Northeast Fisheries Science Center Reference Document 24-06

Estimates of cetacean and pinniped bycatch in the New England and Mid-Atlantic gillnet fisheries, 2022

January 2024

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Editorial Notes

Second Edition: We have issued a second edition of NOAA NEFSC CRD24-06, “Estimates of cetacean and pinniped bycatch in the Northeast and Mid-Atlantic gillnet fisheries, 2022.” The second edition incorporates the following changes:

(1) A very low percentage of hauls were observed in the Southern Maine portgroup in January-May and in the Southern New England management area in September-December. Therefore, to estimate bycatch in those areas and seasons, these strata were merged with the Mid-Coast management area and the South of Cape Cod portgroup, respectively, within the same season. The strata to merge with were chosen because the Mid-Coast management area and South of Cape Cod portgroup were geographically closest and had higher observer coverage. This merging of 2 poorly observed strata with 2 larger strata impacted bycatch estimates for harbor porpoise, harbor seals, and gray seals.
(2) An error has been fixed that impacted estimates of harbor seals and gray seals in New Hampshire in June-August.
(3) A white-sided dolphin observed in the Northeast gillnet fishery in 2022 was previously reported as seriously injured and has been corrected to a mortality in Table 13B.
(4) The number of estimated mortalities for common dolphins in the Mid-Atlantic in 2019 has been corrected from 23 to 20 in Table 13C.

The second edition can be found here: https://doi.org/10.25923/fw5f-nk10

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BYCATCH ESTIMATES AND ESTIMATION PROCESS

This report provides estimated bycatch of 7 species of small cetaceans and pinnipeds bycaught in the New England gillnet (NEG) and Mid-Atlantic gillnet (MAG) fisheries in 2022. The bycatch estimation methodology used for these data is the same as was used in the 2019 estimates (Precoda and Orphanides 2022), which describes slight modifications to the approach detailed in Orphanides and Hatch (2017). For New England, the 2022 observer data were used to calculate bycatch rates, which were multiplied by 2022 landings to estimate total bycatch. In the Mid-Atlantic, observer coverage was very low, and no bycatch was observed. Because of the low coverage, we used observer data from 2017-2019 (prior to the COVID-19 pandemic) to estimate MAG bycatch rates and applied those rates to the total MAG fishing effort in 2022. This is the same approach as was used in Precoda (2023) for estimates of bycatch in the NEG and MAG fisheries in 2020 and 2021.

Bycatch estimates in New England were performed with a stratified ratio estimation approach using the seasons, portgroups, and management areas used in recent years (Orphanides and Hatch 2017; Figure 1). Portgroups, which reflect the port where the catch was landed, are used for trips whose location was unknown, trips which fished outside the management areas, and trips which fished inside the management areas but outside the times when management measures were in place. This time-area stratification approach was originally developed for the estimation of bycatch of harbor porpoise (*Phocoena phocoena phocoena*) but has been applied to bycatch of other small cetaceans and pinnipeds since 1995 (Blaylock et al. 1995) because bycatch for other species is also largely driven by spatial and temporal patterns. A summary of observer and commercial fishery data in New England is given in Table 1. A very low percentage of hauls were observed in the Southern Maine portgroup in January-May and in the Southern New England management area in September-December. Therefore, to estimate bycatch in those areas and seasons, these strata were merged with the Mid-Coast management area and the South of Cape Cod portgroup respectively, within the same season. The strata to merge with were chosen because the Mid-Coast management area and South of Cape Cod portgroup were geographically closest and had higher observer coverage. This merging of two poorly observed strata with two larger strata impacted bycatch estimates for harbor porpoise, harbor seals (*Phoca vitulina vitulina*), and gray seals (*Halichoerus grypus atlantica*).The estimated 2022 serious injuries and total mortalities in the NEG fishery were 2 (coefficient of variation [CV] = 0.43) white-sided dolphins (*Lagenorhynchus acutus*), 22 (CV = 0.36) common dolphins (*Delphinus delphis delphis*), 4 (CV = 0.64) Risso's dolphins (*Grampus griseus*), 118 (CV = 0.22) harbor porpoise, 185 (CV = 0.18) harbor seals, and 522 (CV = 0.12) gray seals (Tables 2-7). The NEG estimates are based on dead and seriously injured bycatch observed in 2022 consisting of 1 white-sided dolphin, 5 common dolphins, 1 Risso's dolphin, 22 harbor porpoise, 35 harbor seals, and 89 gray seals (Figure 2).

Incidental takes of unknown species were excluded from the bycatch estimation; this included 13 unidentified seals and 1 unidentified dolphin. In 2022, 89 gray seals and 35 harbor seals were observed in New England. If we assumed all 13 unidentified seals were gray seals and neglected the stratification, the bycatch estimate would increase from 522 to 522*(89+13)/89 = 598 gray seals, within the 95% confidence interval of the estimate (401-677). At the other extreme, if we assumed all 13 unidentified seals were harbor seals, again neglecting stratification, the bycatch estimate would increase from 185 to 185*(35+13)/35 = 254 harbor seals, within the 95% confidence interval (122-290) for the bycatch estimate. A current focus is to reduce the number of unidentified animals through increased observer training.

The proportions of observed bycatch of each species that was seriously injured or dead are used to apportion the total estimated bycatch to serious injuries and mortalities. The final 2022 serious injury determinations will be published at a later date; serious injury determinations for 2022 that are used in this report are preliminary.

