

Table 36 Recreational Harvest (A + B1) of Skates/Rays on Atlantic Coast

Type A catch is fish that are landed in a form that can be identified by trained interviewers.

Type B1 catch is fish that are used for bait, released dead, or filleted - they are killed, but identification is by individual anglers rather than trained interviewers.

YEAR	NUMBER OF FISH	POUNDS OF FISH
1990	68,160	31,446
1991	62,627	33,622
1992	54,238	43,259
1993	60,429	192,118
1994	92,402	100,289
1995	50,505	26,449
1996	67,354	53,201
1997	75,697	73,781
1998	46,685	35,230
1999	59,012	92,917

Shaded values are those associated with a proportional standard error (PSE) of 0.20 or less and are considered more reliable than those with higher PSEs.

Source: National Marine Fisheries Service, Fisheries Statistics and Economics Division

Table 37 Recreational Harvest (A + B1) in Numbers of Skates/Rays by State

Type A catch is fish that are landed in a form that can be identified by trained interviewers.

Type B1 catch is fish that are used for bait, released dead, or filleted - they are killed, but identification is by individual anglers rather than trained interviewers.

STATE	NUMBERS OF FISH					
	1994	1995	1996	1997	1998	1999
ME	0	0	0	0	0	0
NH	4,216	59	3,104	805	0	136
MA	29,553	2,434	756	14,259	2,597	344
CT	9,976	16,972	7,648	15,675	22,177	16,273
RI	8,399	2,390	12,635	4,319	238	637
NY	2,499	79	3,437	0	0	2,830
NJ	11,931	2,945	12,730	3,543	578	9,296
DE	2,289	5,096	3,862	351	3,559	5,700
MD	0	1,399	3,380	4,131	4,133	1,536
VA	14,080	11,026	11,250	17,484	0	4,869
NC	2,721	585	2,672	439	1,107	1,081

Shaded values are those associated with a proportional standard error (PSE) of 0.20 or less and are considered more reliable than those with higher PSEs.

Source: National Marine Fisheries Service, Fisheries Statistics and Economics Division

3.4 DISCARD INFORMATION

3.4.1 SAW 30 Information

Preliminary commercial fishery discard estimates of skates, for all species combined, were calculated from the NEFSC Domestic Sea Sampling and Dealer Landings data for 1989-1998. The estimates were derived by gear type and primary species group caught on a sea sampled trip. A species group was considered the primary target when it constituted more than 50% of the total trip landings. This may result in an underestimation of total skate discards because some trips (2,604 of 11,834) were mixed, and no species or group comprised 50% of the trip.

The commercial fishery discard rates were initially calculated as the sum of the pounds of skate discarded divided by the sum of the pounds of the single, primary species kept for all years combined, within gear type/primary species cells (Table 38). The number of trips for some of the gear type/primary species cells was small, so the data were next aggregated into species groups to derive yearly estimates for otter trawls, sink gill nets, and scallop dredges (Table 39 – Table 41). The other fishing gears had too few trips to dis-aggregate by year. Even with the species groupings, some of the cells remained empty, requiring use of time series arithmetic average discard rates for those cells (Table 39 – Table 41).

The commercial fishery discard estimates are the product of Domestic Sea Sampling discard rates and the reported landings of the primary target species groups from the Dealer Landings data. Table 42 gives the sum of the discard estimates by gear type. The estimates have ranged from high values between 50,000 and 70,000 mt in 1989-1990 to a low of 14,700 mt in 1994. Otter trawls and scallop dredges account for >90% of the total discards. Over the 1989-1998 period, the biomass of total discards are estimated to be two (1998) to eight times (1989) the reported total landings. The commercial fishery discard mortality rate of skates, and therefore the magnitude of total skate discard mortality, is unknown.

Calculation of total skate discards on the primary species group/annual discard rate basis provided a higher estimate of discards in seven of the ten years of the Domestic Sea Sample time series, when compared with the primary species/time series discard rate estimates. On average, the primary species group/annual discard rate estimates were five percent higher (Table 43).

