

**Finfish and Invertebrate Bycatch in the Georges Bank and Hudson Canyon Closed
Areas Using a 3.5-Inch (88.9mm) and a 4.0-Inch (101.6mm) Ring Sea Scallop
Dredge**

**William D. DuPaul, David B. Rudders and Kevin D. Goff
Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, VA 23062**

April 29, 2002

VIMS Marine Resource Report No. 2002-04

Finfish and Invertebrate Bycatch in the Georges Bank and Hudson Canyon Closed Areas Using a 3.5-Inch (88.9mm) and a 4.0-Inch (101.6mm) Ring Sea Scallop Dredge

This report documents finfish bycatch encountered during the experimental trials of a 4 inch ring dredge in the Georges Bank and Hudson Canyon South Closed Areas. Data was collected on eight research cruises from June 2000 to September 2001 aboard the F/V *Celtic*, a commercial sea scallop dredge vessel operating out of New Bedford, Massachusetts.

The primary objective of the study was to assess changes in the size selectivity and relative efficiency of an experimental dredge equipped with 4.0 inch (101.6 mm) rings compared to a standard sea scallop dredge possessing a ring bag knit with 3.5" (88.9 mm) rings. In addition to analyzing the effects of the experimental gear on the catch of sea scallops, finfish and invertebrate bycatch was also documented.

The vessel in the study utilized two 15 ft. (4.57 m) New Bedford style sea scallop dredges towed simultaneously. The dredges were identical except for the size of the rings in the chain bag. One dredge had the regulated 3.5 inch (88.9 mm) rings, while the other dredge had an experimental chain bag comprised of 4 inch (101.6 mm) rings. When sampled, finfish and invertebrate bycatch was counted and measured to the nearest centimeter. Bycatch and sea scallop length measurements were converted to weights using established length-weight relationships (NEFSC, 1999, Wigley *et. al.*, in review).

The catch data was grouped to reflect finfish bycatch encountered in each of the four closed areas. Of the eight experimental research trips, three were conducted in Closed Area II, two in Closed Area I, two in Hudson Canyon South and one in the Nantucket Lightship Closed Area. A description of the comparative gear trials for the four resource areas are shown in Tables 1-4. For each Closed Area, bycatch from the experimental and standard gear is expressed both in terms of numbers and weight captured (Tables 1a-4a). Tables 1b-4b express bycatch from the two gears relative to area covered. Numbers of bycatch per metric ton of sea scallops captured are shown in Tables 1c-4c. Weights of bycatch per metric ton of sea scallops captured are shown in Tables 1d-4d. Table 5 presents the summation of finfish and invertebrate bycatch for each gear configuration for all trips.

This information was supplied to the NMFS NEFSC at Woods Hole, MA to be incorporated into their Scallop Area Management Simulation.

Table 1

Description of comparative gear trials inside Closed Area I.

Closed Area	Georges Bank-Area I
Number of Cruises	2
Gear Width	15ft. x 2 (one 3.5" dredge and one 4.0" dredge)
Number of Tows Sampled	32
Dates of Trip	10/2/00-10/5/00
Dates of Trip	10/12/00-10/16/00
Area Covered by Each Dredge (km ²)	0.1565
Weight of All Scallop Meats (including discards) for 3.5" Ring Dredge (mt)	2.723
Weight of Retained Scallop Meats for 3.5" Ring Dredge (mt)	2.081
Weight of All Scallop Meats (including discards) for 4.0" Ring Dredge (mt)	2.989
Weight of Retained Scallop Meats for 4.0" Ring Dredge (mt)	2.361

Table 1a

Number and weight of finfish bycatch from comparative gear research inside Closed Area I. Trips were conducted 10/2/00 through 10/5/00 and 10/12/00 through 10/16/00. NW denotes that no weight was calculated for that species.

