

Derived and Observed Catch at Age from the Gulf of Mexico Red Grouper (*Epinephelus morio*) Stock

by

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INTRODUCTION

Potentially valuable information resides in the age distributions of red grouper (*Epinephelus morio*) caught in Gulf of Mexico fisheries over time. In age-based assessment models, these distributions can shed light on both fishing pressure and on cohort strength.

Methods for quantifying catch at age were chosen with strong consideration given to the previous assessment (NMFS 2002). Continuity case models are valuable in distinguishing whether any changes in perceived stock status derive from new data. Consequently, they provide context to conclusions from new models, that may differ in both data and form/assumptions.

METHODS

Catches at age distributions were produced using two techniques: derivation of catch at age from size frequencies using a von Bertalanffy growth and meristic equations; and compilation of age frequencies from fish whose ages were determined from otolith samples.

Derived Catch at Age

Several sources provided size samples of red grouper, including the Marine Recreational Fishery Statistical Survey (MRFSS), the HeadBoat survey (HB), and the Trip Interview Program (TIP). Each dataset is organized somewhat differently and so each was processed for consistency. In all cases, samples were limited to those from the Gulf of Mexico. Each was also checked for outliers in their length-weight information. MRFSS and TIP outliers were identified by examining their

ratios of observed to predicted weights. Any whose ratio was less than 0.75 or greater than 1.5 were flagged as outliers. HB data were examined visually for consistency with previous efforts. Those previous efforts were used as a visual guide for limits on identifying outliers. Reported weights for outliers were replaced with estimates from meristic length-weight equations as identified in SEDAR12-DW-Report.

Commercial TIP samples were processed further with respect to region and gear. Samples were stratified into north and south regions at the 28°N latitude. Since actual coordinates are not usually reported, statistical areas were used instead, with areas 6-19 representing the north region and the rest representing the south. Samples were also stratified with respect to gear. Strata included longline (gear codes 675-677), trap (gear code 345), electric reel (gear codes 613 and 616, but only for samples taken during 2002 or later), and handline + (all other samples).

Other inputs included various biological and life history parameters. Meristic equations differed but to only a small degree. Natural mortality (M) estimates also differed in that they were age-specific in this assessment, although the central tendency was the same (0.2) as the previous assessment. Finally the von Bertalanffy growth equation was updated. See SEDAR12-DW-Report for details.

The probabilistic approach (Goodyear 1997) used for red grouper for recent assessments was used to create a derived catch at age. For the recreational fishery a single Gulf-wide recreational catch at age series of discards and landings per year. For commercial catch at age, a series was produced for each of the two regions by year and gear. These were then summed to produce a single series stratified by year and gear. There was one other notable difference from the previous assessment. This time, 100% discard mortality was assumed. This assumption produced discard estimates representing all discards (not just the dead ones), to which various mortality rates can be applied.

Results were tested by iteratively adding the new information/components to the analysis. The first run used new software (primarily differing in gear categories), catch estimates, and meristic equations, but old size sample data, M values, and von Bertalanffy parameters. Subsequent runs used new size sample data, then new data and M values, and finally all new information. Results were compared to see what effect the various additions had on age distributions.

Observed Catch at Age

Commercial and recreational samples were separated. Commercial samples were summed by year, gear, and N-S region. Gears were organized as follows: longlines (gear codes 675-677), traps (gear code 345), electric reels (gear codes 613 and 616, but only for samples taken during 2002 or later), and handline+ (handline or spear). Recreational samples were summed by year and mode (CP, HB, PR).

Commercial distributions were then recombined N-S by weighting the annual distribution for each gear for each region by landings. Similarly, recreational distributions were recombined across modes.

RESULTS

Derived Catch at Age

The resulting derived landings series are shown in Table 1, and discard series in Table 2.

The series of runs that increasingly relied on new information indicated that the von Bertalanffy parameters were primarily responsible for changes in the frequency distributions of catch at age. The addition of new meristic equations, any changes in the size samples, and age-specific M values all had minimal influence on the frequency distributions. Other than the von Bertalanffy parameters, the only substantial change to derived catch at age distributions from last assessment came from the treatment of discard mortality. Whereas the last assessment built it into these calculations, the current assessment estimates all discards, alive and dead, here and applies mortality rates elsewhere.