The percent of NEG hauls containing the proper number of pingers in compliance with the 2010 Harbor Porpoise Take Reduction Plan (HPTRP) was 61% in 2022. This percent refers to the correct number of pingers used, not the pingers' functionality (Table 8).

The Mid-Atlantic ratio estimator stratification was done as in recent years by area, mesh size, soak duration, and season coinciding with previous bycatch estimates in this region (Orphanides and Hatch 2017). The spatial stratifications for 2020 and 2021 Mid-Atlantic bycatch included the Waters off New Jersey (NJ) and Southern Mid-Atlantic (SMA) HPTRP management areas (Figure 1). Seasons used were based on observed bycatch from 1994-2019 and were Dec-Mar (NJ and SMA) for common dolphin; Dec-May (NJ and SMA) for gray seal; May-Aug (NJ) and Jan-Apr (SMA) for harbor porpoise; Dec-May (NJ) for harbor seal; and Dec-May (NJ) for harp seal. A summary of observer and commercial fishery data in the Mid-Atlantic in 2022 is shown in Table 9. The estimated 2022 total serious injuries and mortalities in the MAG fishery were 26 (CV = 0.57) common dolphins, 8 (CV = 0.81) gray seals, 12 (CV = 0.66) harbor porpoise, 5 (CV = 0.38) harbor seals, and 2 (CV = 1.01) harp seals (*Pagophilus groenlandicus*; Table 11). The MAG estimates are based on dead and seriously injured bycatch observed from 2017 to 2019 consisting of 6 common dolphins, 3 harbor porpoise, 3 harp seals, 7 harbor seals, and 3 gray seals. Incidental takes of unknown species were not included in the bycatch estimation; this included 1 unidentified marine mammal, 1 unidentified dolphin, and 1 unidentified porpoise/dolphin. No bycatch was observed in the MAG in 2022 (Figure 2).

Adherence to the HPTRP regulations on observed hauls in the 2022 MAG fishery was 56% for large and 81% for small mesh gillnets (Table 12).

Observer coverage by fishery and year and observed and estimated serious injuries and mortalities are summarized for the 5-year period of 2018-2022 in Table 13 to correspond with tables provided in the U.S. Atlantic Stock Assessment Reports (Marine…updated 2024). The calculation of the CV for the mean annual bycatch estimate over the 5-year period from 2018-2022 makes use of the annual bycatch estimates and their CVs over that period. However, since observer coverage was very low in some years due to the COVID-19 pandemic (Precoda and Lyssikatos 2023), bycatch rates in New England from 2020 to 2021 and in the Mid-Atlantic from 2020 to 2022 were derived using observer data pooled over 2017-2019. Consequently, the information on which the 2018 and 2019 CVs are based is also included in the calculation of the CVs associated with the estimates in those later years. Treating the later CVs as if they were independent of the 2018-2019 CVs results in some underestimation of the CV of the 5-year (2018-2022) mean annual bycatch estimate.

Note on CAMS System Data

Dealer data in the Catch Accounting and Monitoring System (CAMS) can change over time. Dealer data used in this report was pulled from CAMS at the following time: Data for 2022: 2023-11-14 10:51:27

TABLES

Table 1. Summaries of observed hauls, observed trips, commercial trips from vessel trip reports (VTR), observed landings, prorated commercial landings, and observer coverage by season and portgroup (P) or management area (MA) for the New England gillnet fishery (Figure 1). Observer and commercial data are from 2022. Observers record locations and dates for each haul, while VTR locations and dates reflect the trip as a whole. Spatiotemporal mismatches may thus occur between the observer data and VTR data.

Season	Area	Observed Hauls[a]	Observed Trips[b]	Commercial Trips	Observed Landings (mt)	Commercial Landings (mt)	Observer Coverage (trips)	Observer Coverage (mt)
Jan-May	Cape Cod South (MA)	63 (46)	24	159	52.84	641.58	15.1%	8.2%
Jan-May	East of Cape Cod (P)	1 (0)	1	36	0.71	156.87	2.8%	0.5%
Jan-May	Massachusetts Bay (MA)	0 (0)	0	7	0.00	4.26	0.0%	0.0%
Jan-May	Mid-Coast (MA)	111 (1)	27	135	20.55	87.04	20.0%	23.6%
Jan-May	North of Boston (P)	29 (0)	7	17	4.17	12.18	41.2%	34.2%
Jan-May	Offshore (MA)	4 (0)	1	6	0.53	4.87	16.7%	10.8%
Jan-May	Offshore (P)	0 (0)	0	2	0.00	3.76	0.0%	0.0%
Jan-May	South of Boston (P)	3 (0)	3	13	0.57	5.81	23.1%	9.9%
Jan-May	South of Cape Cod (P)	4 (0)	3	20	3.41	51.75	15.0%	6.6%
Jan-May	Southern New England (MA)	236 (76)	67	262	288.59	1,170.61	25.6%	24.7%
Jan-May	Stellwagen Bank (MA)	67 (3)	24	13	7.61	4.46	184.6%	170.6%
Jan-May	Subtotal	518 (126)	135	670	378.99	2,143.19	20.1%	17.7%
Jun-Aug	East of Cape Cod (P)	205 (18)	74	923	228.84	2,488.54	8.0%	9.2%
Jun-Aug	New Hampshire (P)	66 (0)	7	26	34.50	85.32	26.9%	40.4%
Jun-Aug	North of Boston (P)	173 (10)	68	147	92.75	192.03	46.3%	48.3%

