Estimation of smooth dogfish discards in the Northeast United States fisheries using data collected by the Northeast Fisheries Observer Program

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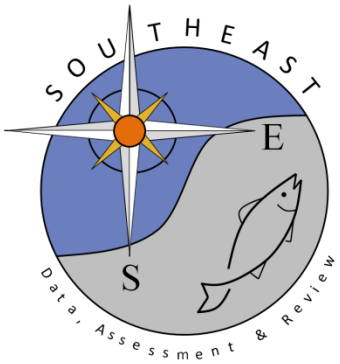

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ABSTRACT

Discards were estimated following the NEFSC Standardized Bycatch Reporting Methodology. Total discards range from 1080 mt in 1989 to a low of 41 mt in 2012. On average, otter trawls account for 75 percent of the total with sink gill net around 23 percent. Longline discards represent a very small portion of the total. Overall CV ranged from a low of 15% in 2010 to a high of 82% in 1989.

INTRODUCTION

Discards are an important component in any stock assessment. The NEFSC implemented an observer program in 1989 with the intent of developing estimates of discards of all species in the Northeast Region's fleets. Coverage has changed over time and has generally improved in recent years.

METHODS/RESULTS/DISCUSSION

Discard estimates were estimated using a ratio-estimator based on the methodology described in Rago et al. (2005) and updated in Wigley et al 2007. It relies on a d/k ratio where the kept component is defined as the total landings of all species within a "fishery". A fishery is defined as a homogeneous group of vessels with respect to gear type (longline, otter trawl, and sink gill net), quarter (months 1-3, 4-6, 7-9, 10-12), and region (NE -Maine, New Hampshire, Massachusetts and Rhode Island; MA-Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina). Mesh size was not used to split out otter trawl trips or sink gill net trips. All trips were included if they occurred within this stratification regardless of whether or not they caught smooth dogfish.

The discard ratio for smooth dogfish in stratum h is the sum of discard weight over all trips divided by sum of kept weights over all trips:

$$\hat{R}_h = \frac{\sum_{i=1}^{n_h} d_{ih}}{\sum_{i=1}^{n_h} k_{ih}} \qquad (1)$$

where d_{ih} is the discards for dogfish within trip i in stratum h and k_{ih} is the kept component of the catch for all species. R_h is the discard rate in stratum h. The stratum weighted discard to kept ratio is obtained by weighted sum of discard ratios over all strata:

$$\hat{R} = \sum_{h=1}^{H} \left(\frac{N_h}{\sum_{h=1}^{H} N_h} \right) \hat{R}_h \qquad (2)$$

The total discard within a strata is simply the product of the estimate discard ratio R and the total landings for the fishery defined as stratum h, i.e., $D_h=R_hK_h$.

Missing cells or cells with less than 3 trips sampled were imputed using averages of existing cells. If information existed in the same region, the annual average discard ratio was applied in the missing cells. There were some cases for the longline fishery in which the entire year was averaged for the MA over the time series and for NE over 1989-2005.. The details of the imputation are given in Appendix 1. To hind-cast the discards to 1972, the sum of the discards/the sum of the total landings by quarter for the first three years (1989-1991) was applied to the total landings from the dealer database. Region was not used in the hindcast because the MA states did not report any landings until 1978 and not all MA states reported until 1989. These estimates may still be an underestimate due to the differential reporting.

Estimated discards by fishery for 1972-2013 are summarized in Table 1. Total discards range from 1080 mt in 1989 to a low of 41 mt in 2012. On average, otter trawls account for 75 percent of the total with sink gill net around 23 percent. Longline discards represent a very small portion of the total. Overall CV ranged from a low of 15% in 2010 to a high of 82% in 1989.

REFERENCES

Rago, P.J., S. E. Wigley, and M. J. Fogarty. 2005. NEFSC Bycatch Estimation Methodology: Allocation, Precision, and Accuracy. NOAA/NMFS/NEFSC. NEFSC Ref. Doc. 05-09.

S.E. Wigley, S.E., P.J. Rago, K.A. Sosebee, and D.L. Palka. 2007. The Analytic Component to the Standardized Bycatch Reporting Methodology Omnibus Amendment: Sampling Design, and Estimation of Precision and Accuracy *(Second Edition)* NOAA/NMFS/NEFSC. Northeast Fisheries Science Center Reference Document 07-09.

Table 1. Estimated discards by fishery along with the corresponding CV.

Year	Longline	Otter Trawl	Sink Gill Net	Total	Otter Trawl	Sink Gill Net	Total
		discards				CV	
1972	3.2	519.6	1.0	523.7			
1973	3.7	472.8	1.1	477.6			
1974	3.7	437.1	1.8	442.6			
1975	3.6	418.6	2.0	424.2			
1976	2.0	474.3	3.0	479.4			
1977	1.6	527.0	4.2	532.8			
1978	3.4	561.8	5.6	570.8			
1979	4.4	603.3	5.3	612.9			
1980	3.3	690.7	7.3	701.2			
1981	2.3	598.3	8.3	608.9			
1982	1.6	757.6	5.5	764.8			
1983	1.4	718.0	5.2	724.6			
1984	1.1	629.0	6.1	636.2			
1985	1.1	538.9	5.9	545.8			
1986	1.4	516.0	6.4	523.7			
1987	2.2	472.8	6.3	481.2			
1988	2.0	443.0	6.7	451.7			
1989	1.6	1070.2	8.3	1080.2	83.30	2.55	82.53
1990	1.1	291.6	7.4	300.1	60.93	16.58	59.21
1991	2.7	134.8	13.5	151.0	57.57	26.65	51.45
1992	3.9	533.5	337.2	874.6	73.64	28.63	46.26
1993	2.9	63.3	244.9	311.1	65.60	25.87	24.35
1994	1.2	263.5	77.3	342.0	29.70	27.49	23.71
1995	2.1	382.8	61.1	446.0	24.84	24.96	21.59
1996	2.8	385.1	114.3	502.3	71.76	21.55	55.24
1997	3.2	150.2	48.0	201.4	58.30	24.08	43.86
1998	3.9	256.4	163.4	423.7	61.26	33.69	39.28
1999	2.3	53.7	256.2	312.2	69.71	48.23	41.36
2000	2.6	467.2	73.7	543.5	29.65	34.60	25.91
2001	5.3	213.4	67.4	286.1	50.26	58.55	39.95
2002	3.8	377.2	110.6	491.6	42.65	39.11	33.88
2003	5.2	121.8	217.0	344.1	42.79	41.32	30.15
2004	3.5	268.4	11.3	283.3	21.35	32.79	20.27
2005	11.0	647.9	262.9	921.8	44.70	67.83	36.90
2006	6.2	398.8	90.0	495.0	37.25	64.23	32.22
2007	4.5	594.9	73.0	672.4	26.05	33.24	23.33
2008	5.2	169.0	10.2	184.4	27.32	33.45	25.11
2009	6.8	359.9	28.4	395.1	17.89	40.51	16.56
2010	7.4	172.1	9.3	188.8	16.11	33.43	14.78
2011	8.0	290.1	30.4	328.5	17.90	92.13	17.96
2012	8.9	206.3	3.2	218.4	27.40	51.58	25.89
2013	7.6	306.4	83.4	397.4	16.29	38.17	14.89