Note about longline spreadsheet procedure—not performed yet.

Observed Catch at Age

The resulting observed landings series are shown in Table 3.

SUMMARY

In sum, several changes were made to the catch at age derivation procedure from the last assessment. These changes included:

- Updated meristic equations;
- Age-dependent M values;
- Updated von Bertalanffy parameters;
- Counting all discards, alive and dead, by applying a discard mortality of 1 here...other discard mortality rates can be applied elsewhere in the assessment process;
- Breaking out commercial trap gear and commercial electric reel (from 2002-2005) as separate strata; and
- Stratification of commercial catch at age, both derived and observed, into north and south regions at the 28°N latitude, ultimately recombining them in a catch-weighted fashion.

Most of these changes had minimal effect on the catch at age patterns. The updated von Bertalanffy parameters were primarily responsible for differences from the last assessment in catch at age frequency distribution, while the magnitude was influence primarily and predictably by counting alive and dead discards.

REFERENCE

Goodyear, C.P. 1997. Fish age determination from length: an evaluation of three methods using simulated red snapper data. Fish. Bull. 95: 39-46.

NMFS. 2002. Status of red grouper in United States Waters of the Gulf of Mexico during 1986-2001. NOAA, Southeast Fisheries Science Center, Sustainable Fisheries Division Contribution No. SFD-01/02-175.

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies

Recreational

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1981	8146	43265	77144	55960	37232	24994	16870	11718	8415	6182	4587	3410	931	691	511
1982	1902	37427	81753	59295	35864	23409	17330	13464	10456	7994	6008	4452	1203	879	640
1983	121	91794	190379	119675	62598	36924	27751	24508	22353	19722	16621	13471	3905	3018	2302
1984	829	133847	269608	301279	268240	178812	104018	60177	36888	24305	16961	12258	3319	2464	1835
1985	6830	14055	99703	153245	138055	105302	76805	55141	39299	28014	20043	14397	3820	2765	2008
1986	364	102480	222517	190105	124242	67414	34472	17832	9600	5425	3216	1993	473	316	217
1987	14	57578	118935	92853	60965	37184	22630	14212	9216	6110	4110	2793	705	488	341
1988	27	70565	196726	163036	109621	69437	42042	24973	14873	8994	5553	3504	831	546	365
1989	7	45381	223680	216956	138581	78548	43135	23832	13484	7869	4740	2941	689	450	299
1990	6	4889	8330	27181	36830	34140	26382	18643	12683	8542	5773	3935	997	694	488
1991	0	1	3723	38211	69672	64957	45929	29300	18218	11404	7269	4727	1153	778	533
1992	691	1015	9421	62187	104202	94680	67510	43808	27567	17322	11008	7107	1717	1147	778
1993	0	1512	13182	59457	88091	75044	50991	32078	19965	12627	8174	5408	1342	920	638
1994	0	36	4706	42272	74119	66378	46258	29473	18302	11384	7173	4596	1103	732	494
1995	0	2	4272	34646	61646	61255	47341	32665	21496	13946	9064	5943	1451	976	665
1996	0	1	1704	15813	29689	29888	22990	15749	10299	6647	4300	2808	683	458	311
1997	0	5	1273	11193	20820	19843	14344	9395	6008	3859	2512	1660	410	278	192
1998	0	18	2911	15789	24595	22015	15839	10498	6772	4354	2818	1844	450	302	206
1999	0	182	4471	20257	38307	38437	29374	20089	13165	8537	5558	3655	896	605	414
2000	0	56	9355	50093	71670	63645	48131	34345	23847	16330	11123	7578	1908	1315	913
2001	0	4	3316	30109	50644	45561	32638	21658	14079	9157	6004	3980	983	668	459
2002	0	16	3141	27261	51440	52167	40645	28325	18888	12437	8201	5449	1346	914	628
2003	0	4	5111	37350	54842	45951	31259	19747	12271	7694	4913	3199	781	527	361
2004	0	710	9217	73466	120059	103433	71618	46902	30617	20178	13446	9052	2265	1557	1080
2005	0	0	1433	25586	56552	57139	42554	28297	18196	11694	7602	5014	1236	840	578