The discard estimates were not dis-aggregated to skate species because identification of skates is uncertain in the Domestic Sea Sampling data. However, barndoor skate may have been identified correctly when they were caught, because of their large size and distinctive ventral coloration. The discard estimates for barndoor skate were calculated as above for all years combined. The discard rates are generally low, at less than five percent of the landings of the target species group, resulting in estimates of barndoor skate commercial fishery discards of a few hundred metric tons per year. The commercial fishery discard mortality rate of barndoor skate, and therefore the true magnitude of total barndoor skate discard mortality, is unknown.

Table 38 Estimated Discards of Skates by Gear Type and Target Species

(ot = otter trawls; sgn = sink gill net; dgn = drift gill net; sd = scallop dredge; mpt = midwater pair trawls; cp = conch pots; lp = lobster pot; bt = beam trawl; mt = midwater trawl; lt = line trawl; ll = longline; pt = pair trawl; st = shrimp trawl)

The discard rate is calculated as the sum of the pounds of discarded skates divided by the sum of the kept pounds of the target species when the target was more than 50% of the catch.

primary species	No. Discard		Landings of target species in mt										skate discards in mt									
	trips	Rate	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
ot goosefish	29	0.584	1104	474	2183	2445	2650	2429	3669	4556	4642	4170	645	277	1275	1428	1548	1419	2143	2661	2711	2436
ot bluefish	1	0.161	55	70	200	57	21	54	141	172	202	228	9	11	32	9	3	9	23	28	33	37
ot butterfish	12	0.008	769	418	693	645	2360	1635	642	1157	1027	407	6	3	6	5	19	13	5	9	8	3
ot cod	96	0.573	4075	7117	4053	1833	1336	1360	583	1107	819	767	2336	4080	2323	1051	766	780	334	635	470	440
ot croaker	13	0.001	28	0	0	0	91	62	185	301	1354	878	0	0	0	0	0	0	0	0	1	1
ot winter fl	31	1.375	715	756	871	678	401	433	905	1119	1786	1600	984	1039	1198	933	551	595	1244	1539	2457	2200
ot summer fl	131	0.765	607	234	322	538	544	749	846	860	1206	1269	464	179	246	411	416	572	647	657	922	971
ot witch fl	1	0.091	33	2	3	41	28	25	31	41	27	42	3	0	0	4	3	2	3	4	2	4
ot yellowtail fl	47	2.439	1310	5645	1559	1033	380	858	210	360	809	1039	3194	13767	3801	2520	926	2093	512	878	1972	2535
ot plaice	11	0.245	45	14	67	137	60	67	67	99	94	45	11	4	16	34	15	16	16	24	23	11
ot windowpane	2	2.415	679	234	1411	437	383	43	318	241	78	160	1639	565	3409	1056	926	105	769	583	188	386
ot flounder, nk	1	8.852	17	7	15	18	14	3	0	1	1	0	154	60	129	163	126	24	1	7	11	0
ot haddock	2	0.862	6	22	78	99	20	1	1	6	18	210	5	19	68	85	18	1	1	5	16	181
ot red hake	12	0.009	199	188	184	258	207	361	106	343	264	225	2	2	2	2	2	3	1	3	2	2
ot white hake	1	0.000	37	251	308	442	145	11	41	50	6	34	0	0	0	0	0	0	0	0	0	0
ot herring, nk	1	0.001	0	0	0	0	243	555	123	297	11	188	0	0	0	0	0	0	0	0	0	0
ot Atl herring	18	0.010	487	670	1574	4079	2134	2725	2029	2114	1304	5526	5	7	15	40	21	27	20	21	13	54
ot Atl mackerel	21	0.002	6604	7667	13898	7545	1984	6243	6601	9018	6065	6728	13	16	28	15	4	13	13	18	12	14
ot ocean pout	3	0.793	989	1032	1066	174	118	124	15	32	13	1	784	818	845	138	93	98	12	26	10	1
ot pollock	6	0.084	1641	1432	741	464	177	71	91	109	234	430	138	121	63	39	15	6	8	9	20	36
ot scup	15	0.098	456	263	992	883	812	623	396	628	696	439	45	26	97	87	80	61	39	62	68	43
ot blk sea bass	1	0.015	9	22	6	0	28	37	1	57	17	24	0	0	0	0	0	1	0	1	0	0
ot weakfish	18	0.353	412	471	88	160	76	76	257	210	231	290	145	166	31	56	27	27	91	74	81	102
ot sp dogfish	38	0.065	352	6730	4778	4286	4505	2607	2323	2747	1450	2442	23	440	312	280	294	170	152	179	95	160
ot skates, nk	47	0.314	5445	8956	8333	9387	8982	5111	4176	11122	6878	10099	1709	2811	2615	2946	2819	1604	1311	3490	2159	3169
ot striped bass	1	0.030	0	4	5	3	19	33	67	32	0	0	0	0	0	0	0	0	1	1	2	1
ot tautog	7	0.069	2	8	3	12	29	8	13	16	5	5	0	1	0	1	2	1	1	1	0	0
ot silver hake	226	0.068	13017	15178	10955	10102	11963	7529	7894	12009	10437	10141	882	1029	743	685	811	510	535	814	707	687
ot crab, nk	2	0.055	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
ot horseshoe crab	49	0.104	342	221	301	356	707	304	332	534	392	777	36	23	31	37	74	32	35	56	41	81
ot shrimp	1	0.096	37	31	21	5	7	5	14	41	48	4	4	3	2	0	1	0	1	4	5	0
ot conchs	2	4.131	89	80	38	4	69	141	28	23	37	21	369	330	158	16	287	583	116	93	151	88
ot sea scallop	1	0.048	3685	3912	7224	4608	3335	5703	6130	5600	3471	4339	178	189	350	223	162	276	297	271	168	210
ot loligo	171	0.083	14473	8294	13145	11775	16068	13432	10548	5834	9468	10039	1202	689	1092	978	1335	1116	876	485	787	834
ot illex	34	0.000	6761	11095	11765	17605	17753	17286	13496	14580	12486	21818	3	4	5	7	7	7	5	6	5	9
ot squid, nk	6	0.217											0	0	0	0	0	0	0	0	0	0
Total													14990	26678	18893	13249	11347	10164	9212	12644	13141	14697

