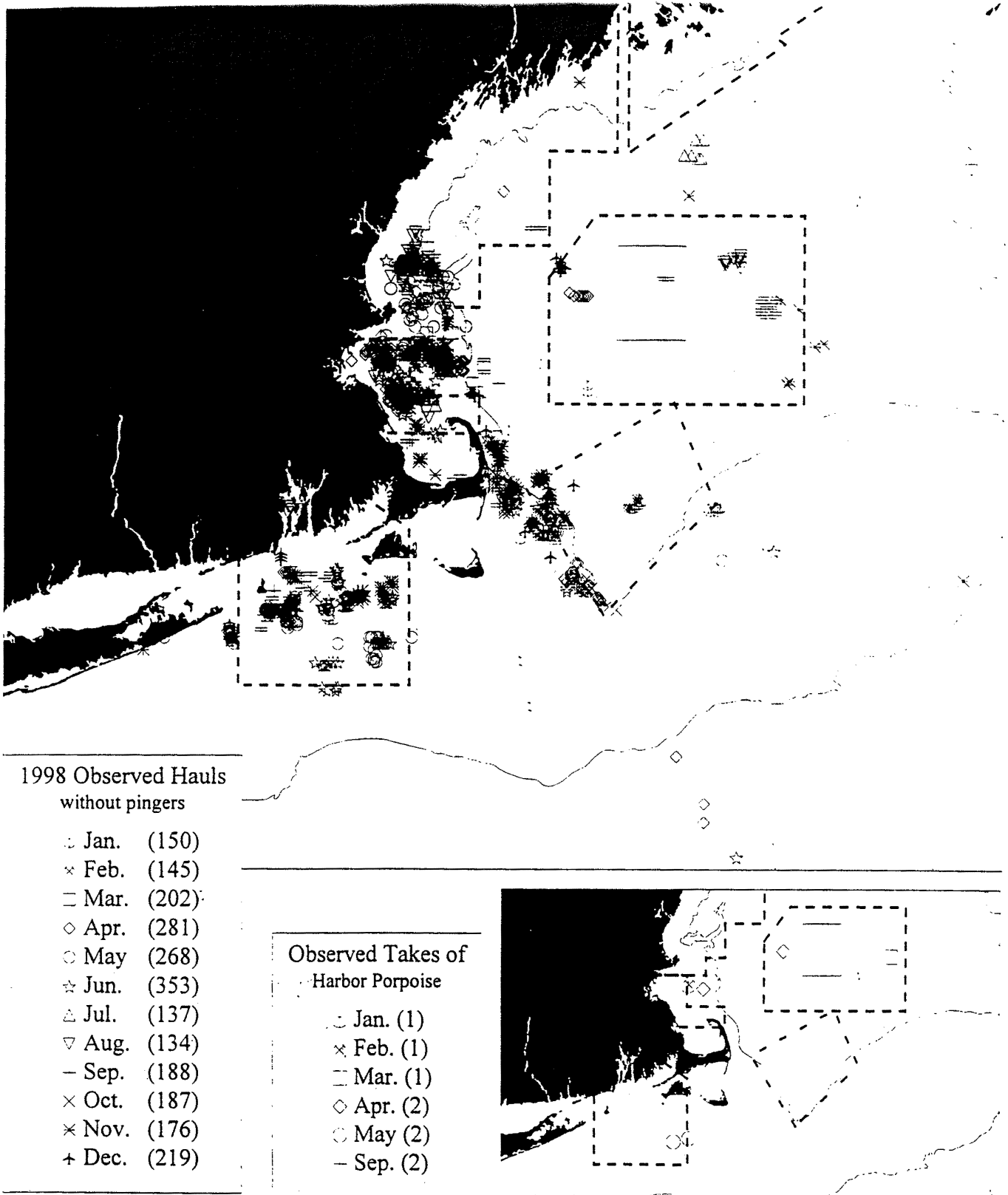


Figure 3. Observed Northeast multispecies sink gillnet fishery hauls and harbor porpoise takes without active marine mammal devices (pingers) during the 1998 NEFSC Fisheries Sea Sampling Program.