Season	Area	Observed Hauls[a]	Observed Trips[b]	Commercial Trips	Observed Landings (mt)	Commercial Landings (mt)	Observer Coverage (trips)	Observer Coverage (mt)
Jun-Aug	Northern Maine (P)	0 (0)	0	3	0.00	139.42	0.0%	0.0%
Jun-Aug	Offshore (P)	39 (13)	4	25	17.03	79.26	16.0%	21.5%
Jun-Aug	South of Boston (P)	159 (3)	45	80	41.60	94.39	56.2%	44.1%
Jun-Aug	South of Cape Cod (P)	120 (78)	39	360	87.92	1,074.26	10.8%	8.2%
Jun-Aug	Southern Maine (P)	220 (26)	52	177	79.32	748.52	29.4%	10.6%
Jun-Aug	Subtotal	982 (148)	289	1,741	581.96	4,901.74	16.6%	11.9%
Sep-Dec	Cape Cod South (MA)	0 (0)	0	19	0.00	71.65	0.0%	0.0%
Sep-Dec	East of Cape Cod (P)	156 (4)	51	393	139.72	1,025.86	13.0%	13.6%
Sep-Dec	Massachusetts Bay (MA)	0 (0)	0	1	0.00	0.59	0.0%	0.0%
Sep-Dec	Mid-Coast (MA)	244 (15)	73	148	114.38	280.65	49.3%	40.8%
Sep-Dec	New Hampshire (P)	27 (9)	3	3	11.39	11.73	100.0%	97.1%
Sep-Dec	North of Boston (P)	124 (4)	38	128	46.30	107.42	29.7%	43.1%
Sep-Dec	Offshore (MA)	9 (0)	3	7	4.97	15.54	42.9%	32.0%
Sep-Dec	Offshore (P)	7 (0)	2	19	2.12	31.95	10.5%	6.6%
Sep-Dec	South of Boston (P)	67 (0)	17	34	23.44	51.15	50.0%	45.8%
Sep-Dec	South of Cape Cod (P)	86 (49)	26	231	13.35	314.11	11.3%	4.3%
Sep-Dec	Southern Maine (P)	43 (0)	12	35	23.86	47.53	34.3%	50.2%
Sep-Dec	Stellwagen Bank (MA)	11 (0)	4	1	4.04	0.61	400.0%	657.8%

Season	Area	Observed Hauls[a]	Observed Trips[b]	Commercial Trips	Observed Landings (mt)	Commercial Landings (mt)	Observer Coverage (trips)	Observer Coverage (mt)
Sep-Dec	Subtotal	774 (81)	213	1,019	383.57	1,958.80	20.9%	19.6%
Total		2274 (355)	637	3,430	1,344.51	9,003.72	18.6%	14.9%

[a]The number preceding the parentheses indicates the total observed hauls (i.e., complete hauls + limited hauls). The number in parentheses is the number of limited hauls. During complete sampling, observers do not explicitly watch haulbacks and may fail to see bycatch that falls out of the net prior to being hauled on board. During limited sampling, the observer watches the net during haulbacks, reducing the chance of unnoticed bycatch.

[b]The subtotal and total rows may be smaller than the sum of the observed trips across all strata. This is because an observed trip may include hauls in different strata, while totals include only unique trips.

Table 2. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of white-sided dolphin (*Lagenorhynchus acutus*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Sep-Dec	Mid-Coast (MA)	1	0.008	2.36	0.43	1-10
Sep-Dec	Subtotal	1	-	2.36	0.43	1-10
	Total	1	-	2.36	0.43	1-10

Table 3. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of common dolphin (*Delphinus delphis delphis*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Jan-May	Southern New England (MA)	4	0.013	15.32	0.39	6-38
Jan-May	Subtotal	4	-	15.32	0.39	6-38
Sep-Dec	East of Cape Cod (P)	1	0.007	6.81	0.78	1-35
Sep-Dec	Subtotal	1	-	6.81	0.78	1-35
	Total	5	-	22.12	0.36	9-49

Table 4. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of Risso's dolphin (*Grampus griseus*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Jan-May	Southern New England (MA)	1	0.003	4.05	0.64	1-19
Jan-May	Subtotal	1	-	4.05	0.64	1-19
	Total	1	-	4.05	0.64	1-19

Table 5. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of harbor porpoise (*Phocoena phocoena phocoena*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Jan-May	Cape Cod South (MA)	1	0.019	12.18	0.82	1-54
Jan-May	Mid-Coast (MA)	8	0.396	34.30	0.49	13-108
Jan-May	Southern New England (MA)	2	0.007	8.09	0.47	2-23
Jan-May	Subtotal	11	-	54.56	0.38	25-130
Jun-Aug	North of Boston (P)	2	0.023	4.33	0.26	2-10
Jun-Aug	Southern Maine (P)	6	0.068	51.66	0.33	22-110
Jun-Aug	Subtotal	8	-	55.99	0.29	26-114
Sep-Dec	Mid-Coast (MA)	3	0.026	7.37	0.24	4-16
Sep-Dec	Subtotal	3	-	7.37	0.24	4-16
	Total	22	-	117.92	0.22	70-199