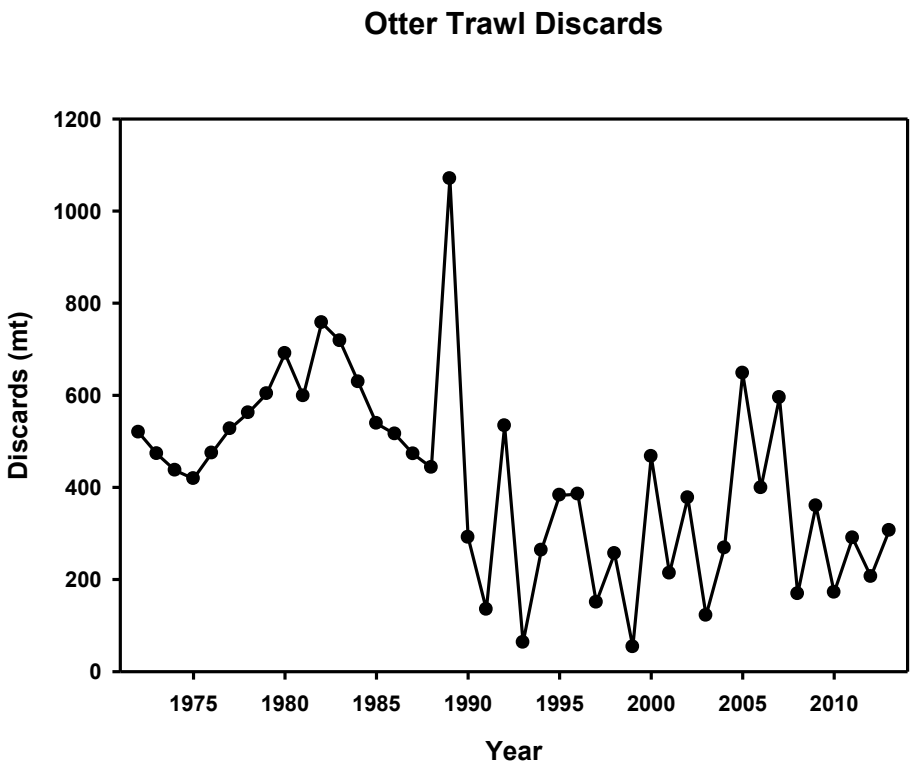

Figure 1. Discards of smooth dogfish in the Northeast United States otter trawl fisheries from 1972-2013.

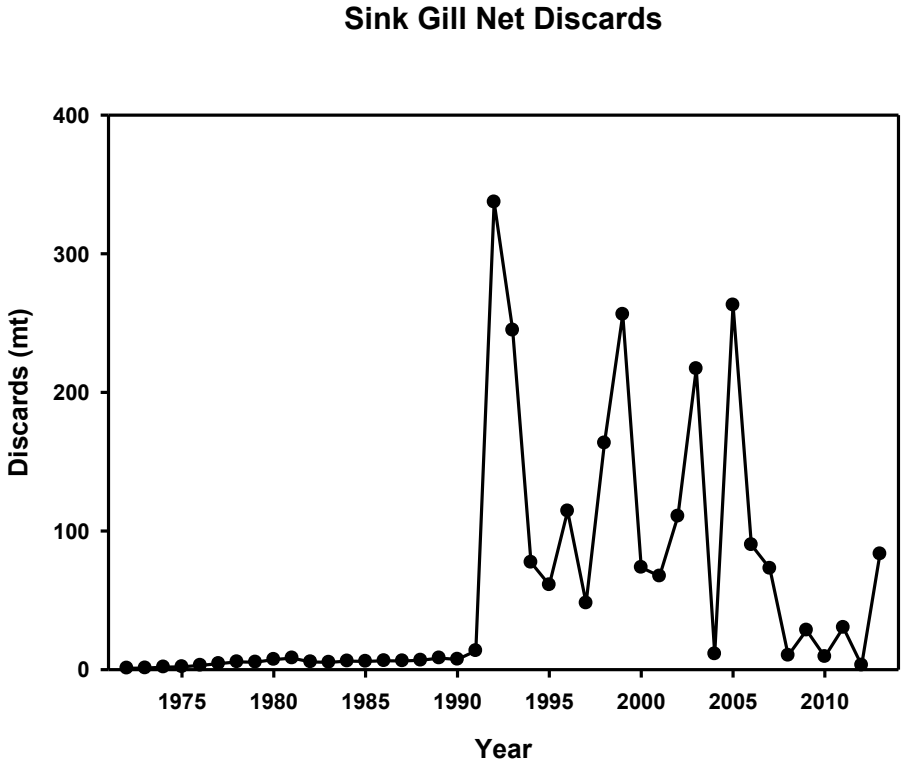

Figure 2. Discards of smooth dogfish in the Northeast United States gill net fisheries from 1972-2013.

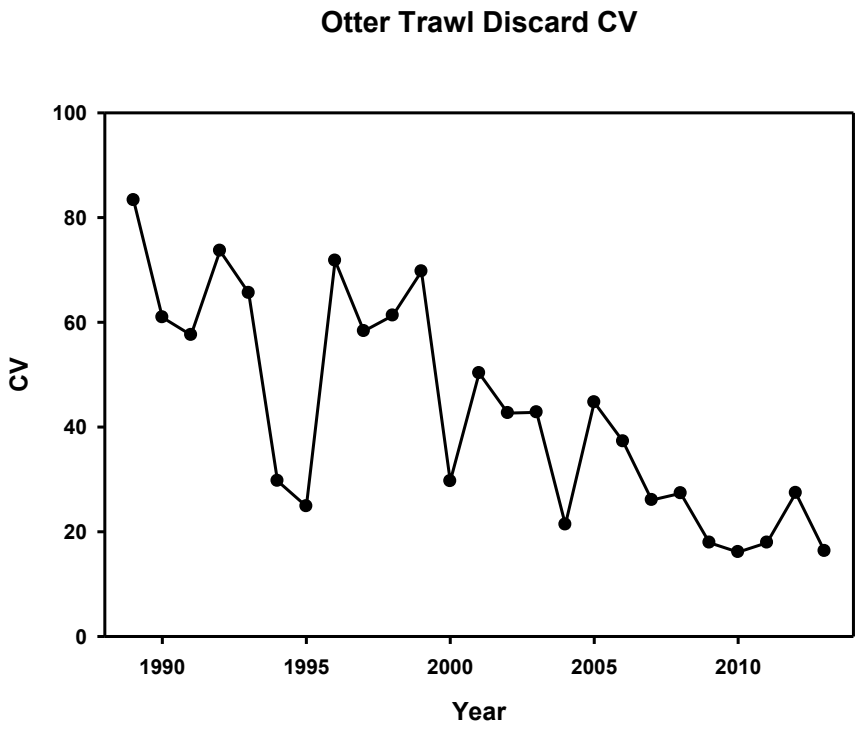

Figure 3. Coefficient of variation for estimates of discards in the northeast US otter trawl fishery from 1989-2013.