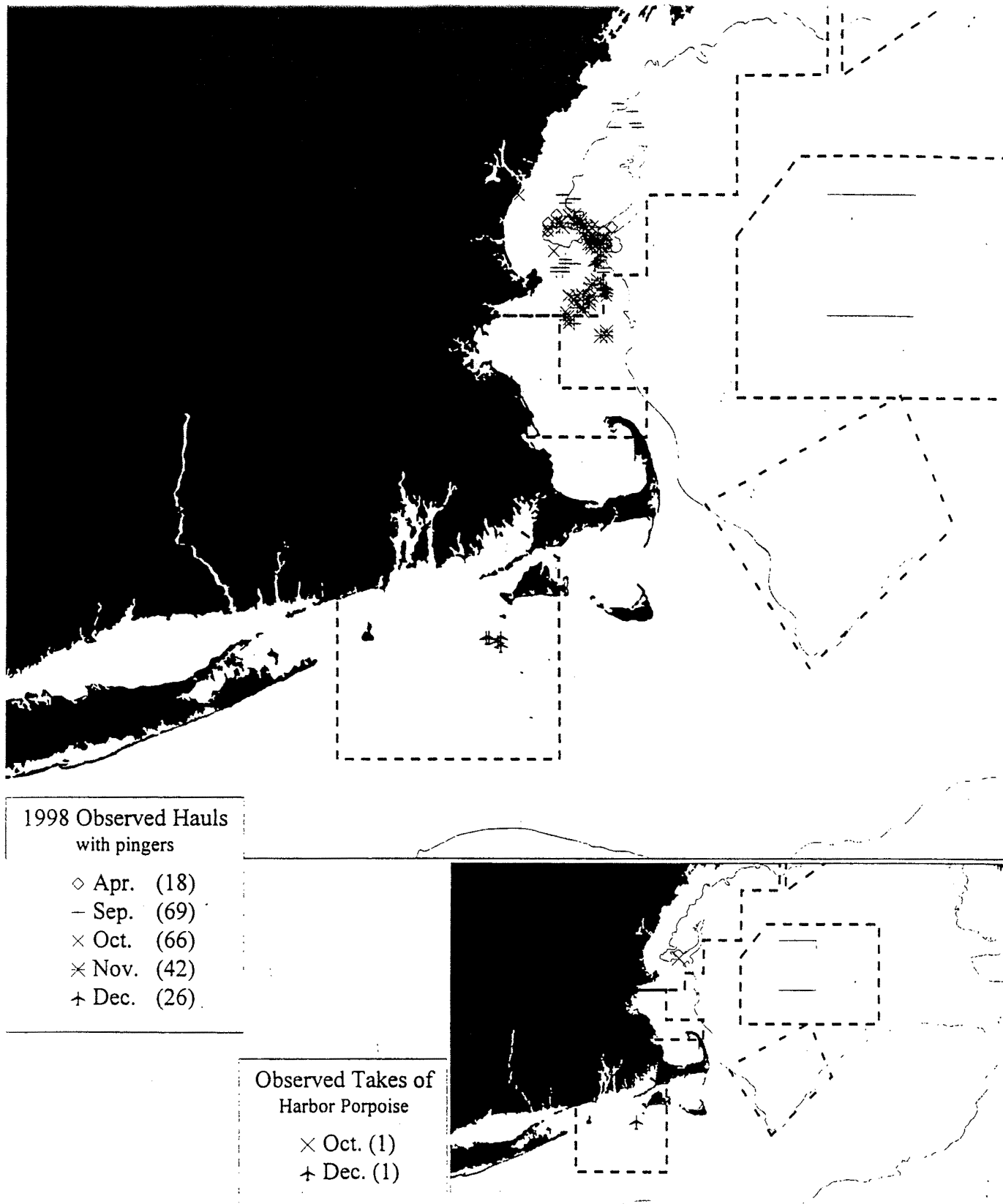


Figure 4. Observed Northeast multispecies sink gillnet fishery hauls and harbor porpoise takes with active marine mammal devices (pingers) during the 1998 NEFSC Fisheries Sea Sampling Program.

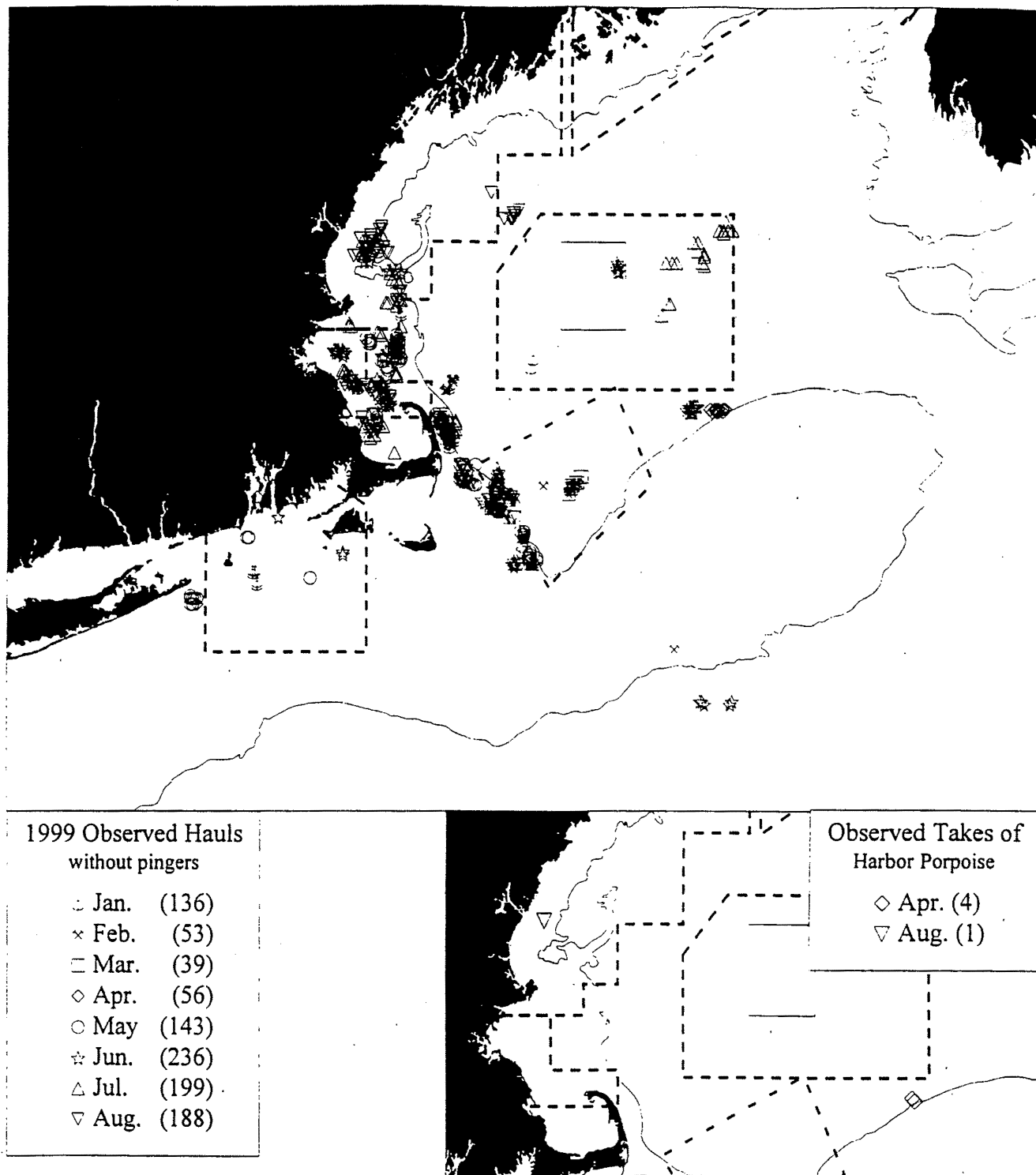


Figure 5. Observed Northeast multispecies sink gillnet fishery hauls and harbor porpoise takes without active marine mammal devices (pingers) during the 1999 NEFSC Fisheries Sea Sampling Program.