Common Name	Total Number (3.5")	Total Number (4.0")	Total Weight (3.5")	Total Weight (4.0")
Skate Uncl.	605	579	NW	NW
Silver Hake	17	9	3.239	1.506
Atlantic Cod	4	1	NW	NW
Red Hake	12	8	2.008	2.158
Fourspot Flounder	67	40	20.898	13.106
Yellowtail Flounder	40	42	18.617	20.717
Winter Flounder	50	49	50.474	57.626
Windowpane Flounder	64	66	16.971	18.623
Longhorn Sculpin	80	68	15.139	12.510
Sea Raven	23	11	15.279	7.224
Monkfish	41	33	169.617	138.817
Eelpout Uncl.	3	1	NW	NW
American Lobster	1	1	NW	NW
Squid Uncl.	1	2	NW	NW

Table 1b

Number and weight of finfish bycatch per square kilometer covered by the gear from comparative gear research inside Closed Area I. Trips were conducted 10/2/00 through 10/5/00 and 10/12/00 through 10/16/00. NW denotes that no weight was calculated for that species.

Common Name	Number per Km ² Towed (3.5")	Number per Km ² Towed (4.0")	Kilogram per Km ² Towed (3.5")	Kilogram per Km ² Towed (4.0")
Skate Uncl.	3868.222	3701.984	NW	NW
Silver Hake	108.694	57.544	20.711	9.630
Atlantic Cod	25.575	6.394	NW	NW
Red Hake	76.725	51.150	12.837	13.799
Fourspot Flounder	428.382	255.750	133.616	83.794
Yellowtail Flounder	255.750	268.538	119.032	132.459
Winter Flounder	319.688	313.294	322.717	368.448
Windowpane Flounder	409.200	421.988	108.509	119.072
Longhorn Sculpin	511.500	434.775	96.795	79.985
Sea Raven	147.056	70.331	97.688	46.188
Monkfish	262.144	210.994	1084.492	887.565
Eelpout Uncl.	19.181	6.394	NW	NW
American Lobster	6.394	6.394	NW	NW
Squid Uncl.	6.394	12.788	NW	NW

Table 1c

Number of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside Closed Area I. Trips were conducted 10/2/00 through 10/5/00 and 10/12/00 through 10/16/00.

Common Name	Number per Metric Ton of Retained and Discarded Scallops (3.5")	Number per Metric Ton of Retained Scallops (3.5")	Number per Metric Ton of Retained and Discarded Scallops (4.0")	Number per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	222.203	290.676	193.699	245.241
Silver Hake	6.244	8.168	3.011	3.812
Atlantic Cod	1.469	1.922	0.335	0.424
Red Hake	4.407	5.765	2.676	3.388
Fourspot Flounder	24.608	32.191	13.382	16.942
Yellowtail Flounder	14.691	19.218	14.051	17.790
Winter Flounder	18.364	24.023	16.392	20.754
Windowpane Flounder	23.506	30.749	22.080	27.955
Longhorn Sculpin	29.382	38.436	22.749	28.802
Sea Raven	8.447	11.050	3.680	4.659
Monkfish	15.058	19.699	11.040	13.977
Eelpout Uncl.	1.102	1.441	0.335	0.424
American Lobster	0.367	0.480	0.335	0.424
Squid Uncl.	0.367	0.480	0.669	0.847

Table 1d

Weight of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside Closed Area I. Trips conducted 10/2/00 through 10/5/00 and 10/12/00 through 10/16/00. NW denotes that no weight was calculated for that species.

Common Name	Kilogram per Metric Ton of Retained and Discarded Scallops (3.5")	Kilogram per Metric Ton of Retained Scallops (3.5")	Kilogram per Metric Ton of Retained and Discarded Scallops (4.0")	Kilogram per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	NW	NW	NW	NW
Silver Hake	1.190	1.556	0.504	0.638
Atlantic Cod	NW	NW	NW	NW
Red Hake	0.737	0.965	0.722	0.914
Fourspot Flounder	7.675	10.040	4.384	5.551
Yellowtail Flounder	6.838	8.945	6.931	8.775
Winter Flounder	18.538	24.250	19.278	24.408
Windowpane Flounder	6.233	8.154	6.230	7.888
Longhorn Sculpin	5.560	7.274	4.185	5.299
Sea Raven	5.612	7.341	2.417	3.060
Monkfish	62.297	81.494	46.440	58.797
Eelpout Uncl.	NW	NW	NW	NW
American Lobster	NW	NW	NW	NW
Squid Uncl.	NW	NW	NW	NW

Table 2

Description for comparative gear trial inside Closed Area II.