Table 6. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of harbor seal (*Phoca vitulina vitulina*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Jan-May	Mid-Coast (MA)	4	0.177	15.77	0.64	4-66
Jan-May	North of Boston (P)	1	0.212	2.70	0.69	1-17
Jan-May	Subtotal	5	-	18.47	0.55	6-66
Jun-Aug	New Hampshire (P)	1	0.029	2.47	0.45	1-7
Jun-Aug	North of Boston (P)	3	0.032	6.19	0.27	3-16
Jun-Aug	Offshore (P)	3	0.176	13.96	0.54	3-32
Jun-Aug	Southern Maine (P)	14	0.159	120.54	0.27	65-232
Jun-Aug	Subtotal	21	-	143.16	0.22	86-254
Sep-Dec	Mid-Coast (MA)	7	0.068	18.26	0.18	11-31
Sep-Dec	North of Boston (P)	2	0.043	4.64	0.33	2-11
Sep-Dec	Subtotal	9	-	22.90	0.16	15-36
	Total	35	-	184.53	0.18	122-290

Table 7. Observed number of bycatch, estimated bycatch rate per metric ton landed, estimated bycatch, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of gray seal (*Halichoerus grypus atlantica*) bycatch in the 2022 New England gillnet fishery by season and port group (P) or management area (MA).

Season	Area	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
Jan-May	Cape Cod South (MA)	10	0.19	121.75	0.28	61-211
Jan-May	Mid-Coast (MA)	1	0.049	4.29	0.79	1-25
Jan-May	North of Boston (P)	1	0.212	2.70	0.50	1-11
Jan-May	Southern New England (MA)	10	0.034	40.22	0.21	24-64
Jan-May	Subtotal	22	-	168.96	0.20	105-258
Jun-Aug	East of Cape Cod (P)	17	0.068	171.23	0.25	105-283
Jun-Aug	New Hampshire (P)	1	0.029	2.47	0.45	1-7
Jun-Aug	North of Boston (P)	16	0.173	33.22	0.12	24-49
Jun-Aug	Offshore (P)	2	0.117	9.31	0.68	2-27
Jun-Aug	South of Cape Cod (P)	2	0.028	29.12	0.86	2-139
Jun-Aug	Southern Maine (P)	4	0.045	34.44	0.46	10-96
Jun-Aug	Subtotal	42	-	279.80	0.18	191-415
Sep-Dec	East of Cape Cod (P)	3	0.02	20.42	0.48	8-54
Sep-Dec	Mid-Coast (MA)	17	0.148	41.54	0.13	29-60
Sep-Dec	North of Boston (P)	3	0.065	6.96	0.34	3-18
Sep-Dec	South of Cape Cod (P)	2	0.008	4.45	2.49	2-63
Sep-Dec	Subtotal	25	-	73.37	0.22	49-114
	Total	89	-	522.13	0.12	401-677

Table 8. Summary of full pinger deployment in 2022 for Northeast Fisheries Observer Program observed hauls within times and areas where pingers were required by the 2010 Harbor Porpoise Take Reduction Plan (HPTRP). Only hauls during times when pingers are required are included. In this table, "Southern New England" refers to the geographic area surrounding and excluding the Cape Cod South management area, and "Cape Cod South" refers to the Cape Cod South geographic area within the period when pingers are required in the Southern New England management area.

Season	Management Area	Observed Hauls	Hauls with All Required Pingers	Hauls with <100% of Required Pingers
Jan-May	Cape Cod South	63	43 (68.3%)	20 (31.7%)
	MidCoast	105	74 (70.5%)	31 (29.5%)
	Offshore Closure	4	4 (100%)	0 (0%)
	Southern New England	236	121 (51.3%)	115 (48.7%)
	Stellwagen Bank	67	63 (94%)	4 (6%)
Sep-Dec	MidCoast	244	133 (54.5%)	111 (45.5%)
	Offshore Closure	9	6 (66.7%)	3 (33.3%)
	Southern New England	12	0 (0%)	12 (100%)
	Stellwagen Bank	11	11 (100%)	0 (0%)
Total		751	455 (60.6%)	296 (39.4%)

Table 9. Summaries of observed hauls, observed trips, commercial trips from vessel trip reports (VTR), observed landings, prorated commercial landings, and observer coverage by state for the Mid-Atlantic gillnet fishery (Figure 1). Observer and commercial data are from 2022.

State	Observed Hauls[a]	Observed Trips[b]	Commercial Trips	Observed Landings (mt)	Commercial Landings (mt)	Observer Coverage (trips)	Observer Coverage (mt)
Florida	0 (0)	0	29	0.00	3.00	0.0%	0.0%
Maryland	70 (0)	20	159	36.08	1,294.08	12.6%	2.8%
Massachusetts	0 (0)	0	4	0.00	4.41	0.0%	0.0%
New Hampshire	0 (0)	0	1	0.00	0.06	0.0%	0.0%
New Jersey	199 (0)	62	980	96.29	1,349.90	6.3%	7.1%
New York	0 (0)	0	52	0.00	26.64	0.0%	0.0%
North Carolina	166 (146)	22	3,615	10.17	1,632.92	0.6%	0.6%
Virginia	80 (13)	19	812	31.41	5,967.61	2.3%	0.5%
Total	515 (159)	123	5,652	173.95	10,278.62	2.2%	1.7%

[a]The number preceding the parentheses indicates the total observed hauls (i.e., complete hauls + limited hauls). The number in parentheses is the number of limited hauls. During complete sampling, observers do not explicitly watch haulbacks and may fail to see bycatch that falls out of the net prior to being hauled on board. During limited sampling, the observer watches the net during haulbacks, reducing the chance of unnoticed bycatch.