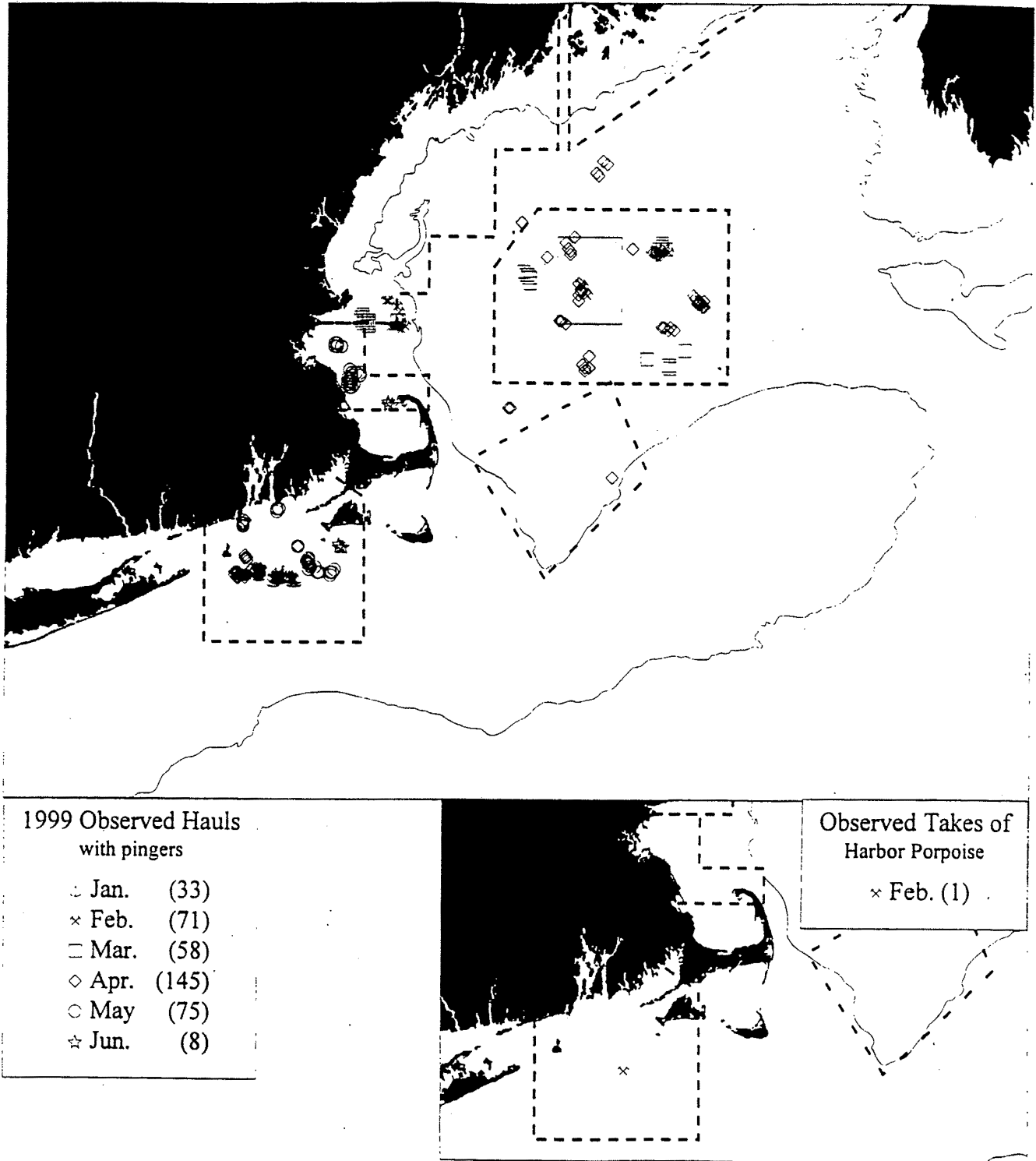


Figure 6. Observed Northeast multispecies sink gillnet fishery hauls and harbor porpoise takes with active marine mammal devices (pingers) during the 1999 NEFSC Fisheries Sea Sampling Program.