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Recreational (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30+
1981	378	279	206	153	113	84	62	46	34	25	19	14	10	8	6
1982	467	340	248	182	133	98	72	53	39	29	21	16	12	9	7
1983	1742	1310	981	734	548	409	305	227	170	126	94	70	52	39	29
1984	1368	1019	759	565	421	314	233	174	130	97	72	54	40	30	22
1985	1463	1068	782	574	422	311	229	170	126	93	69	51	38	28	21
1986	152	109	79	57	42	31	23	17	13	9	7	5	4	3	2
1987	240	170	121	87	63	46	33	24	18	13	10	7	5	4	3
1988	249	171	119	84	60	43	31	22	16	12	9	6	5	3	3
1989	203	139	97	68	48	35	25	18	13	10	7	5	4	3	2
1990	346	247	178	128	93	68	50	37	27	20	15	11	8	6	4
1991	370	260	184	131	94	68	50	36	26	19	14	11	8	6	4
1992	535	372	261	185	132	95	69	50	36	27	20	14	11	8	6
1993	448	317	227	163	118	86	62	46	34	25	18	13	10	7	5
1994	338	234	164	116	82	59	43	31	23	16	12	9	7	5	4
1995	459	319	225	159	114	82	59	43	31	23	17	12	9	7	5
1996	214	149	105	74	53	38	27	20	15	11	8	6	4	3	2
1997	133	94	66	47	34	25	18	13	10	7	5	4	3	2	2
1998	142	99	69	49	35	25	18	13	10	7	5	4	3	2	2
1999	286	200	141	100	72	52	38	27	20	15	11	8	6	4	3
2000	640	451	321	229	165	119	87	63	46	34	25	18	14	10	7
2001	319	223	158	113	81	58	42	31	22	16	12	9	7	5	4
2002	436	305	216	154	110	79	58	42	31	22	16	12	9	7	5
2003	251	176	124	89	64	46	33	24	18	13	10	7	5	4	3
2004	757	534	379	272	196	142	103	75	55	40	30	22	16	12	9
2005	402	283	200	143	103	74	54	39	29	21	16	11	8	6	5

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Longline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1986	40	28727	60992	63041	58538	50068	39636	29861	21932	15912	11473	8247	5926	4265	3075
1987	16	28723	137742	145876	118631	88158	62785	44037	30828	21662	15300	10858	7746	5554	4000
1988	1	26761	95126	86740	69952	52273	37883	27378	19717	14120	10064	7152	5083	3620	2585
1989	0	6019	36301	46627	44240	38318	31946	26001	20647	16020	12198	9160	6819	5050	3728
1990	0	0	222	5597	17495	25638	27601	25519	21594	17291	13365	10099	7527	5569	4100
1991	0	0	839	13740	35130	44007	42034	35528	28036	21218	15660	11391	8228	5932	4279
1992	0	0	394	9843	31867	43300	42184	35612	27919	20985	15395	11143	8015	5757	4136
1993	0	0	1652	22461	57375	75358	73779	62476	48889	36590	26709	19235	13772	9853	7054
1994	0	1	1568	17392	40479	50648	48376	40289	31073	22950	16554	11800	8376	5948	4233
1995	0	1	1736	20738	44952	51201	45582	36405	27430	19988	14298	10132	7161	5067	3595
1996	0	2	2891	29270	59127	65669	57435	44977	33211	23761	16736	11714	8197	5756	4059
1997	0	24	2985	29061	60625	67308	58471	45849	34165	24756	17668	12516	8852	6271	4456
1998	0	20	2378	22172	47963	57646	53346	43155	32423	23413	16573	11630	8150	5727	4040
1999	0	3	2765	31568	70914	82870	74771	59852	44909	32515	23104	16277	11446	8067	5706
2000	0	1	1569	19589	46919	57099	53190	43881	33870	25142	18242	13073	9320	6641	4739
2001	0	3	2275	28698	66574	77509	69135	54751	40722	29277	20688	14513	10172	7150	5047
2002	0	2	1899	25646	61593	71619	63153	49554	36696	26358	18641	13095	9192	6470	4572
2003	0	2	2076	25336	56619	65153	58303	46501	34821	25179	17882	12601	8868	6258	4434
2004	0	0	2552	35721	80741	88257	73542	55372	39906	28167	19697	13734	9593	6730	4745
2005	0	0	1291	25568	63956	74301	64943	50758	37719	27317	19517	13853	9819	6972	4965