[b]The subtotal and total rows may be smaller than the sum of the observed trips across all strata. This is because an observed trip may include hauls in different strata, while totals include only unique trips.

Table 10. Summaries of observed hauls, observed trips, observed effort in 2017-2019, and vessel trip report (VTR) trips and prorated commercial effort in 2022 by species, season, region, mesh size and soak duration for strata with bycatch of common dolphin (Delphinus delphis delphis), gray seal (Halichoerus grypus atlantica), harbor porpoise (Phocoena phocoena phocoena), harbor seal (Phoca vitulina vitulina) and harp seal (Pagophilus groenlandicus) in the Mid-Atlantic gillnet fishery. As the observed data covers 3 years and the VTR data covers only 1 year, the observed trips or landings can exceed the VTR trips or landings.

Species	Season	Area	Mesh Size (in)	Soak Duration (hrs)	Observed Hauls[a]	Observed Trips	Observed Landings (mt)	VTR Trips	Commercial Landings (mt)
common dolphin	Dec-Mar	Southern Mid-Atlantic	< 7	<= 72	3804 (959)	711	1,066.08	941	6,311.73
common dolphin	Dec-Mar	Waters off New Jersey	>= 7	<= 72	321 (67)	99	161.19	115	204.12
common dolphin	Dec-Mar	Waters off New Jersey	>= 7	> 72	168 (26)	50	97.24	41	65.15
gray seal	Dec-May	Southern Mid-Atlantic	< 7	<= 72	5116 (1579)	929	1,205.65	1,044	7,283.81
gray seal, harbor seal	Dec-May	Waters off New Jersey	>= 7	<= 72	556 (67)	178	322.69	202	318.06
gray seal, harbor seal, harp seal	Dec-May	Waters off New Jersey	>= 7	> 72	260 (26)	82	173.09	53	89.83
harbor porpoise	Jan-Apr	Southern Mid-Atlantic	< 7	<= 72	4174 (1129)	738	941.14	662	5,372.94
harbor porpoise	May-Aug	Waters off New Jersey	>= 7	<= 72	300 (0)	99	220.81	94	139.91

[a]The number preceding the parentheses indicates the total observed hauls (i.e., complete hauls + limited hauls). The number in parentheses is the number of limited hauls. During complete sampling, observers do not explicitly watch haulbacks and may fail to see bycatch that falls out of the net prior to being hauled on board. During limited sampling, the observer watches the net during haulbacks, reducing the chance of unnoticed bycatch.

Table 11. Observed number of bycatch in 2017-2019, estimated bycatch rate per metric ton landed in the same period, estimated bycatch in 2022, coefficient of variation (CV), and 95% confidence interval (CI) for the estimate of common dolphin (*Delphinus delphis delphis*), gray seal (*Halichoerus grypus atlantica*), harbor porpoise (*Phocoena phocoena phocoena*), harbor seal (*Phoca vitulina vitulina*), and harp seal (*Pagophilus groenlandicus*) bycatch in the 2022 Mid-Atlantic gillnet fishery by season, region, mesh size, and soak duration. Total rows for each species estimate bycatch by merging the strata listed above them.

Species	Season	Area	Mesh Size (in)	Soak Duration (hrs)	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
common dolphin	Dec-Mar	Waters off New Jersey	>= 7	> 72	1	0.010	0.67	1.03	0-4
common dolphin	Dec-Mar	Waters off New Jersey	>= 7	<= 72	1	0.006	1.27	1.01	0-7
common dolphin	Dec-Mar	Southern Mid-Atlantic	< 7	<= 72	4	0.004	23.68	0.61	6-77
common dolphin	Dec-Mar	Total			6	0.004	25.62	0.57	7-80
gray seal	Dec-May	Waters off New Jersey	>= 7	> 72	1	0.006	0.52	0.99	0-3
gray seal	Dec-May	Waters off New Jersey	>= 7	<= 72	1	0.003	0.99	0.99	0-5
gray seal	Dec-May	Southern Mid-Atlantic	< 7	<= 72	1	0.001	6.04	1.00	0-37
gray seal	Dec-May	Total			3	0.001	7.55	0.81	1-41
harbor porpoise	May-Aug	Waters off New Jersey	>= 7	<= 72	1	0.005	0.63	1.00	0-4
harbor porpoise	Jan-Apr	Southern Mid-Atlantic	< 7	<= 72	2	0.002	11.42	0.70	0-38
harbor porpoise		Total		<= 72	3	0.002	12.05	0.66	1-39
harbor seal	Dec-May	Waters off New Jersey	>= 7	> 72	4	0.023	2.08	0.47	1-5

Species	Season	Area	Mesh Size (in)	Soak Duration (hrs)	Observed Bycatch	Bycatch Rate	Estimated Bycatch	CV	95% CI
harbor seal	Dec-May	Waters off New Jersey	>= 7	<= 72	3	0.009	2.96	0.56	1-8
harbor seal	Dec-May	Waters off New Jersey	>= 7	Total	7	0.012	5.03	0.38	2-10
harp seal	Dec-May	Waters off New Jersey	>= 7	> 72	3	0.017	1.56	1.01	0-8

Table 12. Observed number of hauls in 2022 for large (7-18”) and small (5-7”) mesh gillnets following requirements for the Mid-Atlantic 2010 Harbor Porpoise Take Reduction Plan (HPTRP). Observed hauls missing information for an assessed gear modification were assumed to be following the HPTRP for that gear characteristic and were not included in the count of non-compliant hauls. Locations of observed hauls are depicted in Figure 2.