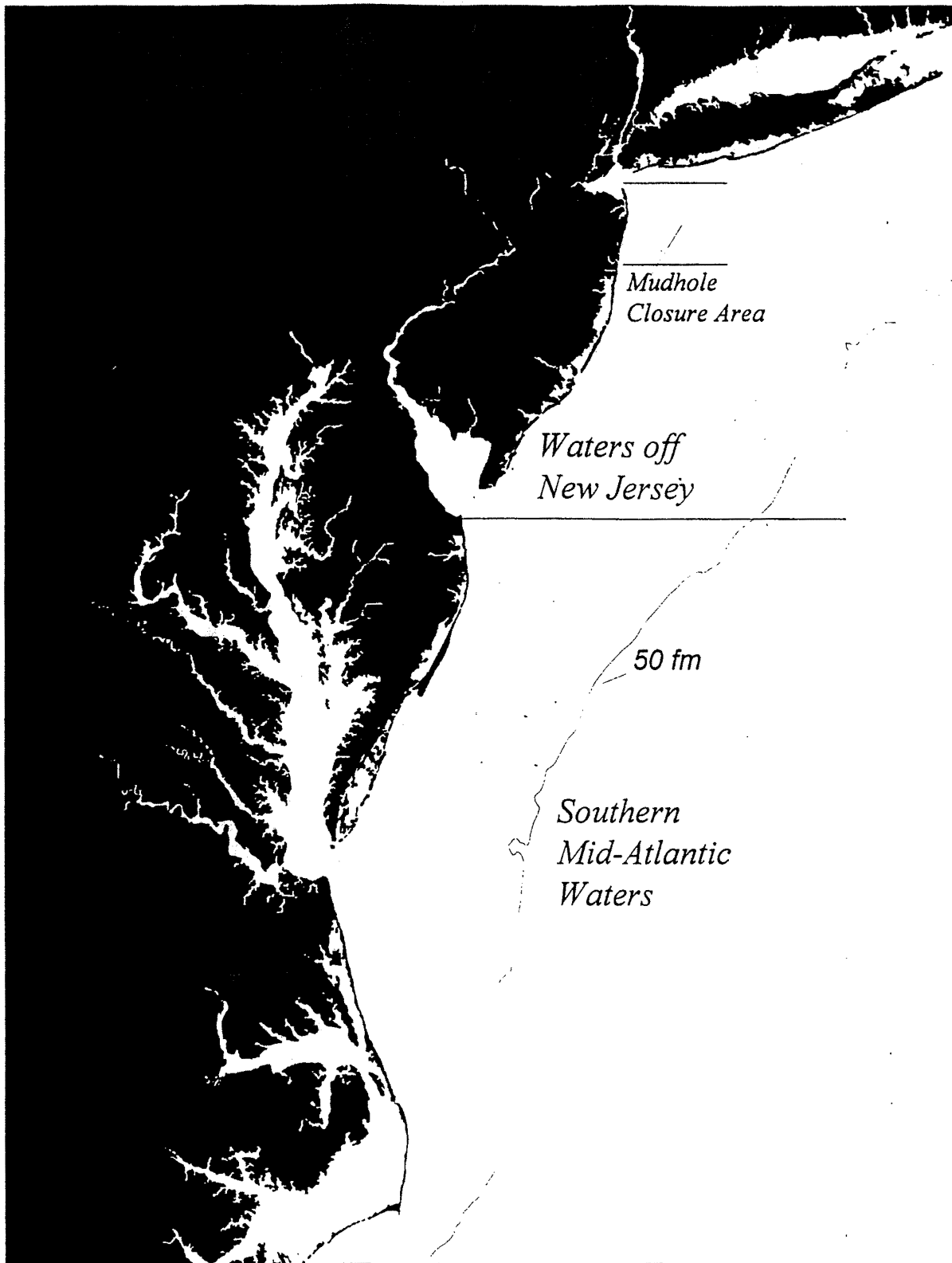


Figure 7. Marine mammal closures in effect in the Mid-Atlantic region under the Harbor Porpoise Take Reduction Plan (HPTRP).

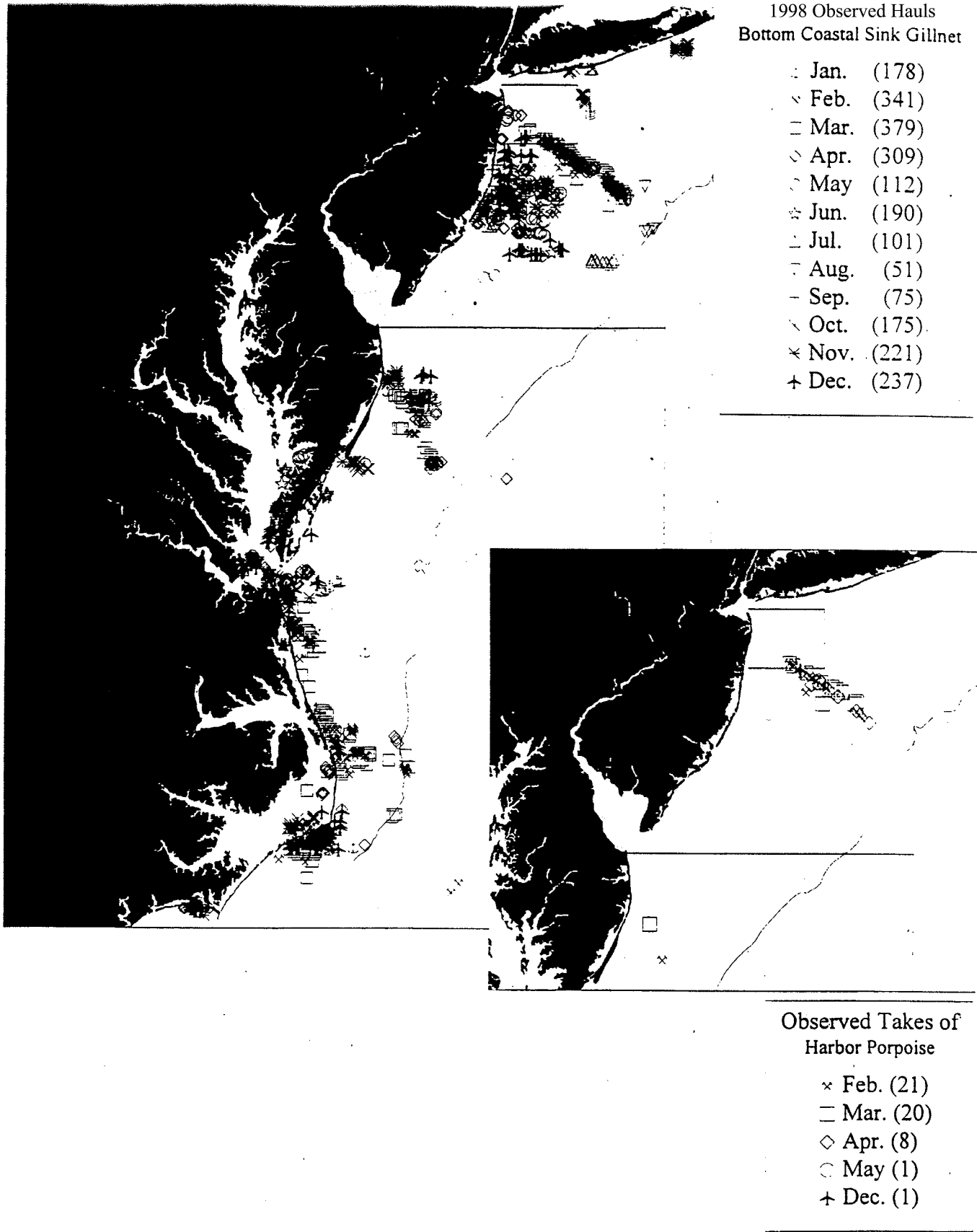


Figure 8. Observed Mid-Atlantic bottom coastal sink gillnet fishery hauls and harbor porpoise takes during the 1998 NEFSC Fisheries Sea Sampling Program.