Table 38 cont.

(ot = otter trawls; sgn = sink gill net; dgn = drift gill net; sd = scallop dredge; mpt = midwater pair trawls; cp = conch pots; lp = lobster pot; bt = beam trawl; mt = midwater trawl; lt = line trawl; ll = longline; pt = pair trawl; st = shrimp trawl)

The discard rate is calculated as the sum of the pounds of discarded skates divided by the sum of the kept pounds of the target species when the target was more than 50% of the catch.

primary species	No. of trips	Discard Rate	Landings of target species in mt										skate discards in mt									
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
sgn goosefish	840	0.029	5	10	251	765	1424	2279	3656	3155	3614	4372	0	0	7	22	41	66	106	92	105	127
sgn bluefish	137	0.005	405	564	394	627	613	725	436	464	1166	968	2	3	2	3	3	3	2	2	6	5
sgn bonito	7	0.062				12	0	6	5	3	3	3	0	0	0	1	0	0	0	0	0	0
sgn cod	2364	0.148	2890	2453	2421	1552	1145	1285	1334	1396	733	434	429	364	359	230	170	191	198	207	109	64
sgn croaker	266	0.000	37	3	3	98	778	922	849	1181	2198	2738	0	0	0	0	0	0	0	0	0	0
sgn winter fl	130	0.122	29	25	16	26	28	15	42	17	22	22	4	3	2	3	3	2	5	2	3	3
sgn witch fl	9	0.127	0	0	1	0	6	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0
sgn yellowtail fl	205	0.036	8	37	48	35	13	27	118	93	54	154	0	1	2	1	0	1	4	3	2	6
sgn Am. plaice	80	0.011		0		0	7	1	7	3	1	128	0	0	0	0	0	0	0	0	0	1
sgn haddock	2	0.005	7	2	0	1			1	1	1	9	0	0	0	0	0	0	0	0	0	0
sgn white hake	272	0.004	792	585	258	887	466	116	213	137	67	97	4	3	1	4	2	1	1	1	0	0
sgn mackerel	58	0.008	24	132	44	72	19	34	44	124	79	48	0	1	0	1	0	0	0	1	1	0
sgn menhaden	49	0.000	56	155	306	467	506	503	166	176	119	140	0	0	0	0	0	0	0	0	0	0
sgn pollock	517	0.002	2862	1533	647	548	662	268	248	164	248	561	6	3	1	1	1	1	1	0	1	1
sgn sea raven	1	1.189						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sgn scup	1	0.118				0	0	1	3	4	1	0	0	0	0	0	0	0	0	0	0	0
sgn weakfish	131	0.001	57	72	87	39	169	193	120	175	369	511	0	0	0	0	0	0	0	0	0	0
sgn Am shad	10	0.016	379	307	214	279	269	217	114	260	254	298	6	5	3	5	4	3	2	4	4	5
sgn sm. dogfish	113	0.004			108	298	206	192	206	349	255	274	0	0	0	1	1	1	1	1	1	1
sgn sp. dogfish	1901	0.006	3591	7449	7039	7426	11441	10482	13192	14567	13617	14408	21	44	42	44	68	62	78	86	81	85
sgn skates, nk	70	0.023	0	3	19	62	361	537	240	445	1010	683	0	0	0	1	8	12	5	10	23	16
sgn Sp mackerel	33	0.000	0	4	21	6	29	27	5	9	66	67	0	0	0	0	0	0	0	0	0	0
sgn spot	74	0.000	451	158	449	730	1010	1244	1054	831	1068	1266	0	0	0	0	0	0	0	0	0	0
sgn tautog	24	0.074	5	14	29	35	8	15	9	10	3	1	0	1	2	3	1	1	1	1	0	0
sgn little tuna	7	0.001				0	2	1	18	0	6	2	0	0	0	0	0	0	0	0	0	0
sgn porbeagle	2	0.002			1		0		0		0	0	0	0	0	0	0	0	0	0	0	0
sgn sandbar shark	12	0.027			1			2	0	1	4	1	0	0	0	0	0	0	0	0	0	0
sgn horseshoe crab	2	0.131						1	9	8	30	18	0	0	0	0	0	0	1	1	4	2
sgn lobster	4	0.029	7			0	4	2	1	43	33	2	0	0	0	0	0	0	0	1	1	0
sgn loligo	1	0.003							1	0	0	3	0	0	0	0	0	0	0	0	0	0
Total													473	428	423	320	305	345	406	414	340	318

Table 38 cont.

(*ot* = otter trawls; *sgn* = sink gill net; *dgn* = drift gill net; *sd* = scallop dredge; *mpt* = midwater pair trawls; *cp* = conch pots; *lp* = lobster pot; *bt* = beam trawl; *mt* = midwater trawl; *lt* = line trawl; *ll* = longline; *pt* = pair trawl; *st* = shrimp trawl)

The discard rate is calculated as the sum of the pounds of discarded skates divided by the sum of the kept pounds of the target species when the target was more than 50% of the catch.