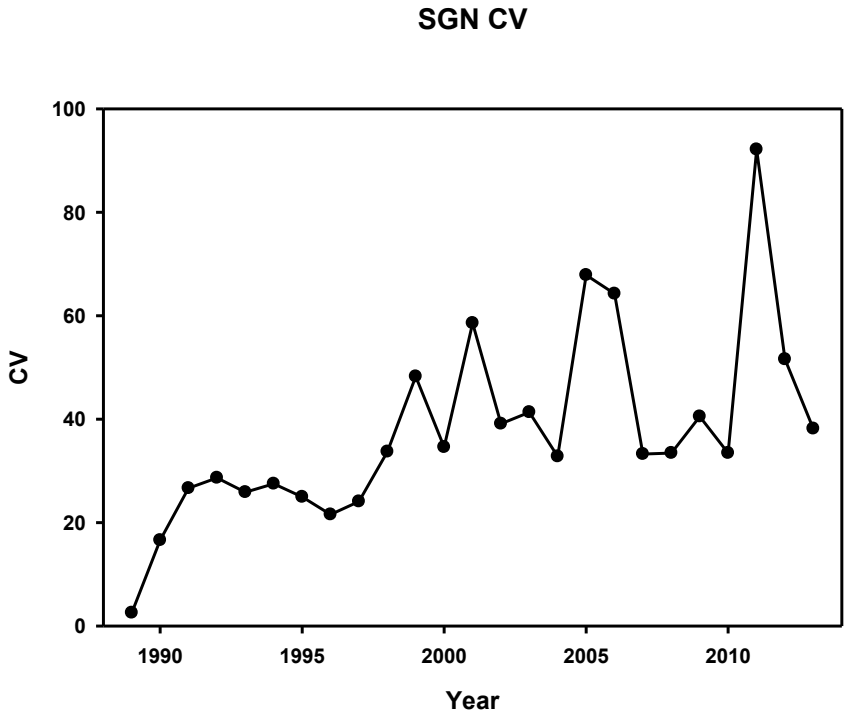

Figure 4. Coefficient of variation for estimates of discards in the northeast US gill net fishery from 1989-2013.

Appendix 1. Table 1. Discard estimation for smooth dogfish in the northeast United States Mid-Atlantic (Connecticut to North Carolina) longline fishery.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
1989	1	MA				0.00734	130.2	1.0
1989	2	MA				0.00734	34.3	0.3
1989	3	MA				0.00734	25.7	0.2
1989	4	MA				0.00734	31.7	0.2
1990	1	MA				0.00734	51.3	0.4
1990	2	MA				0.00734	20.7	0.2
1990	3	MA				0.00734	41.1	0.3
1990	4	MA				0.00734	35.3	0.3
1991	1	MA				0.00734	122.9	0.9
1991	2	MA				0.00734	99.8	0.7
1991	3	MA				0.00734	51.9	0.4
1991	4	MA				0.00734	99.0	0.7
1992	1	MA				0.00734	141.7	1.0
1992	2	MA	1	229	0	0.00734	149.3	1.1
1992	3	MA				0.00734	139.8	1.0
1992	4	MA				0.00734	95.9	0.7
1993	1	MA	1	4205	0	0.00734	117.0	0.9
1993	2	MA				0.00734	117.8	0.9
1993	3	MA	1	578	0	0.00734	63.0	0.5
1993	4	MA				0.00734	99.1	0.7
1994	1	MA	1	64	1	0.00734	57.4	0.4
1994	2	MA				0.00734	94.8	0.7
1994	3	MA				0.00734	3.0	0.0
1994	4	MA				0.00734	1.5	0.0
1995	1	MA	1	0	0	0.00734	106.8	0.8
1995	2	MA				0.00734	92.7	0.7
1995	3	MA				0.00734	46.8	0.3
1995	4	MA				0.00734	43.0	0.3
1996	1	MA				0.00734	77.5	0.6
1996	2	MA				0.00734	122.9	0.9
1996	3	MA				0.00734	95.7	0.7
1996	4	MA				0.00734	90.0	0.7
1997	1	MA				0.00734	60.2	0.4
1997	2	MA				0.00734	139.6	1.0
1997	3	MA				0.00734	132.5	1.0
1997	4	MA				0.00734	100.6	0.7
1998	1	MA				0.00734	104.1	0.8
1998	2	MA				0.00734	131.9	1.0
1998	3	MA	1	115	0	0.00734	61.8	0.5
1998	4	MA				0.00734	237.1	1.7
1999	1	MA				0.00734	77.7	0.6
1999	2	MA				0.00734	83.6	0.6
1999	3	MA				0.00734	77.4	0.6
1999	4	MA				0.00734	72.5	0.5
2000	1	MA				0.00734	83.4	0.6
2000	2	MA				0.00734	61.6	0.5
2000	3	MA				0.00734	68.4	0.5
2000	4	MA				0.00734	143.5	1.1
2001	1	MA				0.00734	108.8	0.8
2001	2	MA				0.00734	192.8	1.4

Appendix 1. Table 1. Cont.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
2001	3	MA				0.00734	183.4	1.3
2001	4	MA				0.00734	231.3	1.7
2002	1	MA				0.00734	167.0	1.2
2002	2	MA				0.00734	116.0	0.9
2002	3	MA				0.00734	90.2	0.7
2002	4	MA				0.00734	144.1	1.1
2003	1	MA				0.00734	126.8	0.9
2003	2	MA				0.00734	219.8	1.6
2003	3	MA				0.00734	206.3	1.5
2003	4	MA				0.00734	153.9	1.1
2004	1	MA				0.00734	79.2	0.6
2004	2	MA				0.00734	112.2	0.8
2004	3	MA				0.00734	127.2	0.9
2004	4	MA	1	1144	24	0.00734	153.1	1.1
2005	1	MA				0.00734	294.3	2.2
2005	2	MA				0.00734	371.4	2.7
2005	3	MA	1	11009	0	0.00734	482.0	3.5
2005	4	MA				0.00734	224.2	1.6
2006	1	MA				0.00734	152.9	1.1
2006	2	MA	1	25934	46	0.00734	157.6	1.2
2006	3	MA				0.00734	268.7	2.0
2006	4	MA	2	27314	619	0.00734	247.3	1.8
2007	1	MA				0.00734	71.9	0.5
2007	2	MA				0.00734	138.5	1.0
2007	3	MA	1	21469	6	0.00734	190.7	1.4
2007	4	MA	1	2793	0	0.00734	215.9	1.6
2008	1	MA				0.00734	210.5	1.5
2008	2	MA				0.00734	151.8	1.1
2008	3	MA				0.00734	171.8	1.3
2008	4	MA				0.00734	170.1	1.2
2009	1	MA				0.00734	135.6	1.0
2009	2	MA				0.00734	236.4	1.7
2009	3	MA				0.00734	274.6	2.0
2009	4	MA				0.00734	279.2	2.0
2010	1	MA				0.00734	206.9	1.5
2010	2	MA				0.00734	227.6	1.7
2010	3	MA				0.00734	375.8	2.8
2010	4	MA				0.00734	204.4	1.5
2011	1	MA				0.00734	156.5	1.1
2011	2	MA				0.00734	261.7	1.9
2011	3	MA				0.00734	325.9	2.4
2011	4	MA				0.00734	351.5	2.6
2012	1	MA				0.00734	113.0	0.8
2012	2	MA				0.00734	235.8	1.7
2012	3	MA				0.00734	490.4	3.6
2012	4	MA				0.00734	370.3	2.7
2013	1	MA				0.00734	143.1	1.1
2013	2	MA				0.00734	242.5	1.8
2013	3	MA				0.00734	391.0	2.9
2013	4	MA				0.00734	260.0	1.9