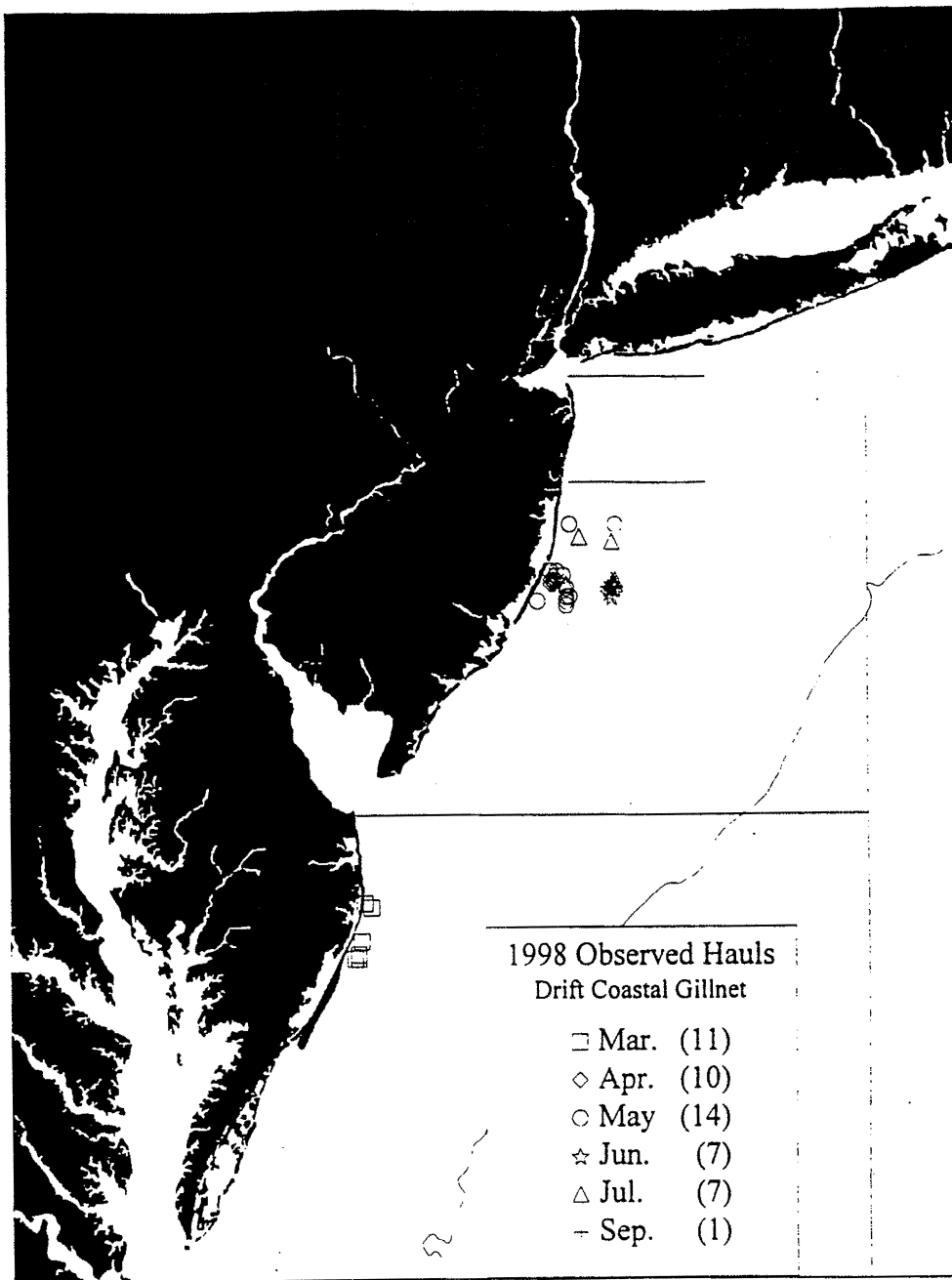


Figure 9. Observed Mid-Atlantic drift coastal gillnet fishery hauls during the 1998 NEFSC Fisheries Sea Sampling Program. No harbor porpoise takes were observed.