Closed Area	Georges Bank-Area II
Number of Cruises	3
Gear Width	15ft. x 2 (one 3.5" dredge and one 4.0" dredge)
Number of Tows Sampled	67
Dates of Trip	7/11/00-7/19/00
Dates of Trip	9/7/00-9/10/00
Dates of Trip	6/20/01-6/25/01
Area Covered by Each Dredge (km ²)	2.552
Weight of All Scallop Meats (including discards) for 3.5" Ring Dredge (mt)	1.631
Weight of Retained Scallop Meats for 3.5" Ring Dredge (mt)	1.110
Weight of All Scallop Meats (including discards) for 4.0" Ring Dredge (mt)	1.477
Weight of Retained Scallop Meats for 4.0" Ring Dredge (mt)	1.120

Table 2a

Number and weight of finfish bycatch from comparative gear research inside Closed Area II. Trips were conducted 7/11/00 through 7/19/00, 9/7/00 through 9/10/00 and 6/20/01 through 6/25/01. NW denotes that no weight was calculated for that species.

Common Name	Total Number (3.5")	Total Number (4.0")	Total Weight (3.5")	Total Weight (4.0")
Skate Uncl.	6348	6365	NW	NW
Atlantic Torpedo	0	1		NW
Silver Hake	944	744	129.632	93.088
Atlantic Cod	2	1	NW	NW
Haddock	2	2	0.113	0.094
Red Hake	262	178	54.879	37.353
American Plaice	73	74	36.870	43.283
Summer Flounder	1	0	3.444	0.000
Fourspot Flounder	787	627	143.544	116.247
Yellowtail Flounder	2975	2959	1293.208	1364.380
Winter Flounder	17	12	19.589	9.669
Witch Flounder	150	151	71.778	77.631
Windowpane Flounder	161	184	48.872	55.460
Gulf Stream Flounder	1	0	NW	0.000
Longhorn Sculpin	664	384	126.587	74.046
Sea Raven	61	43	48.378	36.721
Monkfish	391	429	885.537	988.513
Eelpout Uncl.	5	2	NW	NW
American Lobster	1	1	NW	NW
Squid Uncl.	6	6	NW	NW

Table 2b

Number and weight of finfish bycatch per square kilometer covered by the gear from comparative gear research inside Closed Area II. Trips were conducted 7/11/00 through 7/19/00, 9/7/00 through 9/10/00 and 6/20/01 through 6/25/01. NW denotes that no weight was calculated for that species.

Common Name	Number per Km ² Towed (3.5")	Number per Km ² Towed (4.0")	Kilogram per Km ² Towed (3.5")	Kilogram per Km ² Towed (4.0")
Skate Uncl.	2487.453	2494.114	NW	NW
Atlantic Torpedo	0.000	0.392	0.000	NW
Silver Hake	369.905	291.535	50.796	36.476
Atlantic Cod	0.784	0.392	NW	NW
Haddock	0.784	0.784	0.044	0.037
Red Hake	102.664	69.749	21.504	14.637
American Plaice	28.605	28.997	14.447	16.960
Summer Flounder	0.392	0.000	1.349	0.000
Fourspot Flounder	308.385	245.689	56.247	45.551
Yellowtail Flounder	1165.749	1159.479	506.741	534.630
Winter Flounder	6.661	4.702	7.676	3.789
Witch Flounder	58.777	59.169	28.126	30.419
Windowpane Flounder	63.088	72.100	19.151	21.732
Gulf Stream Flounder	0.392	0.000	NW	0.000
Longhorn Sculpin	260.187	150.470	49.603	29.015
Sea Raven	23.903	16.849	18.957	14.389
Monkfish	153.213	168.103	346.996	387.347
Eelpout Uncl.	1.959	0.784	NW	NW
American Lobster	0.392	0.392	NW	NW
Squid Uncl.	2.351	2.351	NW	NW

Table 2c

Number of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside Closed Area II. Trips were conducted 7/11/00 through 7/19/00, 9/7/00 through 9/10/00 and 6/20/01 through 6/25/01.