Appendix 1. Table 2. Discard estimation for smooth dogfish in the northeast United States New England (Maine to Rhode Island) longline fishery.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
1989	1	NE				0.00000	587.9	0.0
1989	2	NE				0.00000	719.6	0.0
1989	3	NE				0.00000	605.6	0.0
1989	4	NE				0.00000	229.4	0.0
1990	1	NE				0.00000	550.8	0.0
1990	2	NE				0.00000	555.5	0.0
1990	3	NE				0.00000	619.9	0.0
1990	4	NE				0.00000	229.7	0.0
1991	1	NE				0.00000	950.6	0.0
1991	2	NE	1	15961	0	0.00000	1103.5	0.0
1991	3	NE				0.00000	831.2	0.0
1991	4	NE	17	38368	0	0.00000	321.8	0.0
1992	1	NE	24	61868	0	0.00000	1602.3	0.0
1992	2	NE	7	4220	0	0.00000	1571.8	0.0
1992	3	NE				0.00000	1154.9	0.0
1992	4	NE				0.00000	922.1	0.0
1993	1	NE	2	296	0	0.00000	1678.7	0.0
1993	2	NE				0.00000	1699.0	0.0
1993	3	NE				0.00000	1276.0	0.0
1993	4	NE				0.00000	956.0	0.0
1994	1	NE	1	481	0	0.00000	1128.5	0.0
1994	2	NE				0.00000	1550.0	0.0
1994	3	NE				0.00000	1482.7	0.0
1994	4	NE				0.00000	898.5	0.0
1995	1	NE				0.00000	1022.1	0.0
1995	2	NE				0.00000	1335.5	0.0
1995	3	NE				0.00000	1378.4	0.0
1995	4	NE				0.00000	1115.7	0.0
1996	1	NE				0.00000	1043.4	0.0
1996	2	NE				0.00000	1156.7	0.0
1996	3	NE				0.00000	959.8	0.0
1996	4	NE				0.00000	1095.5	0.0
1997	1	NE				0.00000	865.6	0.0
1997	2	NE				0.00000	1537.1	0.0
1997	3	NE				0.00000	1008.7	0.0
1997	4	NE				0.00000	1262.2	0.0
1998	1	NE				0.00000	978.1	0.0
1998	2	NE				0.00000	948.9	0.0
1998	3	NE				0.00000	1198.2	0.0
1998	4	NE				0.00000	1113.3	0.0
1999	1	NE				0.00000	673.7	0.0
1999	2	NE				0.00000	1164.6	0.0
1999	3	NE				0.00000	931.6	0.0
1999	4	NE				0.00000	970.9	0.0
2000	1	NE				0.00000	506.6	0.0
2000	2	NE				0.00000	546.8	0.0
2000	3	NE				0.00000	1795.7	0.0
2000	4	NE				0.00000	249.2	0.0
2001	1	NE				0.00000	462.2	0.0
2001	2	NE				0.00000	946.4	0.0

Appendix 1. Table 2. Cont.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
2001	3	NE				0.00000	669.9	0.0
2001	4	NE				0.00000	823.9	0.0
2002	1	NE				0.00000	637.3	0.0
2002	2	NE				0.00000	887.2	0.0
2002	3	NE	3	3264	0	0.00000	337.8	0.0
2002	4	NE	6	4720	0	0.00000	607.2	0.0
2003	1	NE	17	14025	0	0.00000	373.1	0.0
2003	2	NE				0.00000	147.5	0.0
2003	3	NE	2	6300	0	0.00000	610.2	0.0
2003	4	NE				0.00000	603.2	0.0
2004	1	NE	8	6639	0	0.00000	459.8	0.0
2004	2	NE	1	684	0	0.00000	137.1	0.0
2004	3	NE	8	34331	0	0.00000	370.0	0.0
2004	4	NE	104	531944	51	0.00010	714.6	0.1
2005	1	NE	54	89133	0	0.00000	749.8	0.0
2005	2	NE	34	118956	0	0.00000	539.5	0.0
2005	3	NE	17	81439	0	0.00000	702.9	0.0
2005	4	NE	186	628920	585	0.00093	989.4	0.9
2006	1	NE	39	70680	14	0.00020	433.5	0.1
2006	2	NE	6	16845	0	0.00000	210.0	0.0
2006	3	NE	5	33920	0	0.00000	177.8	0.0
2006	4	NE	49	129160	16	0.00012	430.9	0.1
2007	1	NE	17	28101	0	0.00000	501.8	0.0
2007	2	NE	7	22345	0	0.00000	253.5	0.0
2007	3	NE	10	7304	0	0.00000	298.7	0.0
2007	4	NE	57	188569	0	0.00000	366.0	0.0
2008	1	NE	10	4195	0	0.00000	276.0	0.0
2008	2	NE	17	101999	0	0.00000	279.6	0.0
2008	3	NE	4	5745	0	0.00000	284.8	0.0
2008	4	NE	48	214469	0	0.00000	379.1	0.0
2009	1	NE	13	14250	0	0.00000	212.3	0.0
2009	2	NE	22	155087	0	0.00000	434.7	0.0
2009	3	NE	32	95838	0	0.00000	374.3	0.0
2009	4	NE	23	53415	0	0.00000	315.8	0.0
2010	1	NE	24	21815	0	0.00000	187.5	0.0
2010	2	NE	48	151534	0	0.00000	472.6	0.0
2010	3	NE	91	263362	0	0.00000	804.2	0.0
2010	4	NE	29	104734	0	0.00000	257.1	0.0
2011	1	NE	46	60149	0	0.00000	277.4	0.0
2011	2	NE	31	74362	0	0.00000	413.7	0.0
2011	3	NE	35	108613	0	0.00000	816.9	0.0
2011	4	NE	6	8986	0	0.00000	244.2	0.0
2012	1	NE	68	67520	0	0.00000	404.7	0.0
2012	2	NE	39	73398	0	0.00000	311.1	0.0
2012	3	NE	91	279804	11	0.00004	1000.3	0.0
2012	4	NE	21	43993	0	0.00000	411.3	0.0
2013	1	NE	27	11408	0	0.00000	150.5	0.0
2013	2	NE	5	5262	0	0.00000	262.4	0.0
2013	3	NE				0.00000	657.0	0.0
2013	4	NE	4	11015	0	0.00000	418.0	0.0