				General HPTRP Non-adherence Categories		Specific HPTRP Non-adherence Categories						
Management Area	**Observed Hauls**	**Non-Compliant Hauls**	**Compliance %**	**Gear Modification**	**Closed Area**	**Multiple Violations per Haul**	**Number of Nets**	**Twine Size**	**Tie-Down Length**	**Tie-Down Use**	**Net Length**	**Missing Some Gear Information[a]**
Mudhole South Large Mesh	7	7	0%	0	7	0	0	0	0	0	0	0
Southern Mid-Atlantic Small Mesh	100	17	83%	17	0	0	7	3	0	0	7	4
Waters off New Jersey Large Mesh	20	5	75%	5	0	0	5	0	0	0	0	8
Waters off New Jersey Small Mesh	7	3	57%	3	0	0	0	3	0	0	0	0
Totals	134	32	76%	25	7	0	12	6	0	0	7	12

[a]Hauls for which at least 1 gear component was not recorded and therefore could not be checked for compliance. There may be some hauls which are not compliant with one category of gear and are missing information about another category of gear and which therefore appear in both this column and one of the gear non-adherence columns.

Table 13. Summaries for the 5-year period of 2018-2022. (A) Observer coverage by fishery and year. (B, C) Observed and estimated serious injuries and mortalities of marine mammals in the (B) New England gillnet and (C) Mid-Atlantic gillnet fisheries. The "Combined Estimate" is Estimated Mortality + Estimated Serious Injury.

A. Observer coverage as percent of metric tons landed, by fishery and year.

Fishery	Years	Data Type	Observer Coverage (metric tons landed)
New England gillnet	2018-22	Obs. Data, Trip Logbook, Allocated Dealer Data	11.00, 12.24, 1.90, 10.71, 14.93
Mid-Atlantic gillnet	2018-22	Obs. Data, Trip Logbook, Allocated Dealer Data	9.00, 13.11, 3.28, 1.14, 1.69

B. Observed and estimated serious injuries and mortalities of marine mammals in the New England gillnet fishery for 2018-2022. CV = coefficient of variation. The estimates for 2020 and 2021 were calculated using bycatch rates based on pooled 2017-2019 observer data, multiplied by the fishing effort from 2020 and 2021, respectively.

Species	Observed Serious Injury	Observed Mortality	Estimated Serious Injury[a]	Estimated Mortality[a]	Combined Estimate	Estimated CV	Mean (CV) Combined Estimate
bottlenose dolphin (*Tursiops truncatus*)	0, 0, 0, 0, 0	0, 0, 0, 0, 0	0, 0, 0, 0, 0	0, 0, 0, 0, 0	0, 0, 2, 1, 0	0.00, 0.00, 0.99, 0.99, 0.00	1 (1.78)
common dolphin (*Delphinus delphis delphis*)	0, 0, 0, 0, 0	10, 1, 2, 3, 5	0, 0, 0, 0, 0	93, 5, 50, 39, 22	93, 5, 50, 39, 22	0.45, 0.68, 0.25, 0.24, 0.36	42 (0.22)
gray seal (*Halichoerus grypus atlantica*)	0, 0, 0, 0, 1	103, 251, 14, 48, 88	0, 0, 0, 0, 6	1113, 2019, 1357, 1027, 516	1113, 2019, 1357, 1027, 522	0.32, 0.17, 0.14, 0.14, 0.12	1208 (0.09)
harbor porpoise (*Phocoena phocoena phocoena*)	0, 0, 0, 0, 0	9, 33, 10, 25, 22	0, 0, 0, 0, 0	92, 195, 121, 111, 118	92, 195, 121, 111, 118	0.52, 0.22, 0.22, 0.19, 0.22	127 (0.12)
harbor seal (*Phoca vitulina vitulina*)	0, 0, 0, 0, 0	22, 59, 4, 24, 35	0, 0, 0, 0, 0	188, 316, 261, 241, 185	188, 316, 261, 241, 185	0.36, 0.15, 0.14, 0.13, 0.18	238 (0.09)
harp seal (*Pagophilus groenlandicus*)	0, 0, 0, 0, 0	2, 34, 0, 0, 0	0, 0, 0, 0, 0	14, 163, 0, 0, 0	14, 163, 72, 66, 0	0.80, 0.19, 0.22, 0.24, 0.00	63 (0.16)

Species	Observed Serious Injury	Observed Mortality	Estimated Serious Injury[a]	Estimated Mortality[a]	Combined Estimate	Estimated CV	Mean (CV) Combined Estimate
Risso's dolphin (*Grampus griseus*)	0, 0, 0, 0, 0	0, 1, 0, 3, 1	0, 0, 0, 0, 0	0, 5, 0, 3, 4	0, 5, 2, 3, 4	0.00, 0.70, 1.01, 0.00, 0.64	3 (0.57)
white-sided dolphin (*Lagenorhynchus acutus*)	0, 0, 0, 0, 0	0, 0, 0, 2, 1	0, 0, 0, 0, 0	0, 0, 0, 2, 2	0, 0, 0, 2, 2	0.00, 0.00, 0.00, 0.00, 0.43	1 (1.17)

[a]The combined bycatch estimate was not allocated into estimated serious injuries and estimated mortalities for 2020-2021, when observer data offered low and unrepresentative coverage.