gear	primary species	No. of trips	Discard Rate	Landings of target species in mt									skate discards in mt										
				1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
dgn	cod	2	0.001	5	1	1		1						0	0	0	0	0	0	0	0	0	0
dgn	bluefish	32	0.001	34	67	427	74	171	230	111	410	369	331	0	0	0	0	0	0	0	0	0	0
dgn	menhaden	5	0.000	168	66	91	86	184	95	118	287	128	149	0	0	0	0	0	0	0	0	0	0
dgn	Am. shad	21	0.015	302	296	306	191	176	75	37	123	112	137	4	4	5	3	3	1	1	2	2	2
dgn	sp. dogfish	2	0.008		14	52	170	77	23	307	1213	1000	1288	0	0	0	1	1	0	2	9	8	10
														5	5	5	4	3	1	3	11	10	12
sd	goosefish	3	0.738	395	244	66	65	1814	390	625	465	680	1058	292	180	48	48	1338	287	461	343	501	780
sd	sea scallop	175	0.246	117161	139092	134692	113309	56476	56251	58393	59786	45758	23580	28817	34211	33128	27869	13891	13835	14362	14705	11254	5800
														29108	34391	33177	27917	15229	14123	14823	15047	11756	6580
mpt	goosefish	2	0.001											0	0	0	0	0	0	0	0	0	0
mpt	bigeye tuna	26	0.000				14	33	48	60				0	0	0	0	0	0	0	0	0	0
mpt	albacore	10	0.001				90	20	58	25				0	0	0	0	0	0	0	0	0	0
mpt	silver hake	1	1.054											0	0	0	0	0	0	0	0	0	0
mpt	squid, nk	1	0.010											0	0	0	0	0	0	0	0	0	0
														0	0	0	0	0	0	0	0	0	0
cp	conchs	1	0.620	1046	2083	1585	2462	2019	1749	1320	1501	1314	780	648	1291	982	1526	1251	1084	818	930	815	484
lp	lobster	10	0.001	22496	26137	27753	24514	25146	23597	20610	31409	36204	35252	17	20	21	19	19	18	16	24	28	27
bt	goosefish	1	1.469						27	42				0	0	0	0	0	39	62	0	0	0
mt	Atl mackerel	1	0.008		451		479	0	44	1155	529	20		0	0	4	0	4	0	0	10	4	0
mt	loligo	1	0.372									2		0	0	0	0	0	0	0	0	0	1
														0	0	4	0	4	0	0	10	4	1
lt	cod	30	0.790	1034	499	1059	835	566	574	713	569	573	728	817	394	837	660	447	453	564	450	453	575
lt	cusk	5	0.043	33	143	325	385	362	125	54	17	25	44	1	6	14	17	16	5	2	1	1	2
lt	white hake	2	0.008	0	14	94	241	110	139	115	12	116	100	0	0	1	2	1	1	1	0	1	1
lt	ocean pout	1	1.861	0	0	0	1	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
														818	401	851	680	465	460	567	450	455	578
ll	dusky shark	1	0.000	0	17	0	40	11	1	3	2	0	4	0	0	0	0	0	0	0	0	0	0
pt	cod	4	0.071		403	520	338	435						0	28	37	24	31	0	0	0	0	0
st	cod	2	0.190	3	37	5		1		1	0	3		1	7	1	0	0	0	0	0	1	0
st	pan. shrimp	477	0.030	3384	4227	3173	3145	2193	3544	6584	9117	6193	3571	103	129	97	96	67	108	201	278	189	109
														104	136	98	96	67	108	201	278	189	109

Table 39 Estimated Discards of Skates on Otter Trawlers by Year and Primary Species Category