Appendix 1. Table 3. Discard estimation for smooth dogfish in the northeast United States Mid-Atlantic (Connecticut to North Carolina) otter trawl fishery.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
1989	1	MA	9	178902	29	0.00016	15694.1	2.5
1989	2	MA	8	77170	44	0.00057	8372.7	4.8
1989	3	MA	8	18373	2102	0.11441	7977.0	912.6
1989	4	MA	15	102362	0	0.00000	10598.6	0.0
1990	1	MA	13	172034	0	0.00000	13500.5	0.0
1990	2	MA	15	108234	2243	0.02072	8020.0	166.2
1990	3	MA	9	19343	221	0.01143	10432.3	119.2
1990	4	MA	11	99774	0	0.00000	12287.0	0.0
1991	1	MA	18	586796	0	0.00000	21446.9	0.0
1991	2	MA	20	71595	723	0.01010	10533.7	106.4
1991	3	MA	10	542954	870	0.00160	12487.3	20.0
1991	4	MA	40	686250	405	0.00059	12278.4	7.2
1992	1	MA	31	373713	199	0.00053	22866.7	12.2
1992	2	MA	8	62314	10	0.00016	12659.0	2.0
1992	3	MA	8	22224	468	0.02106	14679.5	309.1
1992	4	MA	14	246464	3834	0.01556	12982.9	202.0
1993	1	MA	10	285147	0	0.00000	19436.6	0.0
1993	2	MA	3	8304	0	0.00000	10203.9	0.0
1993	3	MA	7	20599	12	0.00058	16380.5	9.5
1993	4	MA	10	49079	146	0.00297	10048.9	29.9
1994	1	MA	14	364148	76	0.00021	15437.8	3.2
1994	2	MA	7	23670	67	0.00283	14364.8	40.7
1994	3	MA	8	39446	83	0.00210	15612.1	32.9
1994	4	MA	11	124656	1893	0.01519	11142.2	169.2
1995	1	MA	16	240741	42	0.00017	12747.5	2.2
1995	2	MA	25	60389	1548	0.02563	11070.0	283.8
1995	3	MA	60	219819	989	0.00450	11534.4	51.9
1995	4	MA	26	131394	553	0.00421	9990.7	42.0
1996	1	MA	10	163467	131	0.00080	20299.5	16.3
1996	2	MA	26	580799	1703	0.00293	11008.6	32.3
1996	3	MA	42	1139700	30525	0.02678	9669.8	259.0
1996	4	MA	30	787966	670	0.00085	9001.3	7.7
1997	1	MA	31	423875	2237	0.00528	14597.2	77.0
1997	2	MA	3	139634	0	0.00000	8950.9	0.0
1997	3	MA	22	2318739	2449	0.00106	14808.0	15.6
1997	4	MA	4	131699	12	0.00009	12927.6	1.2
1998	1	MA	20	327189	98	0.00030	16902.2	5.1
1998	2	MA	5	71297	100	0.00140	16664.5	23.4
1998	3	MA	5	348355	15	0.00004	16456.3	0.7
1998	4	MA	21	111098	2848	0.02564	8864.5	227.2
1999	1	MA	15	419567	70	0.00017	13285.1	2.2
1999	2	MA	11	629911	1899	0.00301	8869.7	26.7
1999	3	MA	12	226707	8	0.00004	10657.8	0.4
1999	4	MA	18	202079	384	0.00190	10247.9	19.5
2000	1	MA	31	1092376	1763	0.00161	13542.1	21.9
2000	2	MA	16	517177	483	0.00093	6623.3	6.2
2000	3	MA	20	939958	375	0.00040	12155.7	4.8
2000	4	MA	12	54588	2441	0.04472	7702.0	344.4

Appendix 1. Table 3. Cont.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
2001	1	MA	31	2469168	2000	0.00081	9104.7	7.4
2001	2	MA	21	724365	277	0.00038	6334.8	2.4
2001	3	MA	52	669688	11227	0.01676	7176.1	120.3
2001	4	MA	21	154985	1643	0.01060	7221.7	76.6
2002	1	MA	20	636320	1002	0.00157	8446.6	13.3
2002	2	MA	12	14028	898	0.06401	5120.9	327.8
2002	3	MA	48	249018	751	0.00302	7001.8	21.1
2002	4	MA	8	72007	0	0.00000	7750.9	0.0
2003	1	MA	17	207854	100	0.00048	10890.0	5.2
2003	2	MA	29	109924	722	0.00656	4292.0	28.2
2003	3	MA	23	2195881	333	0.00015	5804.5	0.9
2003	4	MA	27	734721	4700	0.00640	7057.2	45.1
2004	1	MA	74	1226296	197	0.00016	9737.5	1.6
2004	2	MA	72	400660	2767	0.00691	13857.2	95.7
2004	3	MA	86	2487965	3540	0.00142	21219.6	30.2
2004	4	MA	150	1299516	8710	0.00670	9244.6	62.0
2005	1	MA	61	1213312	10892	0.00898	13191.0	118.4
2005	2	MA	48	331752	11054	0.03332	8666.4	288.8
2005	3	MA	80	536662	6926	0.01290	10990.0	141.8
2005	4	MA	74	820353	4602	0.00561	7634.2	42.8
2006	1	MA	54	1773367	3016	0.00170	29739.7	50.6
2006	2	MA	50	1697313	3316	0.00195	7571.6	14.8
2006	3	MA	73	2877922	7370	0.00256	13323.1	34.1
2006	4	MA	49	211723	6098	0.02880	9547.8	275.0
2007	1	MA	43	886068	16728	0.01888	9210.2	173.9
2007	2	MA	82	158135	10378	0.06563	3714.8	243.8
2007	3	MA	184	3093808	11648	0.00376	9826.3	37.0
2007	4	MA	74	574463	8546	0.01488	5824.4	86.6
2008	1	MA	52	1175635	1438	0.00122	6607.3	8.1
2008	2	MA	90	287349	2824	0.00983	3900.1	38.3
2008	3	MA	78	1528628	3717	0.00243	14370.8	34.9
2008	4	MA	68	675017	4547	0.00674	7109.2	47.9
2009	1	MA	70	937558	1275	0.00136	11344.7	15.4
2009	2	MA	103	2504009	9714	0.00388	6486.0	25.2
2009	3	MA	121	1720362	12585	0.00732	13779.6	100.8
2009	4	MA	156	1007794	23334	0.02315	7068.9	163.7
2010	1	MA	125	2424784	5127	0.00211	8975.3	19.0
2010	2	MA	200	2859866	6658	0.00233	8489.5	19.8
2010	3	MA	179	3470948	8290	0.00239	12719.2	30.4
2010	4	MA	117	1399229	8498	0.00607	5913.4	35.9
2011	1	MA	114	2818986	3322	0.00118	11686.1	13.8
2011	2	MA	140	2006736	7663	0.00382	11752.3	44.9
2011	3	MA	174	1907397	16861	0.00884	14235.1	125.8
2011	4	MA	180	1751408	23729	0.01355	5782.9	78.3
2012	1	MA	138	1959917	9514	0.00485	8728.0	42.4
2012	2	MA	47	539179	3757	0.00697	7117.5	49.6
2012	3	MA	90	1484179	5683	0.00383	11936.9	45.7
2012	4	MA	112	495477	3083	0.00622	6329.4	39.4
2013	1	MA	109	2725412	7245	0.00266	8501.9	22.6

Appendix 1. Table 3. Cont.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
2013	2	MA	207	679898	11362	0.01671	3631.5	60.7
2013	3	MA	180	3294969	26548	0.00806	11043.4	89.0
2013	4	MA	142	1530527	12211	0.00798	7972.9	63.6