C. Observed and estimated serious injuries and mortalities of marine mammals in the Mid-Atlantic gillnet fishery for 2018-2022. CV = coefficient of variation. The estimates for 2020, 2021, and 2022 were calculated using bycatch rates based on pooled 2017-2019 observer data, multiplied by the fishing effort from 2020, 2021, and 2022, respectively.

Species	Observed Serious Injury	Observed Mortality	Estimated Serious Injury[a]	Estimated Mortality[a]	Combined Estimate	Estimated CV	Mean (CV) Combined Estimate
common dolphin (*Delphinus delphis delphis*)	0, 0, 0, 0, 0	1, 3, 0, 0, 0	0, 0, 0, 0, 0	8, 20, 0, 0, 0	8, 20, 30, 24, 26	0.91, 0.56, 0.55, 0.53, 0.57	22 (0.27)
gray seal (*Halichoerus grypus atlantica*)	0, 0, 0, 0, 0	0, 3, 0, 0, 0	0, 0, 0, 0, 0	0, 18, 0, 0, 0	0, 18, 9, 7, 8	0.00, 0.40, 0.72, 0.69, 0.81	8 (0.38)
harbor porpoise (*Phocoena phocoena phocoena*)	0, 0, 0, 0, 0	0, 2, 1, 0, 0	0, 0, 0, 0, 0	0, 13, 16, 0, 0	0, 13, 16, 10, 12	0.00, 0.51, 0.63, 0.65, 0.66	10 (0.39)
harbor seal (*Phoca vitulina vitulina*)	0, 0, 0, 0, 0	3, 3, 2, 0, 0	0, 0, 0, 0, 0	26, 17, 9, 0, 0	26, 17, 9, 9, 5	0.52, 0.35, 0.43, 0.40, 0.38	13 (0.24)
harp seal (*Pagophilus groenlandicus*)	0, 0, 0, 0, 0	0, 3, 0, 0, 0	0, 0, 0, 0, 0	0, 29, 0, 0, 0	0, 29, 2, 2, 2	0.00, 0.84, 1.01, 1.01, 1.01	7 (0.89)

[a]The combined bycatch estimate was not allocated into estimated serious injuries and estimated mortalities for 2020-2022, when observer data offered low and unrepresentative coverage.