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Longline (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30+
1986	2225	1613	1173	856	627	460	338	249	184	136	101	75	56	41	31
1987	2896	2103	1533	1122	823	606	446	329	244	181	134	99	74	55	41
1988	1855	1334	964	700	509	372	273	200	148	109	80	60	44	33	24
1989	2751	2028	1496	1105	817	604	448	332	246	183	136	101	75	56	42
1990	3016	2215	1628	1199	884	652	482	357	265	195	145	108	81	60	44
1991	3097	2247	1638	1198	881	649	480	355	264	196	146	109	81	61	45
1992	2982	2153	1561	1135	828	606	445	328	241	178	131	97	72	54	40
1993	5069	3651	2640	1916	1397	1021	747	550	405	299	220	163	121	90	67
1994	3026	2170	1563	1132	822	599	438	321	237	174	128	95	71	52	39
1995	2564	1835	1320	954	693	505	369	270	199	147	108	79	60	44	33
1996	2881	2054	1473	1062	770	559	408	299	219	162	119	88	65	49	36
1997	3182	2281	1643	1189	863	629	461	338	248	184	135	100	74	55	41
1998	2868	2045	1466	1056	766	557	406	298	218	161	118	88	65	48	36
1999	4059	2899	2081	1503	1090	793	580	424	312	230	169	126	92	69	51
2000	3395	2439	1759	1274	927	676	495	363	267	197	145	108	79	59	44
2001	3584	2557	1835	1323	959	697	509	373	274	202	148	110	81	61	44
2002	3250	2320	1665	1201	871	634	463	339	249	183	136	100	74	55	41
2003	3159	2262	1627	1176	854	623	456	334	246	181	134	99	73	54	41
2004	3367	2401	1722	1241	900	655	478	350	257	189	139	103	77	56	42
2005	3552	2550	1839	1332	969	708	517	380	279	207	152	113	84	62	46

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Trap

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1986	0	7653	68736	60146	39799	24323	14179	8117	4662	2722	1626	995	624	401	262
1987	0	14619	59860	41919	22886	12432	6860	3861	2226	1318	802	501	320	209	139
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	17028	65619	47869	26895	15361	9117	5483	3320	2032	1263	798	514	337	225
1990	0	281	3673	6464	9113	8740	6682	4591	3013	1949	1263	827	550	373	258
1991	0	108	908	6301	11974	11864	8952	6016	3861	2448	1557	1002	654	434	292
1992	0	0	238	4870	11596	13029	11350	8956	6720	4899	3514	2500	1773	1260	897
1993	0	0	517	12881	27066	25226	17972	11755	7509	4795	3088	2014	1332	892	606
1994	0	0	115	3191	8266	9579	8023	5815	3949	2613	1719	1135	756	509	347
1995	0	0	728	6686	11671	11829	9658	7129	5001	3424	2324	1576	1074	737	510
1996	0	2	1336	9972	16373	15295	11586	8101	5492	3687	2476	1672	1138	782	542
1997	0	2	1202	9178	16610	16988	13904	10368	7402	5177	3591	2486	1726	1205	846
1998	0	0	162	2969	7104	8045	6816	5107	3617	2500	1711	1171	804	556	387
1999	0	0	290	6255	16147	19114	16648	12668	9040	6262	4287	2929	2009	1387	965
2000	0	4	1409	11635	23113	25754	22297	17038	12203	8469	5802	3964	2718	1876	1304
2001	19	3	414	7322	16693	18492	15732	11983	8646	6070	4209	2907	2012	1399	979
2002	0	0	280	5449	16170	21728	20381	16129	11758	8247	5691	3908	2689	1861	1296
2003	0	44	399	6109	13925	16531	15053	11905	8701	6105	4205	2878	1973	1361	945
2004	0	0	161	4721	14371	17694	15895	12634	9459	6853	4878	3442	2423	1708	1209
2005	0	0	260	5863	15407	17695	14603	10458	7048	4647	3052	2017	1346	909	620