(Principal groundfish: cod, haddock, pollock, and white hake; pelagics: herring, mackerel, butterfish, and squid; flatfish: summer flounder, winter flounder, American plaice, witch flounder, yellowtail flounder, windowpane flounder and unclassified flounders; small elasmobranchs: dogfish and skates; small-mesh groundfish: silver hake, red hake, and ocean pout)

Discards are calculated as the sum of pounds of discarded skates divided by the sum of the pounds of the target species kept in each cell. Cells with zero trips are filled in with the weighted average over all years.

	Principal				Small	Small-Mesh			Total
	Goosefish	Groundfish	Pelagics	Flatfish	Elasmos	Groundfish	Scallops	Others	
1989 ntrips	1	23	21	18	8	33	0	8	112
rate	0.700	0.695	0.214	2.306	0.103	0.053	0.048	0.041	
mt target	1104	5759	29094	3407	5797	14206	3685	1431	64483
mt discard	773	4002	6220	7855	596	747	178	58	20430
1990 ntrips	1	16	11	21	12	23	0	12	96
rate	0.082	0.702	0.015	3.059	0.187	0.092	0.048	0.260	
mt target	474	8822	28144	6891	15687	16398	3912	1166	81493
mt discard	39	6197	430	21078	2930	1507	189	303	32673
1991 ntrips	9	25	36	26	11	42	0	13	162
rate	0.139	0.313	0.049	2.266	0.277	0.134	0.048	0.133	
mt target	2183	5181	41074	4248	13110	12205	7224	1654	86879
mt discard	304	1621	2002	9627	3634	1630	350	220	19389
1992 ntrips	5	16	18	24	3	33	0	6	105
rate	0.509	0.404	0.029	1.603	0.992	0.056	0.048	0.295	
mt target	2445	2838	41649	2883	13673	10534	4608	1482	80112
mt discard	1245	1146	1226	4622	13560	593	223	438	23051
1993 ntrips	0	4	8	7	6	23	0	5	53
rate	0.584	0.516	0.001	1.058	0.124	0.067	0.048	0.710	
mt target	2650	1678	40542	1809	13487	12288	3335	1839	77628
mt discard	1548	866	20	1913	1666	818	161	1305	8298
1994 ntrips	0	7	11	19	3	0	0	8	48
rate	0.584	0.255	0.007	0.633	0.035	0.071	0.048	0.014	
mt target	2429	1443	41876	2177	7718	8014	5703	1315	70674
mt discard	1419	368	293	1379	268	565	276	19	4586
1995 ntrips	7	7	41	46	20	26	0	28	175
rate	0.163	0.292	0.088	0.682	0.052	0.016	0.048	0.055	
mt target	3669	717	33440	2376	6499	8015	6130	1387	62232
mt discard	597	209	2949	1620	336	129	297	77	6213
1996 ntrips	2	5	40	26	10	45	0	29	157
rate	3.714	0.980	0.003	0.864	0.251	0.002	0.048	0.019	
mt target	4556	1273	32999	2721	13868	12385	5600	2015	75417
mt discard	16923	1248	102	2351	3477	30	271	39	24442
1997 ntrips	4	1	46	17	3	7	0	5	83
rate	1.313	0.019	0.005	0.563	0.293	0.011	0.048	0.000	
mt target	4642	1078	30361	4000	8329	10714	3471	3049	65643
mt discard	6093	20	158	2252	2444	112	168	0	11248
1998 ntrips	0	2	21	13	8	3	1	3	51
rate	0.584	2.160	0.003	1.016	0.197	0.160	0.048	0.026	
mt target	4170	1442	44706	4156	12541	10367	4339	2697	84418
mt discard	2436	3114	150	4223	2467	1663	210	70	14332