FIGURES

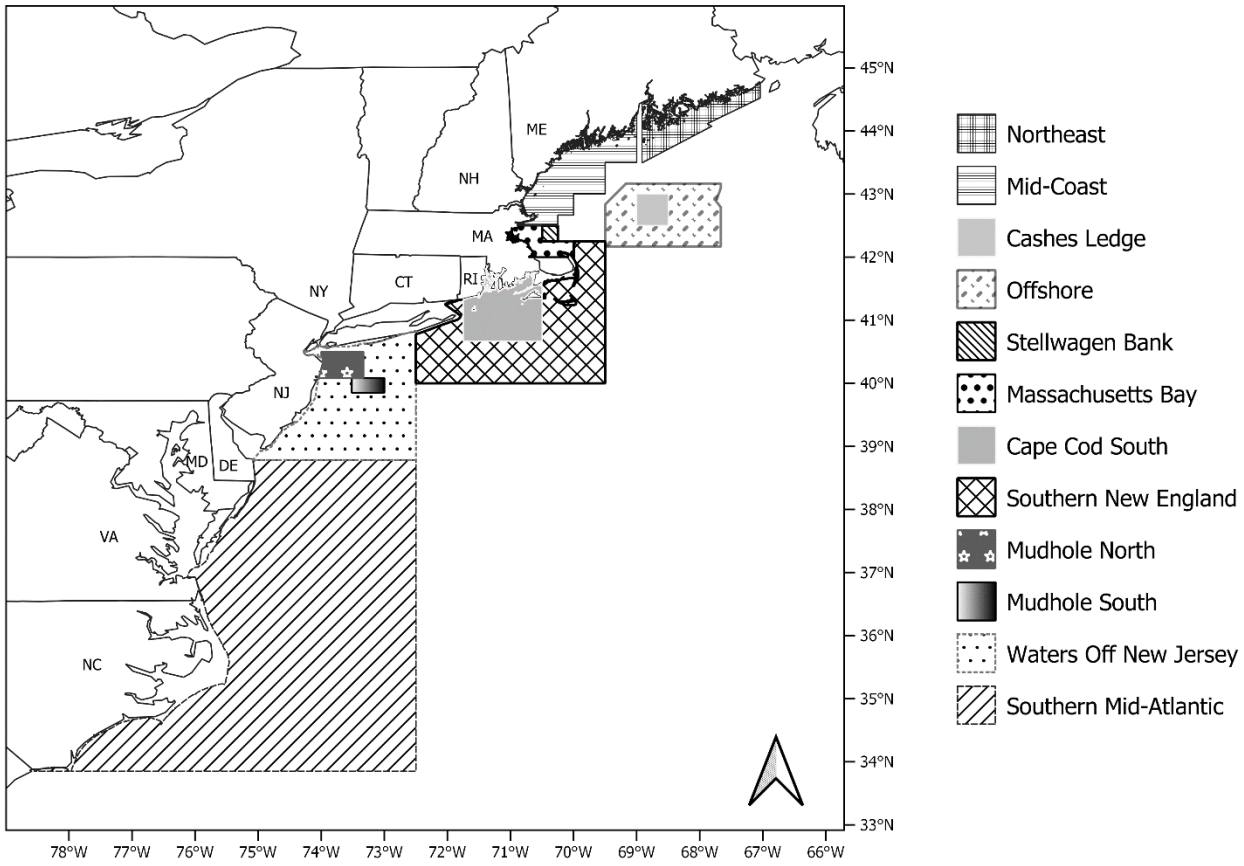

Figure 1. Management areas used in this report. For the purposes of estimating bycatch in the Mid-Atlantic gillnet fishery, Mudhole North and Mudhole South are considered part of the Waters Off New Jersey management area. Port groups, which reflect the port where the catch was landed, are not shown. Port groups are used for trips whose location was unknown, trips which fished outside the management areas, and trips which fished inside the management areas but outside the times when management measures were in place.

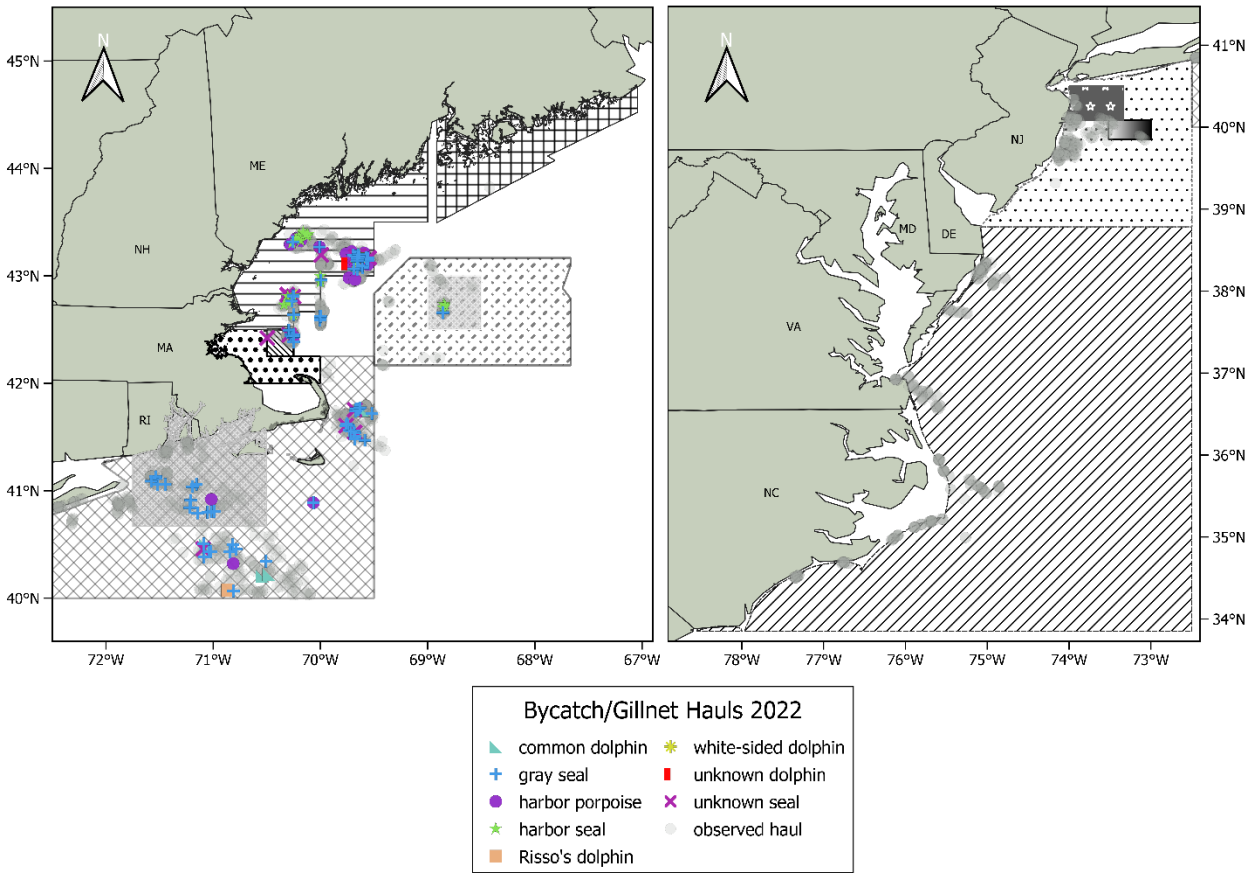

Figure 2. Locations of observed hauls and marine mammal bycatch in the 2022 New England (left) and Mid-Atlantic (right) gillnet fisheries. Observed bycatch consisted of common dolphin (*Delphinus delphis delphis*), gray seal (*Halichoerus grypus atlantica*), harbor porpoise (*Phocoena phocoena phocoena*), harbor seal (*Phoca vitulina vitulina*), Risso's dolphins (*Grampus griseus*), white-sided dolphins (*Lagenorhynchus acutus*), and unknown dolphin and seal species.

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