Appendix 1. Table 4. Discard estimation for smooth dogfish in the northeast United States New England (Maine to Rhode Island) otter trawl fishery.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
1989	1	NE	14	123679	0	0.00000	22117.2	0.0
1989	2	NE	41	425080	1445	0.00340	28941.0	98.4
1989	3	NE	61	709212	428	0.00060	20429.7	12.3
1989	4	NE	29	269854	530	0.00196	20146.8	39.6
1990	1	NE	15	211141	0	0.00000	21574.3	0.0
1990	2	NE	21	514410	75	0.00015	32540.2	4.7
1990	3	NE	19	306434	14	0.00005	31816.2	1.5
1990	4	NE	30	236443	0	0.00000	27573.2	0.0
1991	1	NE	33	409022	0	0.00000	21151.9	0.0
1991	2	NE	32	281895	0	0.00000	34226.2	0.0
1991	3	NE	47	683149	0	0.00000	29625.7	0.0
1991	4	NE	68	582223	27	0.00005	24267.5	1.1
1992	1	NE	54	590152	110	0.00019	19483.5	3.6
1992	2	NE	22	306243	0	0.00000	32063.9	0.0
1992	3	NE	27	474658	0	0.00000	26230.9	0.0
1992	4	NE	23	282046	63	0.00022	20400.1	4.6
1993	1	NE	20	210685	0	0.00000	15901.9	0.0
1993	2	NE	19	292019	241	0.00083	23190.8	19.1
1993	3	NE	18	328848	58	0.00018	26977.3	4.8
1993	4	NE	20	320502	0	0.00000	21392.4	0.0
1994	1	NE	27	517436	0	0.00000	16675.0	0.0
1994	2	NE	11	316060	0	0.00000	19483.9	0.0
1994	3	NE	5	65251	17	0.00026	24185.1	6.3
1994	4	NE	15	100236	60	0.00060	18869.6	11.3
1995	1	NE	30	507678	33	0.00007	14944.1	1.0
1995	2	NE	16	252228	0	0.00000	19016.5	0.0
1995	3	NE	33	215156	22	0.00010	18328.3	1.9
1995	4	NE	35	212494	0	0.00000	14900.3	0.0
1996	1	NE	11	166403	0	0.00000	14127.0	0.0
1996	2	NE	27	326877	448	0.00137	21558.8	29.5
1996	3	NE	37	295703	533	0.00180	22406.8	40.4
1996	4	NE	29	184628	0	0.00000	21540.9	0.0
1997	1	NE	31	353123	16	0.00005	14064.5	0.6
1997	2	NE	13	99186	249	0.00251	20472.0	51.4
1997	3	NE	12	443976	89	0.00020	18997.0	3.8
1997	4	NE	3	85231	3	0.00004	15431.2	0.5
1998	1	NE	10	199769	0	0.00000	18654.6	0.0
1998	2	NE	8	11264	0	0.00000	19590.9	0.0
1998	3	NE	5	87064	0	0.00000	20345.2	0.0
1998	4	NE				0.00000	18096.1	0.0
1999	1	NE	6	106157	0	0.00000	16668.8	0.0
1999	2	NE	15	242850	58	0.00024	20471.8	4.9
1999	3	NE	14	66455	0	0.00000	17809.3	0.0
1999	4	NE	33	213061	0	0.00000	16221.3	0.0
2000	1	NE	37	508249	2400	0.00472	18362.9	86.7
2000	2	NE	62	263282	13	0.00005	19192.6	0.9
2000	3	NE	33	326823	8	0.00002	18563.7	0.5
2000	4	NE	39	478345	48	0.00010	17437.7	1.7

Appendix 1. Table 4. Cont.

YEAR	QTR	region	ntrips	Kept all	discard	dkratio	Total mt kept	Disc mt
2001	1	NE	32	486507	75	0.00015	21968.2	3.4
2001	2	NE	41	406760	2	0.00000	22451.2	0.1
2001	3	NE	64	422168	70	0.00017	19678.8	3.3
2001	4	NE	69	544770	0	0.00000	19993.5	0.0
2002	1	NE	31	409537	20	0.00005	20190.8	1.0
2002	2	NE	26	492938	110	0.00022	21244.0	4.7
2002	3	NE	141	1489876	249	0.00017	16848.5	2.8
2002	4	NE	154	1760118	762	0.00043	14911.0	6.5
2003	1	NE	137	2038509	0	0.00000	20099.0	0.0
2003	2	NE	110	2096438	143	0.00007	18672.4	1.3
2003	3	NE	130	1431376	1090	0.00076	17161.0	13.1
2003	4	NE	123	1583908	2224	0.00140	19991.3	28.1
2004	1	NE	115	2073309	55	0.00003	20422.9	0.5
2004	2	NE	136	2070256	2301	0.00111	21134.9	23.5
2004	3	NE	237	2075269	3580	0.00173	30085.6	51.9
2004	4	NE	288	2613765	491	0.00019	16317.2	3.1
2005	1	NE	384	7203720	524	0.00007	15855.8	1.2
2005	2	NE	353	7886510	3879	0.00049	15329.5	7.5
2005	3	NE	501	4069688	9557	0.00235	17828.3	41.9
2005	4	NE	406	5006042	1769	0.00035	15628.9	5.5
2006	1	NE	323	4476268	4	0.00000	13347.1	0.0
2006	2	NE	135	2296962	1128	0.00049	12389.6	6.1
2006	3	NE	174	2835830	2256	0.00080	13532.0	10.8
2006	4	NE	92	1279127	851	0.00067	11258.9	7.5
2007	1	NE	147	2824312	42	0.00001	15730.3	0.2
2007	2	NE	196	3596510	1842	0.00051	12065.6	6.2
2007	3	NE	198	3041611	6782	0.00223	12118.0	27.0
2007	4	NE	195	3021010	4813	0.00159	12648.1	20.2
2008	1	NE	196	3473070	7	0.00000	14516.7	0.0
2008	2	NE	193	3375612	8460	0.00251	12324.3	30.9
2008	3	NE	187	3823763	2192	0.00057	13188.6	7.6
2008	4	NE	257	4294811	474	0.00011	12129.6	1.3
2009	1	NE	282	3466869	15	0.00000	13722.6	0.1
2009	2	NE	233	3726513	5842	0.00157	12894.1	20.2
2009	3	NE	359	4400656	9540	0.00217	15160.3	32.9
2009	4	NE	260	2739077	406	0.00015	11589.5	1.7
2010	1	NE	157	3087947	1906	0.00062	13759.4	8.5
2010	2	NE	357	5995293	5370	0.00090	14675.7	13.1
2010	3	NE	457	4458287	17733	0.00398	10630.4	42.3
2010	4	NE	423	4146289	1224	0.00030	10721.0	3.2
2011	1	NE	472	5732018	17	0.00000	12725.7	0.0
2011	2	NE	477	6993724	3206	0.00046	14791.5	6.8
2011	3	NE	414	4755800	5448	0.00115	12446.9	14.3
2011	4	NE	539	6150003	3357	0.00055	11396.5	6.2
2012	1	NE	622	9233475	405	0.00004	16615.7	0.7
2012	2	NE	397	3293668	4259	0.00129	14903.4	19.3
2012	3	NE	306	2761633	3057	0.00111	8183.5	9.1
2012	4	NE	456	3611995	58	0.00002	10013.6	0.2
2013	1	NE	418	3812154	554	0.00015	14003.3	2.0
2013	2	NE	349	3292713	8096	0.00246	11110.5	27.3
2013	3	NE	288	3146851	10607	0.00337	10245.0	34.5
2013	4	NE	316	3568709	1963	0.00055	12112.3	6.7

Appendix 1. Table 5. Discard estimation for smooth dogfish in the northeast United States Mid-Atlantic (Connecticut to North Carolina) sink gill net fishery.