Table 40 Estimated Discards of Skates on Sink Gillnet Vessels by Year and Primary Species Category

(Principal groundfish: cod, haddock, pollock, and white hake; pelagics: herring, mackerel, butterfish, and squid; flatfish: summer flounder, winter flounder, American plaice, witch flounder, yellowtail flounder, windowpane flounder and unclassified flounders; small elasmobranchs: dogfish and skates; small-mesh groundfish: silver hake, red hake, and ocean pout)

Discards are calculated as the sum of pounds of discarded skates divided by the sum of the pounds of the target species kept in each cell. Cells with zero trips are filled in with the weighted average over all years.

	Principal			Small			Total
	Goosefish	Groundfish	Pelagics	Flatfish	Elasmos	Others	
1989 ntrips	2	61	0	2	5	6	76
rate	0.537	0.004	0.007	0.446	0.010	0.023	
mt target	5	6552	459	37	3591	961	11605
mt discard	3	29	3	17	37	22	110
1990 ntrips	0	78	1	12	10	4	105
rate	0.029	0.011	0.231	0.299	0.007	0.001	
mt target	10	4573	594	62	7452	814	13505
mt discard	0	52	137	19	50	1	259
1991 ntrips	42	555	3	11	145	16	772
rate	0.209	0.013	0.006	0.112	0.003	0.008	
mt target	251	3326	564	65	7166	984	12357
mt discard	52	43	3	7	24	8	138
1992 ntrips	44	634	9	63	155	33	938
rate	0.111	0.015	0.007	0.229	0.005	0.026	
mt target	765	2987	818	62	7785	1546	13964
mt discard	85	44	6	14	41	40	230
1993 ntrips	38	371	9	46	70	33	567
rate	0.047	0.010	0.014	0.109	0.004	0.022	
mt target	1424	2272	794	53	12009	2615	19167
mt discard	67	22	11	6	48	58	212
1994 ntrips	107	492	7	15	230	117	968
rate	0.038	0.002	0.163	0.001	0.009	0.004	
mt target	2279	1668	753	43	11211	3139	19093
mt discard	87	3	123	0	99	13	326
1995 ntrips	134	283	10	100	350	126	1003
rate	0.025	0.002	0.080	0.024	0.007	0.002	
mt target	3656	1795	325	167	13638	2510	22090
mt discard	93	3	26	4	92	5	224
1996 ntrips	92	244	17	37	278	127	795
rate	0.011	0.000	0.007	0.009	0.008	0.001	
mt target	3155	1697	560	114	15361	2731	23617
mt discard	36	1	4	1	128	3	172
1997 ntrips	160	237	15	54	308	89	863
rate	0.011	0.000	0.073	0.002	0.008	0.000	
mt target	3614	1049	453	77	14882	4947	25021
mt discard	39	0	33	0	122	1	196
1998 ntrips	155	149	37	53	429	212	1035
rate	0.018	0.001	0.000	0.006	0.004	0.000	
mt target	4372	1100	488	306	15365	5578	27208
mt discard	80	1	0	2	55	1	138