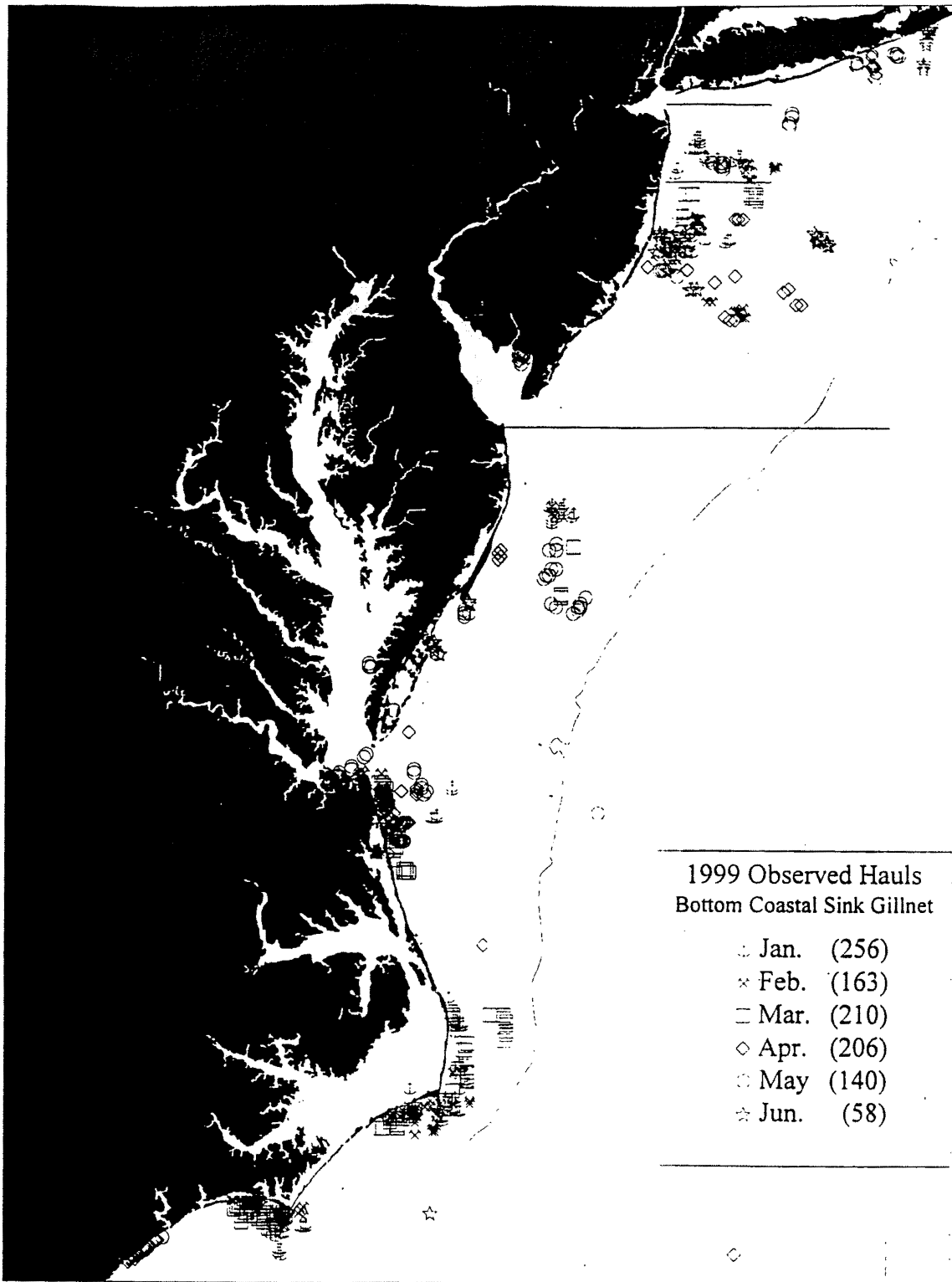


Figure 10. Observed Mid-Atlantic bottom coastal sink gillnet fishery hauls during the 1999 NEFSC Fisheries Sea Sampling Program. No harbor porpoise takes were observed.

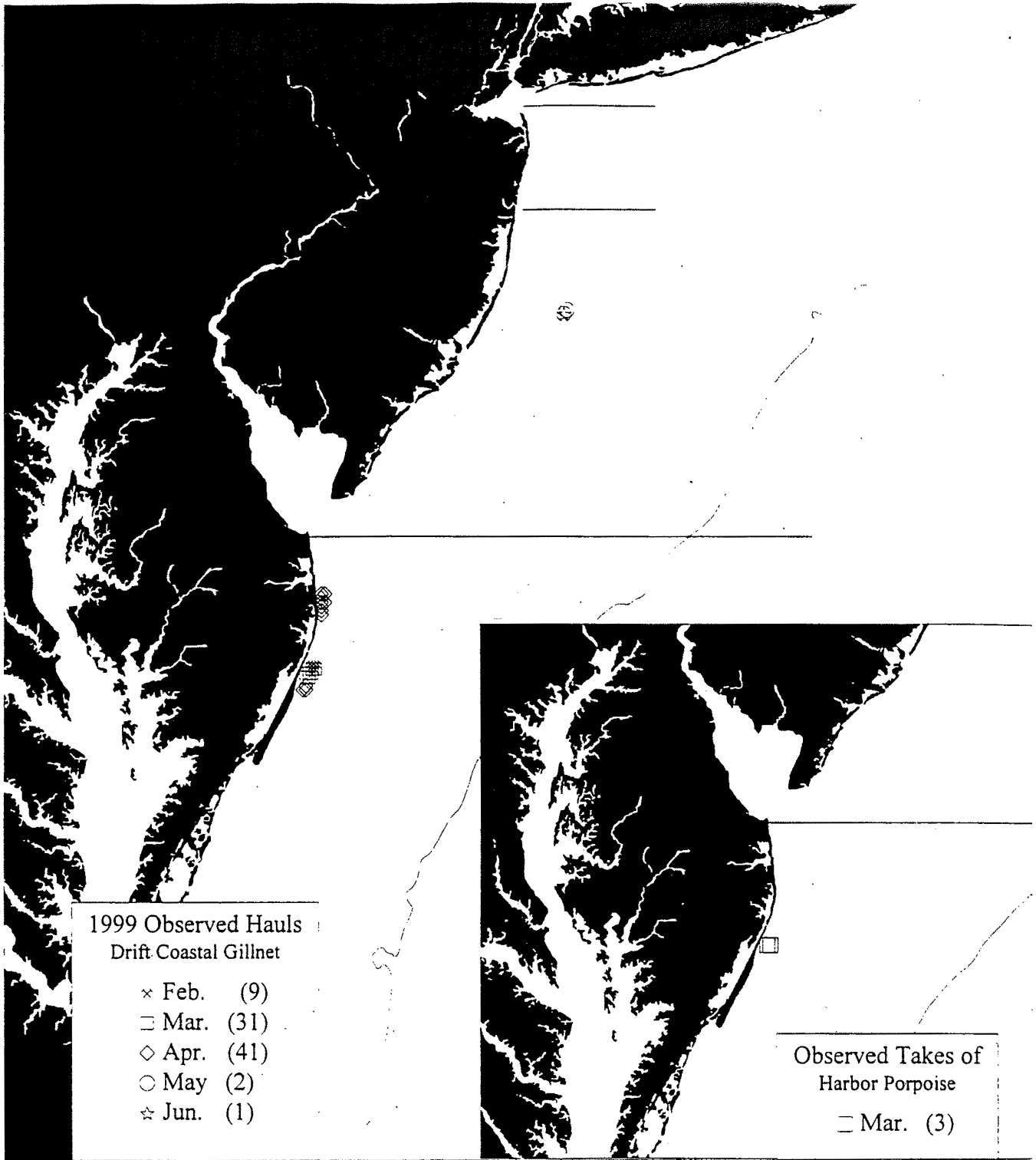


Figure 11. Observed Mid-Atlantic drift coastal gillnet fishery hauls and harbor porpoise takes during the 1999 (Jan.-Jun.) NEFSC Fisheries Sea Sampling Program.

NEFSC fisheries sea sampling program coverage of the 1998 Mid-Atlantic bottom coastal gillnet fishery and the 1999 (Jan.-Apr.) drift coastal gillnet fishery.

NEFSC Fisheries Sea Sampling program coverage of the 1998 Mid-Atlantic coastal gillnet fishery.