Common Name	Number per Metric Ton of Retained and Discarded Scallops (3.5")	Number per Metric Ton of Retained Scallops (3.5")	Number per Metric Ton of Retained and Discarded Scallops (4.0")	Number per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	3891.313	5721.114	4309.146	5680.735
Atlantic Torpedo	0.000	0.000	0.677	0.892
Silver Hake	578.670	850.777	503.693	664.017
Atlantic Cod	1.226	1.802	0.677	0.892
Haddock	1.226	1.802	1.354	1.785
Red Hake	160.606	236.127	120.507	158.864
American Plaice	44.749	65.791	50.098	66.045
Summer Flounder	0.613	0.901	0.000	0.000
Fourspot Flounder	482.430	709.281	424.483	559.595
Yellowtail Flounder	1823.670	2681.209	2003.262	2640.895
Winter Flounder	10.421	15.321	8.124	10.710
Witch Flounder	91.950	135.187	102.228	134.767
Windowpane Flounder	98.693	145.101	124.569	164.219
Gulf Stream Flounder	0.613	0.901	0.000	0.000
Longhorn Sculpin	407.031	598.428	259.970	342.718
Sea Raven	37.393	54.976	29.111	38.377
Monkfish	239.682	352.387	290.436	382.881
Eelpout Uncl.	3.065	4.506	1.354	1.785
American Lobster	0.613	0.901	0.677	0.892
Squid Uncl.	3.678	5.407	4.062	5.355

Table 2d

Weight of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside Closed Area II. Trips were conducted 7/11/00 through 7/19/00, 9/7/00 through 9/10/00 and 6/20/01 through 6/25/01. NW denotes that no weight was calculated for that species.

Common Name	Kilogram per Metric Ton of Retained and Discarded Scallops (3.5")	Kilogram per Metric Ton of Retained Scallops (3.5")	Kilogram per Metric Ton of Retained and Discarded Scallops (4.0")	Kilogram per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	NW	NW	NW	NW
Atlantic Torpedo	0.000	0.000	NW	NW
Silver Hake	79.464	116.830	63.021	83.080
Atlantic Cod	NW	NW	NW	NW
Haddock	0.069	0.102	0.063	0.084
Red Hake	33.640	49.459	25.288	33.337
American Plaice	22.601	33.229	29.303	38.630
Summer Flounder	2.111	3.104		
Fourspot Flounder	87.992	129.368	78.700	103.750
Yellowtail Flounder	792.735	1165.500	923.694	1217.703
Winter Flounder	12.008	17.655	6.546	8.629
Witch Flounder	44.000	64.690	52.556	69.285
Windowpane Flounder	29.959	44.046	37.547	49.498
Gulf Stream Flounder	NW	NW	0.000	0.000
Longhorn Sculpin	77.598	114.086	50.130	66.086
Sea Raven	29.656	43.601	24.860	32.773
Monkfish	542.833	798.087	669.230	882.244
Eelpout Uncl.	NW	NW	NW	NW
American Lobster	NW	NW	NW	NW
Squid Uncl.	NW	NW	NW	NW

Table 3

Description of comparative gear research inside the Hudson Canyon Closed Area.

Closed Area	Hudson Canyon South
Number of Cruises	2
Gear Width	15ft. x 2 (one 3.5" dredge and one 4.0" dredge)
Number of Tows Sampled	55
Dates of Trip	6/02/01-6/07/01
Dates of Trip	9/22/01-9/29/01
Area Covered by Each Dredge (km ²)	2.4495
Weight of All Scallop Meats (including discards) for 3.5" Ring Dredge (mt)	2.438
Weight of Retained Scallop Meats for 3.5" Ring Dredge (mt)	1.958
Weight of All Scallop Meats (including discards) for 4.0" Ring Dredge (mt)	2.332
Weight of Retained Scallop Meats for 4.0" Ring Dredge (mt)	1.975

Table 3a

Number and weight of finfish bycatch from comparative gear research inside Hudson Canyon Closed Area. Trips were conducted 6/2/01 through 6/7/01 and 9/22/01 through 9/29/01. NW denotes that no weight was calculated for that species.