Table 41 Estimated Discards of Skates on Scallop Dredge Vessels by Year and Primary Species Category

(Principal groundfish: cod, haddock, pollock, and white hake; pelagics: herring, mackerel, butterfish, and squid; flatfish: summer flounder, winter flounder, American plaice, witch flounder, yellowtail flounder, windowpane flounder and unclassified flounders; small elasmobranchs: dogfish and skates; small-mesh groundfish: silver hake, red hake, and ocean pout)

Discards are calculated as the sum of pounds of discarded skates divided by the sum of the pounds of the target species kept in each cell. Cells with zero trips are filled in with the weighted average over all years.

	Goosefish	Scallops	Totals
1989 ntrips	0	0	0
rate	0.738	0.246	
mt target	395	117161	117557
mt discard	292	28817	29108
1990 ntrips	0	0	0
rate	0.738	0.246	
mt target	244	139092	139337
mt discard	180	34211	34391
1991 ntrips	0	2	2
rate	0.738	0.182	
mt target	66	134692	134757
mt discard	48	24513	24561
1992 ntrips	0	15	15
rate	0.738	0.173	
mt target	65	113309	113373
mt discard	48	19611	19659
1993 ntrips	2	19	21
rate	0.434	0.249	
mt target	1814	56476	58290
mt discard	788	14038	14826
1994 ntrips	0	23	23
rate	0.738	0.139	
mt target	390	56251	56641
mt discard	287	7801	8088
1995 ntrips	1	22	23
rate	3.474	0.314	
mt target	625	58393	59018
mt discard	2170	18313	20483
1996 ntrips	0	38	38
rate	0.738	0.245	
mt target	465	59786	60251
mt discard	343	14670	15012
1997 ntrips	0	29	29
rate	0.738	0.329	
mt target	680	45758	46437
mt discard	501	15057	15558
1998 ntrips	0	26	26
rate	0.738	0.398	
mt target	1058	23580	24638
mt discard	780	9394	10174

Table 42 Total Estimated Discards of Skates (in mt) by Gear Type

(*ot* = otter trawls; *sgn* = sink gill net; *dgn* = drift gill net; *sd* = scallop dredge; *mpt* = midwater pair trawls; *cp* = conch pots; *lp* = lobster pot; *bt* = beam trawl; *mt* = midwater trawl; *lt* = line trawl; *ll* = longline; *pt* = pair trawl; *st* = shrimp trawl)

gear	skate discards in mt									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
ot	20430	32673	19389	23021	8298	4586	6212	24442	11248	14332
sgn	110	259	138	230	212	326	224	172	196	138
dgn	5	5	5	4	3	1	3	11	10	12
sd	29108	34391	24561	19659	14826	8088	20483	15012	15558	10174
mpt	0	0	0	0	0	0	0	0	0	0
cp	648	1291	982	1526	1251	1084	818	930	815	484
lp	17	20	21	19	19	18	16	24	28	27
bt	0	0	0	0	0	39	62	0	0	0
mt	0	0	4	0	4	0	0	10	4	1
lt	818	401	851	680	465	460	567	450	455	578
ll	0	0	0	0	0	0	0	0	0	0
pt	0	28	37	24	31	0	0	0	0	0
st	104	136	98	96	67	108	201	278	189	109
Total	51240	69203	46086	45259	25176	14711	28586	41330	28502	25855

Table 43 Comparison of Estimates of Total Skate Discards (mt) by Initial Method and by Final Method

(initial method = T = primary species/gear cells, discard rates calculated as mean of the 1989-1998 time series)
 (final method = A = primary species group/gear cells, discard rates calculated annually)

Year	Primary species, Time series (T)	Species group, Annual (A)	Percent difference (A/T)
1989	45,498	51,240	12.6
1990	62,039	69,203	11.5
1991	53,451	46,086	-13.8
1992	42,666	45,259	6.1
1993	27,420	25,176	-8.2
1994	25,201	14,711	-41.6
1995	25,212	28,586	13.4
1996	28,854	41,330	43.2
1997	25,895	28,502	10.1
1998	22,295	25,855	16.0
Mean	35,853	37,595	4.9

3.5 DESCRIPTION OF THE SKATE PROCESSING SECTOR

Much of the following information is also presented in Sections 3.1.1 and 3.1.2 of this SAFE Report.