State	County	Month	1998	1999	1999		
Connecticut	New London	1	21.40				
		2	8.06				
		4	1.79				
		5	35.05				
		6	17.05				
		7	3.95				
		10	3.23				
		11	13.12				
		12	2.44				
		Maryland	Worcester	1	317.26	61.46	0.19
				2	180.10	14.68	0.08
				3	440.99	47.74	0.11
4	159.97			17.37	0.11		
5	178.30						
6	37.17						
7	37.37						
8	0.16						
9	0.04						
10	3.18						
11	102.89			5.67	0.06		
12	142.45			6.90	0.05		
	St. Marvs	1					
		2					
		3					
		11					
		12					
			Charles	1			
2							
3							
11							
12							
New Jersey	Atlantic			2			
		3					
		4					
		5	10.37				
		10	4.21				
		11	1.67				
	Cape May	1	9.98				
		2	2.67				
		3	3.71				
		4	13.02				
		5	33.94				
		6	30.32				
	Cumberland	7	0.02				
		9	1.22				
		10					
		11	17.30				
		12	34.86				
			Essex	3			
4	42.64						
5							
3							
Ocean	Essex			1	278.57	19.09	0.07
				2	192.90	35.59	0.18
		3	72.48	20.63	0.28		
		4	214.87	32.13	0.15		
		5	222.18	44.76	0.20		
		6	154.49	13.40	0.09		
		7	19.89	5.58	0.28		
		8	7.93	4.15	0.52		
		9	23.07	3.59	0.16		
		10	190.82	29.39	0.15		
		11	693.47	11.21	0.02		
		12	644.45	51.06	0.08		

	Salem	4			
New York	Kings	4			
		10	2.21		
	Nassau	4	4.36		
		5	3.75		
		6	3.42		
		7	2.09		
		8	6.37		
		9	25.25		
		10	3.88		
		11	0.30		
	Rockland	unknown			
	Suffolk	1	8.70	1.64	0.19
		2	1.67		
		3	1.43		
		4	61.53		
		5	439.76		
		6	363.86		
		7	123.54	0.03	0.00
		8	87.21		
		9	116.10		
		10	112.19	6.99	0.06
		11	179.25	2.56	0.01
		12	70.51		
		unknown			
	Westchester	unknown			
North Carolina	Beaufort	11	0.11		
	Brunswick	10		2.87	
		11		3.07	
	Carteret	1	0.91		
		2			
		3	23.80	1.52	0.06
		4	10.19	1.63	0.16
		5	8.10		
		6	1.79		
		7	1.21	0.38	0.32
		8	3.23	0.44	0.14
		9	5.01	0.30	0.06
		10	20.30	0.35	0.02
		11	2.46	0.70	0.28
		12		1.80	
	Cumberland	11		0.05	
	Currituck	12		0.04	
	Dare	1	344.71	20.17	0.06
		2	627.78	55.38	0.09
		3	1092.19	56.35	0.05
		4	4012.47	11.98	0.00
		5	77.32	0.60	0.01
		6	23.62		
		7	9.99		
		8	10.00	0.20	0.02
		9	16.43	0.05	0.00
		10	135.46	1.52	0.01
		11	51.81	5.98	0.12
		12	150.55	17.94	0.12
	Hyde	1	36.85		
		2	98.45		
		3	56.42	1.21	0.02
		4	0.58	5.68	9.72
		5	2.46	1.97	0.80
		6	0.23		
		7			
		8	0.12		
		9	5.14		
		10	29.52	0.46	0.02
		11	38.76	1.05	0.03
		12	12.71	0.43	0.03
	Onslow	4		0.63	
		11		0.52	
	Pamlico	1			

		2			
		3			
		4	0.08		
		8	0.03		
		10	0.13		
		11	0.00		
		12	0.00		
Virginia	Accomac	1	63.24		
		2	46.46		
		3	54.55		
		4	45.08		
		5	276.41	3.29	0.01
		6	51.04	16.06	0.31
		7	4.61	-1.89	0.41
		8	4.02		
		9	5.27		
		10	4.11	1.69	0.41
		11	38.98	0.61	0.02
		12	123.48	0.16	0.00
	Charles City	3			
		4			
	Newport News	1			
		2	0.03		
		3			
		4	0.61		
		5			
		6	0.00		
		7	0.27		
		8	0.53		
		9	0.30		
		10	0.08		
		11	0.12		
		12	0.27		
	Norfolk	1		5.94	
		2		0.11	
		3	0.01		
		4	0.04	3.93	106.32
		5	0.77	0.18	0.23
		6	0.02	1.36	61.90
		7	0.09	0.18	2.06
		8	0.20		
		9	0.43	0.59	1.37
		10	0.13		
		11	0.00	5.44	5436.50
		12		0.34	
	Portsmouth	1			
		2			
		3			
		4	0.05		
		5	0.40		
		6			
		7			
		8	0.03		
		9			
		10			
		11			
		12			
	Essex	1	0.01		
		3			
		4			
		5			
		9	0.01		
		10	0.01		
		11			
		12			
	Chesapeake	11	0.05		
	Fairfax	10			
		11			
	Hampton	1			
		2			

		3	0.02		
		4	4.79		
		5	2.06	0.41	0.20
		6	0.47		
		7	1.62	0.55	0.34
		8	0.75	1.00	1.33
		9	2.52	0.58	0.23
		10	2.62		
		11	4.41	0.21	0.05
		12	1.10		
	Gloucester	1			
		2			
		3	0.75		
		4	5.54		
		5	2.23		
		6	2.26		
		7	0.15		
		8	0.76		
		9	2.68		
		10	4.08		
		11	2.68		
		12	0.60		
	Isle of Wight	1			
		2			
		3			
		4			
		5			
		6			
		8	0.00		
		11			
		12	0.04		
	James City	1			
		2	0.10		
		3	0.53		
		4	0.02		
		5			
		6			
		9			
		10			
		11	0.00		
		12	0.20		
	King & Queen	1			
		2			
		3			
		4			
		10			
		11	0.01		
		12	0.00		
	King George	1			
		2			
		3			
		4			
		11			
		12			
	King William	1			
		2			
		3	0.02		
		4	0.12		
		7			
		10			
	Lancaster	1			
		2			
		3	0.01		
		4	1.37		
		5	0.82		
		6	0.62		
		7	0.26		
		8	1.29		
		9	2.28		
		10	3.44		