Common Name	Total Number (3.5")	Total Number (4.0")	Total Weight (3.5")	Total Weight (4.0")
Skate Uncl.	4442	4302	NW	NW
Silver Hake	157	192	10.502	12.477
Red Hake	206	207	15.689	16.133
American Plaice	9	7	2.570	3.023
Summer Flounder	8	9	7.172	7.923
Fourspot Flounder	408	245	78.504	40.865
Yellowtail Flounder	12	11	5.652	5.432
Winter Flounder	8	4	5.935	2.179
Witch Flounder	1	0	0.213	0.000
Windowpane Flounder	52	34	16.074	10.660
Butterfish	1	0	NW	0.000
Black Sea Bass	1	3	NW	NW
Longhorn Sculpin	1	0	0.341	0.000
Sea Raven	1	0	0.830	0.000
Armored Searobin	28	27	NW	NW
Monkfish	535	521	769.371	780.087
Squid Uncl.	1	0	NW	0.000

Table 3b

Number and weight of finfish bycatch per square kilometer covered by the gear from comparative gear research inside the Hudson Canyon Closed Area. Trips were conducted 6/2/01 through 6/7/01 and 9/22/01 through 9/29/01. NW denotes that no weight was calculated for that species.

Common Name	Number per Km ² Towed (3.5")	Number per Km ² Towed (4.0")	Kilogram per Km ² Towed (3.5")	Kilogram per Km ² Towed (4.0")
Skate Uncl.	1813.295	1756.145	NW	NW
Silver Hake	64.090	78.377	4.287	5.093
Red Hake	84.092	84.501	6.404	6.586
American Plaice	3.674	2.858	1.049	1.234
Summer Flounder	3.266	3.674	2.928	3.234
Fourspot Flounder	166.552	100.013	32.046	16.682
Yellowtail Flounder	4.899	4.490	2.307	2.217
Winter Flounder	3.266	1.633	2.423	0.890
Witch Flounder	0.408	0.000	0.087	0.000
Windowpane Flounder	21.227	13.879	6.562	4.352
Butterfish	0.408	0.000	NW	0.000
Black Sea Bass	0.408	1.225	NW	NW
Longhorn Sculpin	0.408	0.000	0.139	0.000
Sea Raven	0.408	0.000	0.339	0.000
Armored Searobin	11.430	11.022	NW	NW
Monkfish	218.396	212.680	314.069	318.444
Squid Uncl.	0.408	0.000	NW	0.000

Table 3c

Number of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside the Hudson Canyon Closed Area. Trips were conducted 6/2/01 through 6/7/01 and 9/22/01 through 9/29/01.

Common Name	Number per Metric Ton of Retained and Discarded Scallops (3.5")	Number per Metric Ton of Retained Scallops (3.5")	Number per Metric Ton of Retained and Discarded Scallops (4.0")	Number per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	1821.923	2268.806	1844.706	2178.119
Silver Hake	64.395	80.190	82.330	97.210
Red Hake	84.493	105.217	88.762	104.805
American Plaice	3.691	4.597	3.002	3.544
Summer Flounder	3.281	4.086	3.859	4.557
Fourspot Flounder	167.345	208.391	105.057	124.044
Yellowtail Flounder	4.922	6.129	4.717	5.569
Winter Flounder	3.281	4.086	1.715	2.025
Witch Flounder	0.410	0.511	0.000	0.000
Windowpane Flounder	21.328	26.560	14.579	17.214
Butterfish	0.410	0.511	0.000	0.000
Black Sea Bass	0.410	0.511	1.286	1.519
Longhorn Sculpin	0.410	0.511	0.000	0.000
Sea Raven	0.410	0.511	0.000	0.000
Armored Searobin	11.484	14.301	11.578	13.670
Monkfish	219.435	273.258	223.406	263.784
Squid Uncl.	0.410	0.511	0.000	0.000

Table 3d

Weight of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside the Hudson Canyon Closed Area. Trips were conducted 6/2/01 through 6/7/01 and 9/22/01 through 9/29/01. NW denotes that no weight was calculated for that species.