YEAR	QTR	region	Number of trips	Kept all	discard	Dk ratio	Total mt kept	Disc mt
1989	1	MA				0.00205	431.8	0.9
1989	2	MA				0.00205	1416.8	2.9
1989	3	MA				0.00205	1410.5	2.9
1989	4	MA				0.00205	633.1	1.3
1990	1	MA				0.00205	695.4	1.4
1990	2	MA	1	256	0	0.00205	1027.1	2.1
1990	3	MA				0.00205	1099.3	2.3
1990	4	MA	3	4267	0	0.00000	955.2	0.0
1991	1	MA				0.00205	801.6	1.6
1991	2	MA	2	5174	0	0.00205	1682.6	3.4
1991	3	MA				0.00205	1901.7	3.9
1991	4	MA				0.00205	1583.4	3.2
1992	1	MA	4	130850	0	0.00000	880.5	0.0
1992	2	MA	2	28571	0	0.00205	1956.1	4.0
1992	3	MA				0.00205	1845.0	3.8
1992	4	MA				0.00205	1254.4	2.6
1993	1	MA	3	88819	0	0.00205	1750.7	3.6
1993	2	MA				0.00205	2380.0	4.9
1993	3	MA	8	6164	176	0.02855	2679.6	76.5
1993	4	MA	12	22923	412	0.01797	1949.4	35.0
1994	1	MA	63	382155	9306	0.02435	1107.4	27.0
1994	2	MA	37	104785	1036	0.00988	2517.0	24.9
1994	3	MA	53	75609	177	0.00233	3124.0	7.3
1994	4	MA	74	260986	1294	0.00496	1714.4	8.5
1995	1	MA	153	687440	483	0.00070	1355.1	1.0
1995	2	MA	81	193525	2629	0.01358	2957.6	40.2
1995	3	MA	51	78390	222	0.00283	2089.9	5.9
1995	4	MA	99	235888	349	0.00148	2748.1	4.1
1996	1	MA	136	716532	531	0.00074	3374.7	2.5
1996	2	MA	81	232332	2326	0.01001	4983.8	49.9
1996	3	MA	51	69453	871	0.01254	2945.9	36.9
1996	4	MA	71	187467	975	0.00520	4062.1	21.1
1997	1	MA	153	617744	701	0.00113	6506.2	7.4
1997	2	MA	74	232762	1089	0.00468	4177.9	19.5
1997	3	MA	40	71103	176	0.00248	3370.2	8.3
1997	4	MA	58	160402	339	0.00211	4079.1	8.6
1998	1	MA	185	716392	454	0.00063	5766.5	3.7
1998	2	MA	37	108014	306	0.00283	5595.4	15.9
1998	3	MA	7	6762	10	0.00148	3301.4	4.9
1998	4	MA	34	72524	841	0.01160	5666.6	65.7
1999	1	MA	25	58710	2	0.00003	6791.5	0.2
1999	2	MA	17	23159	75	0.00324	5432.2	17.6
1999	3	MA	11	8429	189	0.02242	2666.9	59.8
1999	4	MA	21	22143	1065	0.04810	3701.7	178.0
2000	1	MA	28	43208	86	0.00199	5153.5	10.3
2000	2	MA	16	20861	115	0.00551	4065.8	22.4
2000	3	MA	8	20701	110	0.00533	3458.0	18.4
2000	4	MA	31	54081	338	0.00624	3487.7	21.8
2001	1	MA	24	53703	24	0.00044	2959.8	1.3
2001	2	MA	25	46505	141	0.00302	3865.7	11.7
2001	3	MA	6	4520	0	0.00000	2797.4	0.0

Appendix 1. Table 5. Discard estimation for smooth dogfish in the northeast United States Mid-Atlantic (Connecticut to North Carolina) sink gill net fishery.

YEAR	QTR	region	Number of trips	Kept all	discard	Dk ratio	Total mt kept	Disc mt
2001	4	MA	24	27137	375	0.01380	3947.4	54.5
2002	1	MA	12	25717	8	0.00031	2888.2	0.9
2002	2	MA	13	17231	209	0.01210	3902.2	47.2
2002	3	MA	8	5690	2	0.00035	2731.2	1.0
2002	4	MA	19	26158	203	0.00776	3022.8	23.5
2003	1	MA	10	15332	187	0.01216	2844.8	34.6
2003	2	MA	16	26906	956	0.03553	4787.4	170.1
2003	3	MA	13	22697	44	0.00194	2373.7	4.6
2003	4	MA	5	20187	0	0.00000	3384.7	0.0
2004	1	MA	1	3046	0	0.00000	3564.9	0.0
2004	2	MA	2	3174	0	0.00000	2930.2	0.0
2004	3	MA				0.00000	2329.5	0.0
2004	4	MA	47	67317	195	0.00289	2784.6	8.1
2005	1	MA	9	22404	0	0.00000	4426.2	0.0
2005	2	MA	63	163105	362	0.00222	4062.6	9.0
2005	3	MA	8	13493	1284	0.09516	2501.5	238.0
2005	4	MA	24	54342	168	0.00308	3343.7	10.3
2006	1	MA	20	41075	0	0.00000	2645.5	0.0
2006	2	MA	9	18290	8	0.00044	2160.2	0.9
2006	3	MA	16	38325	573	0.01496	1133.7	17.0
2006	4	MA	12	17384	69	0.00397	1706.3	6.8
2007	1	MA	13	17643	90	0.00510	3513.4	17.9
2007	2	MA	18	38017	89	0.00235	3945.8	9.3
2007	3	MA	12	20267	175	0.00863	2717.3	23.5
2007	4	MA	20	26903	99	0.00369	3629.1	13.4
2008	1	MA	12	14123	8	0.00057	2305.4	1.3
2008	2	MA	14	33571	11	0.00033	3702.9	1.2
2008	3	MA	8	9877	3	0.00032	2000.1	0.6
2008	4	MA	19	42368	24	0.00057	2695.2	1.5
2009	1	MA	13	31823	0	0.00000	4820.3	0.0
2009	2	MA	20	44103	82	0.00186	4466.7	8.3
2009	3	MA	2	1548	0	0.00146	3111.3	4.5
2009	4	MA	19	37378	57	0.00152	3913.0	5.9
2010	1	MA	7	5481	0	0.00000	2982.2	0.0
2010	2	MA	53	182137	303	0.00166	3400.3	5.7
2010	3	MA	7	14723	0	0.00000	1519.7	0.0
2010	4	MA	66	179847	258	0.00143	2105.3	3.0
2011	1	MA	38	92685	22	0.00024	4660.1	1.1
2011	2	MA	25	67410	134	0.00199	4062.3	8.1
2011	3	MA	6	3690	31	0.00840	2443.4	20.5
2011	4	MA	21	79201	2	0.00002	4603.5	0.1
2012	1	MA	8	31307	0	0.00000	4045.0	0.0
2012	2	MA	55	284376	65	0.00023	3930.9	0.9
2012	3	MA	1	457	0	0.00000	1616.2	0.0
2012	4	MA	5	21322	0	0.00000	3212.3	0.0
2013	1	MA	8	24998	0	0.00000	3404.9	0.0
2013	2	MA	16	60923	637	0.01046	4152.4	43.4
2013	3	MA	4	10566	94	0.00885	1694.7	15.0
2013	4	MA	16	50496	394	0.00779	3143.0	24.5

Appendix 1. Table 6. Discard estimation for smooth dogfish in the northeast United States New England (Maine to Rhode Island) sink gill net fishery.