		11	0.84		
		12	0.37		
	Mathews	2			
		3	0.02		
		4	1.99		
		5	1.81		
		6	1.05		
		7	0.25		
		8	2.16		
		9	3.93		
		10	2.40		
		11	0.15		
		12	0.28		
	Middlesex	1			
		2	1.43		
		3	0.03		
		4	0.84		
		5	0.87		
		6	0.50		
		7	1.35		
		8	0.35		
		9	2.27		
		10	1.54		
		11	0.68		
		12	0.09		
	C. Suffolk	1			
		2			
		3			
		4	0.00		
		5	0.01		
		6			
		7			
		8	0.04		
		9	0.01		
		10	0.05		
		11	0.01		
		12			
	New Kent	4	0.15		
	Northampton	1			
		2	0.18		
		3	0.30		
		4	0.82		
		5	2.84		
		6	7.25	1.04	0.14
		7	0.12		
		8	0.16		
		9	3.24		
		10	3.77		
		11	1.43		
		12	1.33		
	Northumberland	1			
		2			
		3	0.18		
		4	0.77		
		5	1.49		
		6	0.51		
		7	0.20		
		8	0.15		
		9	0.46		
		10	0.98		
		11	0.33		
		12	0.00		
	Prince George	2			
		3			
		10			
		11			
		12			
	Virginia Beach	1	891.35		
		2	326.53	4.79	0.01
		3	76.81	16.28	0.21

		4	33.03	3.87	0.12
		5	16.43		
		6	14.57		
		7	0.42		
		8	2.34	0.01	0.00
		9	9.28		
		10	5.40		
		11	18.86	2.94	0.16
		12	95.29	8.29	0.09
	Princ William	1			
		2			
		3			
		4			
		11			
		12			
	Richmond	1	0.11		
		2	0.12		
		3	0.06		
		4	0.40		
		5	0.03		
		6	0.00		
		7			
		8			
		9	0.02		
		10	0.04		
		11	0.09		
		12	0.00		
	Stafford	1			
		2			
		3	0.10		
		4			
		10			
		11			
		12			
	Surry	1			
		2			
		3			
		4	0.16		
		5			
		6			
		7			
		11			
		12			
	Westmoreland	1			
		2			
		3	0.39		
		4	0.50		
		5	0.93		
		6	0.01		
		7	0.01		
		8	0.30		
		9	0.89		
		10	0.53		
		11	0.02		
		12	-1.51		
	York	1			
		2			
		3	0.17		
		4	3.01		
		5	5.50		
		6	0.16		
		7	1.15		
		8	0.58		
		9	1.97		
		10	2.24		
		11	2.37		
		12	0.28		

NEFSC Fisheries Sea Sampling Program coverage of the 1999 (Jan.-Apr.) Mid-Atlantic Coastal drift gillnet fishery.

Delaware	Sussex	4		0.63	
	Unknown	3	0.22		
Maryland	Worcester	1	1.52		
		2	1.73	0.25	0.15
		3	15.76	0.89	0.06
		4	16.37	0.65	0.04
	Not Specified	1	19.53		
		2	10.59		
		3	5.66		
		4	7.93		
	St. Marys	1	0.61		
		2	1.52		
		3	5.73		
	Charles	1	7.95		
		2	7.47		
		3	45.70		
New Jersey	Atlantic	4	8.58		
	Cape May	1			
		2			
		3	0.44		
		4	7.95		
	Cumberland	1	1.23		
		3	2.83		
		4	0.00	0.11	
	Essex	3			
	Ocean	1	15.87		
		2	0.51		
		3	0.03		
		4	53.06		
New York	Kings	4	0.07		
	Nassau	4	0.16		
	Suffolk	1			
		2			
		3	2.13		
		4	3.01		
North Carolina	Carteret	1	57.47		
		2	45.95		
		3	0.15		
		4			
	Dare	1	410.66		
		2	391.75		
		3	581.42		
		4	136.95		
	Hyde	1	100.68		
		2	119.69		
		3	119.86		
		4	18.90		
	Pamlico	1	0.02		
		2			
		3			
		4			
Virginia	Accomac	1	1.85		
		2	19.24		
		3	62.01		
		4	75.75		
	Charles City	3	0.84		
		4	1.17		
	Newport News	1	0.25		
		2	8.76		
		3	15.34		
		4	2.05		
	Norfolk	3	1.17		
		4	0.95		
	Portsmouth	4	0.10		
	Essex	3	0.95		

	4	0.60	
Chesapeake	3	0.01	
	4	0.01	
Hampton	2	7.05	
	3	19.46	
	4	64.33	
Gloucester	1	0.35	
	2	12.78	
	3	100.80	
	4	35.32	
Isle of Wight	2	1.49	
	3	3.93	
James City	1	0.49	
	2	24.42	
	3	16.82	
	4	3.18	
King & Queen	4	2.63	
King George	1	10.84	
	2	5.44	
	3	14.86	
	4	4.17	
King William	1	0.01	
	2	0.01	
	3	0.06	
	4	0.03	
Lancaster	1	0.79	
	2	0.19	
	3	5.02	
	4	10.25	
Mathews	2	0.07	
	3	6.54	
	4	12.66	
Middlesex	1	0.37	
	2	2.84	
	3	13.86	
	4	14.63	
C. Suffolk	2	1.33	
	3	3.22	
New Kent	4	0.44	
Northampton	1		
	2	2.46	
	3	5.09	
	4	4.16	
Northumberland	1	0.16	
	2	0.33	
	3	6.36	
	4	2.32	
Prince George	2	0.55	
	3	0.61	
Virginia Beach	1	3.04	
	2	115.17	
	3	130.05	
	4	65.32	
Princ William	1	0.24	
	2	1.43	
	3	3.36	
Richmond	1	4.84	
	2	5.97	
	3	11.00	
	4	3.09	
Spotsylvania	3	0.89	
Stafford	1	4.31	
	2	12.99	
	3	47.62	
	4	13.18	
Surry	1	6.17	
	2	2.48	
	3	1.77	
Westmoreland	1	1.90	
	2	10.27	

		3	51.16	
		4	4.46	
	York	1	0.02	
		2	0.25	
		3	2.88	
		4	11.19	