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Trap (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30+
1986	175	119	82	57	40	28	20	15	11	8	6	4	3	2	2
1987	94	64	45	31	22	16	11	8	6	4	3	2	2	1	1
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	152	105	73	51	36	26	19	13	10	7	5	4	3	2	2
1990	182	131	95	70	52	39	29	22	16	12	9	7	5	4	3
1991	199	138	96	68	48	34	24	18	13	9	7	5	4	3	3
1992	642	460	332	240	175	128	94	69	51	37	27	21	15	11	8
1993	417	291	204	144	103	74	54	38	29	20	15	11	8	6	5
1994	239	167	117	83	59	43	31	22	16	12	9	6	5	4	3
1995	356	250	178	127	91	66	48	35	25	19	14	10	7	6	4
1996	379	267	190	136	98	71	52	38	28	21	15	11	8	6	5
1997	598	426	304	220	159	115	84	62	45	33	24	18	13	9	7
1998	272	192	137	98	71	51	37	27	20	15	11	8	6	4	4
1999	676	477	340	243	176	127	92	67	49	36	26	19	15	11	8
2000	915	646	459	329	237	172	124	91	67	48	36	27	20	15	11
2001	690	489	349	251	181	131	95	70	51	38	27	20	15	12	8
2002	910	643	457	328	236	171	124	90	66	48	35	27	19	14	11
2003	662	466	331	236	170	123	89	66	47	34	26	19	14	10	7
2004	859	614	441	318	230	167	122	89	66	48	36	26	20	14	11
2005	429	299	210	149	107	77	56	41	30	22	16	11	9	6	5

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Electric Reel

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2002	0	1	911	9111	18654	20324	17446	13560	10008	7172	5058	3541	2476	1737	1224
2003	0	0	595	7241	15205	16692	14373	11102	8103	5742	4013	2791	1943	1357	954
2004	0	1	1285	14961	27488	26327	20152	14324	9936	6845	4715	3257	2262	1580	1111
2005	0	3	503	8695	24786	29293	24629	18136	12679	8699	5940	4063	2795	1937	1352

Commercial Electric Reel (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30+
2002	867	617	442	318	230	167	122	89	65	48	35	26	19	14	11
2003	675	480	343	247	179	129	95	70	51	38	28	21	15	11	8
2004	787	561	402	290	209	152	111	81	60	44	32	24	17	13	10
2005	952	675	481	345	249	180	132	96	71	52	39	29	21	15	12

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Handline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1986	0	15	5791	21358	33648	44908	49300	45108	36826	28256	20977	15302	11069	7984	5755
1987	0	1842	37061	63818	63594	52599	41925	32652	24696	18240	13269	9572	6881	4948	3562
1988	9	27581	98861	68837	40387	24754	16148	10958	7559	5244	3647	2543	1780	1252	886
1989	3	41078	170047	164361	123500	90654	64314	43677	28829	18825	12305	8103	5395	3637	2480
1990	0	110	1466	5924	14365	23267	28655	29241	26271	21733	17072	12989	9700	7171	5270
1991	0	84	3293	22172	40220	42706	37257	29740	22557	16589	11984	8574	6113	4359	3115
1992	0	10	440	7473	20004	25602	24724	20986	16571	12533	9240	6713	4843	3487	2510
1993	0	17	568	7126	17937	23683	23446	20014	15721	11777	8591	6179	4417	3155	2255
1994	0	0	964	11570	24001	26472	23443	18857	14343	10537	7584	5397	3826	2713	1928
1995	0	32	1526	12419	24156	26314	22707	17682	13095	9452	6734	4769	3375	2394	1703
1996	0	23	1212	10536	20450	21753	18271	13878	10045	7099	4964	3457	2412	1689	1189
1997	0	1	681	9738	22075	24373	20631	15717	11411	8094	5679	3971	2780	1954	1380
1998	0	65	898	7621	15729	17666	15506	12114	8897	6328	4431	3086	2149	1504	1057
1999	0	2	1016	11373	24725	28184	24822	19425	14294	10185	7145	4983	3475	2433	1712
2000	0	119	2273	17961	35207	38707	33955	26727	19814	14214	10025	7021	4913	3448	2430
2001	0	1	1563	17354	35640	38273	32482	25078	18454	13220	9337	6554	4597	3234	2284
2002	0	11	1197	10036	20290	21997	18389	13704	9671	6658	4541	3094	2119	1460	1014
2003	0	3	760	6211	11603	11735	9321	6736	4684	3213	2197	1506	1038	722	505
2004	0	0	662	7487	13612	13086	10112	7248	5043	3464	2370	1623	1117	774	540
2005	0	0	146	4099	12326	14446	11647	8088	5310	3435	2227	1459	968	651	443