YEAR	QTR	region	Number of trips	Kept all	discard	Dk ratio	Total mt kept	Disc mt
1989	1	NE				0.00002	2040.0	0.0
1989	2	NE	1	3410	0	0.00002	5243.5	0.1
1989	3	NE	46	136507	0	0.00000	8648.9	0.0
1989	4	NE	60	124852	5	0.00004	5210.6	0.2
1990	1	NE	25	14518	0	0.00000	1651.2	0.0
1990	2	NE	49	53431	15	0.00028	5760.0	1.6
1990	3	NE	37	259319	0	0.00000	10599.4	0.0
1990	4	NE	38	72831	0	0.00000	5039.9	0.0
1991	1	NE	16	9930	0	0.00000	1699.7	0.0
1991	2	NE	176	456944	29	0.00006	7010.8	0.4
1991	3	NE	490	1582513	0	0.00000	7819.8	0.0
1991	4	NE	273	328373	58	0.00018	4467.7	0.8
1992	1	NE	85	53083	0	0.00000	1455.1	0.0
1992	2	NE	406	614190	33428	0.05443	5485.2	298.5
1992	3	NE	399	1060325	2536	0.00239	8383.7	20.1
1992	4	NE	291	394400	645	0.00164	5050.9	8.3
1993	1	NE	65	37293	0	0.00000	1252.2	0.0
1993	2	NE	280	353568	4620	0.01307	6082.3	79.5
1993	3	NE	144	471382	1995	0.00423	10133.7	42.9
1993	4	NE	258	459503	200	0.00044	5714.9	2.5
1994	1	NE	69	31899	0	0.00000	1124.5	0.0
1994	2	NE	19	70060	0	0.00000	5970.2	0.0
1994	3	NE	32	189169	150	0.00079	10730.6	8.5
1994	4	NE	57	156570	44	0.00028	4030.5	1.1
1995	1	NE	18	17434	3	0.00017	1226.8	0.2
1995	2	NE	46	181237	134	0.00074	8229.2	6.1
1995	3	NE	59	257340	66	0.00026	10727.7	2.8
1995	4	NE	30	99778	20	0.00020	4762.2	1.0
1996	1	NE	12	28166	0	0.00000	994.3	0.0
1996	2	NE	25	73564	44	0.00060	6050.4	3.6
1996	3	NE	29	179303	0	0.00000	10542.0	0.0
1996	4	NE	17	78106	4	0.00005	4686.8	0.2
1997	1	NE	8	38749	0	0.00000	1215.0	0.0
1997	2	NE	22	46792	31	0.00066	6186.4	4.1
1997	3	NE	20	55173	0	0.00000	7932.0	0.0
1997	4	NE	14	57436	0	0.00000	3883.6	0.0
1998	1	NE	10	16443	0	0.00000	1304.2	0.0
1998	2	NE	35	107203	317	0.00296	5420.5	16.0
1998	3	NE	41	244466	1396	0.00571	9161.4	52.3
1998	4	NE	54	219141	216	0.00099	4982.1	4.9
1999	1	NE	16	41923	0	0.00000	1777.6	0.0
1999	2	NE	30	90771	0	0.00000	5710.2	0.0
1999	3	NE	35	250677	0	0.00000	5412.8	0.0
1999	4	NE	34	111131	16	0.00014	3697.7	0.5
2000	1	NE	23	42371	7	0.00017	1949.2	0.3
2000	2	NE	51	82841	11	0.00013	4185.3	0.6
2000	3	NE	32	69193	0	0.00000	4763.1	0.0
2000	4	NE	37	82550	0	0.00000	3823.3	0.0
2001	1	NE	19	22498	0	0.00000	1459.3	0.0
2001	2	NE	30	59017	0	0.00000	4352.2	0.0

Appendix 1. Table 6.

YEAR	QTR	region	Number of trips	Kept all	discard	Dk ratio	Total mt kept	Disc mt
2001	3	NE	22	44580	0	0.00000	4362.9	0.0
2001	4	NE	17	33367	0	0.00000	4379.5	0.0
2002	1	NE	18	47361	0	0.00000	2373.5	0.0
2002	2	NE	24	76471	521	0.00681	4008.3	27.3
2002	3	NE	44	65921	50	0.00076	4140.7	3.1
2002	4	NE	35	42133	76	0.00180	4240.0	7.6
2003	1	NE	27	23473	0	0.00000	2069.9	0.0
2003	2	NE	109	246798	14	0.00006	4414.1	0.3
2003	3	NE	182	375200	487	0.00130	5642.1	7.3
2003	4	NE	130	363705	12	0.00003	4437.8	0.1
2004	1	NE	126	223708	0	0.00000	7057.6	0.0
2004	2	NE	160	474940	289	0.00061	3889.0	2.4
2004	3	NE	402	1107959	127	0.00011	4991.2	0.6
2004	4	NE	351	702500	73	0.00010	3092.8	0.3
2005	1	NE	135	111675	0	0.00000	1500.2	0.0
2005	2	NE	53	152875	51	0.00033	3679.2	1.2
2005	3	NE	447	1269608	38	0.00003	5065.5	0.2
2005	4	NE	265	752750	1022	0.00136	3053.2	4.1
2006	1	NE	91	176831	0	0.00000	1902.0	0.0
2006	2	NE	16	34044	0	0.00000	2737.8	0.0
2006	3	NE	48	203833	47	0.00023	5037.3	1.2
2006	4	NE	39	203625	3283	0.01612	3977.1	64.1
2007	1	NE	32	168897	0	0.00000	1602.7	0.0
2007	2	NE	37	113721	76	0.00067	3355.1	2.2
2007	3	NE	119	657533	549	0.00083	5986.3	5.0
2007	4	NE	83	458350	172	0.00038	4420.9	1.7
2008	1	NE	33	145706	0	0.00000	2084.3	0.0
2008	2	NE	56	327508	80	0.00025	3748.1	0.9
2008	3	NE	120	483295	160	0.00033	6758.2	2.2
2008	4	NE	47	251434	118	0.00047	5019.0	2.4
2009	1	NE	125	278756	0	0.00000	2093.5	0.0
2009	2	NE	32	104568	162	0.00155	4049.4	6.3
2009	3	NE	139	365790	96	0.00026	7698.1	2.0
2009	4	NE	66	244090	80	0.00033	3968.4	1.3
2010	1	NE	33	124743	0	0.00000	2716.9	0.0
2010	2	NE	326	1578591	82	0.00005	5430.5	0.3
2010	3	NE	871	3433907	138	0.00004	6086.4	0.2
2010	4	NE	516	1344623	48	0.00004	2093.2	0.1
2011	1	NE	309	768104	0	0.00000	1161.2	0.0
2011	2	NE	361	1451592	85	0.00006	4177.2	0.2
2011	3	NE	824	3499697	132	0.00004	7242.4	0.3
2011	4	NE	475	1665240	25	0.00002	3875.2	0.1
2012	1	NE	315	615354	0	0.00000	1832.9	0.0
2012	2	NE	377	1552002	797	0.00051	4106.6	2.1
2012	3	NE	585	2160187	65	0.00003	5122.7	0.2
2012	4	NE	342	958757	9	0.00001	2894.6	0.0
2013	1	NE	40	149443	0	0.00000	1112.6	0.0
2013	2	NE	169	512996	38	0.00007	2973.3	0.2
2013	3	NE	382	1603630	91	0.00006	4356.4	0.2
2013	4	NE	200	638871	0	0.00000	2604.5	0.0