Skates caught for lobster bait are landed whole by otter trawlers and either sold 1) fresh, 2) fresh salted, or 3) salted and strung or bagged for bait by the barrel. Bait skates are “processed” in that most are salted and strung or bagged by the buyers as preparation for use in lobster pots. A tremendous volume of salt is used in the bait operations, up to 130,000 pounds weekly during the peak of lobster season. Barrels of skates may weigh between 500 – 600 pounds. All “processing” of skates for lobster bait occurs at the level of the buyer/dealer and not the processor. No processing facilities are involved with skate products for use as lobster bait.

Skate wings are processed for export to various international markets. Winter skate, thorny skate, and barndoor skate are considered sufficient in size for processing of wings. Processors state that they prefer skate wings of at least 1-1 1/4 lb. skin-on. A one-pound skinless wing is estimated to weigh about 1.3-pounds skin-on. Skate processors buy whole, hand-cut, and/or onboard machine-cut skates from vessels primarily out of Massachusetts and Rhode Island. Cutting machines were developed in 1988 in response to increasing markets for skate wings and increased participation in the fishery. However, the practice of onboard machine cutting has decreased since that time and may not exist at all anymore. Cutting machines have been somewhat problematic because they can leave wing meat on the body of the skate or cut too close to the cartilage, decreasing the quality of the product and/or requiring additional hand-cutting. Processors prefer hand-cut wings because hand-cutting generally produces a better product and higher yield.

There are currently four known major skate wing processors in New England and another two companies in the Mid-Atlantic. The companies reportedly buy wings from vessels mostly from New Bedford and Mid-Atlantic ports. One major skate processing facility in New Bedford reports that about 90% of its product is landed in New Bedford, with the remainder trucked from Provincetown, Scituate, and other ports primarily in Massachusetts. Processors report that while demand for the product is generally consistent, profit margins are extremely low. One processor mentioned that the strong U.S. dollar makes the exported product more expensive.

In total, nine processors from MA, RI, NY, and NH reported processing 3.9 million pounds of unspecified skate products. No further description of product form is available (e.g., whether frozen or fresh). Sales amounted to \$3.2 million, for an average price of \$0.81. These firms employ 514 workers.

The activities involved with skate processing depend on the market which the product serves. However, almost all wings are frozen for export. Wings processed for export to Europe are either skinless or skinless and boneless, and they are individually wrapped. In contrast, the Korean market prefers a whole frozen skate.

Data of annual production of processed and exported skate products is sparse. Limited trade data was collected by NOAA/NMFS for the New England Fisheries Development Program in 1975. Reports from an international seafood trade expert at the Seafood Institute indicate that skate export poundage was tracked through “Euro Stat Data” until 1995 or 1996, then abandoned. Customs does not track the exports, and no census data exists specific to skate exports.

3.6 DOMESTIC AND INTERNATIONAL MARKETS FOR SKATES

Much of the following information is also presented in Sections 3.1.1 and 3.1.2 of this SAFE Report.

The current market for skate wings remains primarily an export market. France, Korea, and Greece are the leading importers. France prefers skate wings, a processed product that is either skinless or skinless and boneless; frozen individually wrapped in poly (IWP). The Korean market generally prefers whole processed skates, and there is a Japanese market for wings. There is also a market for skate wings in Portugal. The Portuguese market is reported to prefer barndoor skates over winter and thorny skates because they are the least stringy, most tender and flavorful of the wing skates. Interestingly, barndoor skates are said to fetch the lowest ex-vessel prices of the wing skates because they cannot be skinned by machine, as the skin tears too easily.

Brokers have also secured skates for the European and Asian markets from Argentina and Canada. Argentina initially produced a significant amount of skates, but they were reportedly of poor quality. Processing techniques have improved, and Argentina now provides the bulk of the European and Asian market. Argentina supplements their skate production with large skates produced from the U.S. west coast fishery. Canadian production of skates for the export market has diminished, as some of the industry switched toward more lucrative crab and shrimp fisheries.