Common Name	Kilogram per Metric Ton of Retained and Discarded Scallops (3.5")	Kilogram per Metric Ton of Retained Scallops (3.5")	Kilogram per Metric Ton of Retained and Discarded Scallops (4.0")	Kilogram per Metric Ton of Retained Scallops (4.0")
Skate Uncl.	NW	NW	NW	NW
Silver Hake	4.307	5.364	5.350	6.317
Red Hake	6.435	8.013	6.918	8.168
American Plaice	1.054	1.313	1.296	1.531
Summer Flounder	2.942	3.663	3.398	4.012
Fourspot Flounder	32.199	40.097	17.523	20.690
Yellowtail Flounder	2.318	2.887	2.329	2.750
Winter Flounder	2.434	3.031	0.934	1.103
Witch Flounder	0.087	0.109	0.000	0.000
Windowpane Flounder	6.593	8.210	4.571	5.397
Butterfish	NW	NW	0.000	0.000
Black Sea Bass	NW	NW	NW	NW
Longhorn Sculpin	0.140	0.174	0.000	0.000
Sea Raven	0.340	0.424	0.000	0.000
Armored Searobin	NW	NW	NW	NW
Monkfish	315.564	392.965	334.503	394.961
Squid Uncl.	NW	NW	NW	NW

Table 4

Description inside the Nantucket Lightship Closed Area.

Closed Area	Georges Bank-Nantucket Lightship
Number of Cruises	1
Gear Width	15ft. x 2 (one 3.5" dredge and one 4.0" dredge)
Number of Tows Sampled	6
Dates of Trip	8/21/2001-8/23/01
Area Covered by Each Dredge (km ²) -	0.0085
Weight of All Scallop Meats (including discards) for 3.5" Ring Dredge (mt)	0.694
Weight of Retained Scallop Meats for 3.5" Ring Dredge (mt)	0.580
Weight of All Scallop Meats (including discards) for 4.0" Ring Dredge (mt)	0.806
Weight of Retained Scallop Meats for 4.0" Ring Dredge (mt)	0.697

Table 4a

Number and weight of finfish bycatch from comparative gear research inside the Nantucket Lightship Closed Area. A trip was conducted 8/21/01 through 8/23/01. NW denotes that no weight was calculated for that species.

Common Name	Total Number (3.5")	Total Number (4.0")	Total Weight (3.5")	Total Weight (4.0")
Spiny Dogfish	2	0	NW	0.000
Skate Uncl.	204	222	NW	NW
Red Hake	1	0	0.227	0.000
American Plaice	2	2	1.175	1.358
Summer Flounder	1	0	0.556	0.000
Fourspot Flounder	4	2	0.893	0.439
Yellowtail Flounder	21	35	10.086	15.962
Winter Flounder	13	14	7.713	7.532
Windowpane Flounder	2	0	0.327	0.000
Longhorn Sculpin	10	6	1.838	1.048
Sea Raven	2	5	1.646	3.924
Monkfish	5	8	12.369	31.618
EelPout Uncl.	1	1	NW	NW

Table 4b

Number and weight of finfish bycatch per square kilometer covered by the gear from comparative gear research inside the Nantucket Lightship Closed Area. A trip was conducted 8/21/01 through 8/23/01. NW denotes that no weight was calculated for that species.

Common Name	Number per Km ² Towed (3.5")	Number per Km ² Towed (4.0")	Kilogram per Km ² Towed (3.5")	Kilogram per Km ² Towed (4.0")
Spiny Dogfish	230.414	0.000	NW	0.000
Skate Uncl.	23502.272	25576.002	NW	NW
Red Hake	115.207	0.000	26.188	0.000
American Plaice	230.414	230.414	135.379	156.403
Summer Flounder	115.207	0.000	64.049	0.000
Fourspot Flounder	460.829	230.414	102.925	50.604
Yellowtail Flounder	2419.351	4032.252	1162.033	1838.982
Winter Flounder	1497.694	1612.901	888.571	867.708
Windowpane Flounder	230.414	0.000	37.723	0.000
Longhorn Sculpin	1152.072	691.243	211.698	120.692
Sea Raven	230.414	576.036	189.646	452.118
Monkfish	576.036	921.658	1424.943	3642.622
EelPout Uncl.	115.207	115.207	NW	NW

Table 4c

Number of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside the Nantucket Lightship Closed Area. A trip was conducted 8/21/01 through 8/23/01.

Common Name	Number per Metric Ton of Retained and Discarded Scallops (3.5")	Number per Metric Ton of Retained Scallops (3.5")	Number per Metric Ton of Retained and Discarded Scallops (4.0")	Number per Metric Ton of Retained Scallops (4.0")
Spiny Dogfish	2.881	3.448	0.000	0.000
Skate Uncl.	293.854	351.730	275.597	318.727
Red Hake	1.440	1.724	0.000	0.000
American Plaice	2.881	3.448	2.483	2.871
Summer Flounder	1.440	1.724	0.000	0.000
Fourspot Flounder	5.762	6.897	2.483	2.871
Yellowtail Flounder	30.250	36.208	43.450	50.250
Winter Flounder	18.726	22.414	17.380	20.100
Windowpane Flounder	2.881	3.448	0.000	0.000
Longhorn Sculpin	14.405	17.242	7.449	8.614
Sea Raven	2.881	3.448	6.207	7.179
Monkfish	7.202	8.621	9.931	11.486
EelPout Uncl.	1.440	1.724	1.241	1.436

Table 4d

Weight of finfish bycatch relative to weight of sea scallops harvested from comparative gear research inside the Nantucket Lightship Closed Area. A trip was conducted 8/21/01 through 8/23/01. NW denotes that no weight was calculated for that species.

Common Name	Kilogram per Metric Ton of Retained and Discarded Scallops (3.5")	Kilogram per Metric Ton of Retained Scallops (3.5")	Kilogram per Metric Ton of Retained and Discarded Scallops (4.0")	Kilogram per Metric Ton of Retained Scallops (4.0")
Spiny Dogfish	NW	NW	0.000	0.000
Skate Uncl.	NW	NW	NW	NW
Red Hake	0.327	0.392	0.000	0.000
American Plaice	1.693	2.026	1.685	1.949
Summer Flounder	0.801	0.959	0.000	0.000
Fourspot Flounder	1.287	1.540	0.545	0.631
Yellowtail Flounder	14.529	17.391	19.816	22.917
Winter Flounder	11.110	13.298	9.350	10.813
Windowpane Flounder	0.472	0.565	0.000	0.000
Longhorn Sculpin	2.647	3.168	1.301	1.504
Sea Raven	2.371	2.838	4.872	5.634
Monkfish	17.816	21.325	39.251	45.394
EelPout Uncl.	NW	NW	NW	NW

Table 5

Total catches of finfish and invertebrate bycatch for all experimental cruises in all closed areas. Per cent difference is the difference in the total catch from the 4.0' ring dredge relative to the total catch from the 3.5" ring dredge expressed as a percentage.

Common Name	Catch by 3.5" Rings	Catch by 4.0" Rings	% Difference
Spiny Dogfish	2	0	*
Skate Uncl.	11599	11468	-1.1
Torpedo Ray	0	1	*
Silver Hake	1118	945	-15.5
Atlantic Cod	6	2	-66.7
Haddock	2	2	0.0
Red Hake	481	393	-18.3
American Plaice	84	83	-1.2
Summer Flounder	10	9	-10.0
Fourspot Flounder	1266	914	-27.8
Yellowtail Flounder	3048	3047	0.0
Blackback Flounder	88	79	-10.2
Grey Sole	151	151	0.0
Windowpane Flounder	279	284	1.8
Gulfstream Flounder	1	0	*
Butterfish	1	0	*
Black Sea Bass	1	3	200.0
Longhorn Sculpin	755	458	-39.3
Sea Raven	87	59	-32.2
Armored Searobin	28	27	-3.6
Monkfish	972	991	2.0
Eelpout Uncl.	9	4	-55.6
American Lobster	2	2	0.0
Squid Uncl.	8	8	0.0

Literature cited

NEFSC (1999) [Report of the] 29th Northeast Regional Stock Assessment Workshop (29th SAW). Stock Assessment Review Committee (SARC) consensus summary of assessments. Fish. Sci. Cent. Ref. Doc. 99-14. 347 pp.

Wigley, S. E., H. M. McBride and N. J. McHugh. (in review). Length-weight relationships for 74 species collected during NEFSC research vessel bottom trawl surveys, 1992-1999. NOAA Technical Report.