TABLE 1—Landings at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Handline + (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30+
1986	4158	3009	2184	1589	1162	851	624	459	339	250	184	137	102	75	56
1987	2573	1863	1352	986	721	528	388	286	211	156	115	85	63	48	35
1988	630	451	324	234	170	124	90	66	49	36	26	20	15	11	8
1989	1712	1193	840	596	426	306	221	161	118	86	63	47	34	25	19
1990	3867	2834	2079	1527	1123	827	610	451	333	247	183	136	101	76	56
1991	2235	1608	1161	842	613	448	328	241	177	131	97	72	53	39	30
1992	1812	1310	950	692	505	370	271	200	147	109	81	59	44	33	25
1993	1619	1165	841	610	445	325	237	175	129	95	70	52	39	29	22
1994	1376	986	709	513	372	271	199	145	106	78	58	43	32	24	17
1995	1218	874	630	456	332	242	177	130	95	70	52	38	29	21	15
1996	843	600	430	310	224	163	119	87	64	47	35	26	19	14	10
1997	981	700	503	363	263	191	140	103	76	55	41	30	22	17	12
1998	748	532	380	274	198	144	105	76	56	41	30	22	17	13	9
1999	1212	863	618	445	322	234	170	124	91	67	49	36	27	20	15
2000	1724	1228	880	634	459	334	243	178	131	97	71	52	39	28	21
2001	1623	1159	831	599	435	316	230	169	124	92	67	50	37	28	20
2002	711	501	356	255	183	133	96	70	51	37	28	20	15	11	8
2003	357	253	181	130	93	68	49	36	27	19	14	11	8	6	5
2004	380	269	191	138	99	72	52	38	28	20	15	11	8	6	4
2005	305	212	150	106	75	54	40	29	21	15	11	8	6	4	4

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies

Recreational

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1981	55473	23386	2032	185	28	6	2	1	0	0	0	0	0	0	0
1982	42556	17940	1559	142	21	5	1	1	0	0	0	0	0	0	0
1983	147132	62026	5391	489	73	17	5	2	1	0	0	0	0	0	0
1984	315168	132865	11547	1048	157	35	11	4	2	1	0	0	0	0	0
1985	83047	35010	3043	276	41	9	3	1	0	0	0	0	0	0	0
1986	365180	153949	13379	1215	182	41	12	5	2	1	1	0	0	0	0
1987	340267	143446	12466	1132	169	38	12	4	2	1	0	0	0	0	0
1988	617164	260177	22611	2053	307	69	21	8	3	2	1	0	0	0	0
1989	1437473	605995	52665	4782	716	162	49	18	8	4	2	1	0	0	0
1990	519619	459359	332939	209282	101981	42673	17536	7558	3485	1721	905	502	107	65	41
1991	954384	843706	611510	384389	187309	78377	32208	13881	6401	3162	1662	922	197	119	75
1992	835800	738874	535529	336628	164036	68638	28206	12156	5606	2769	1456	808	173	104	65
1993	546600	483211	350227	220149	107277	44888	18446	7950	3666	1811	952	528	113	68	43
1994	526169	465150	337137	211920	103267	43211	17757	7653	3529	1743	916	509	109	66	41
1995	523145	462477	335199	210702	102673	42962	17655	7609	3509	1733	911	506	108	65	41
1996	370613	327633	237466	149268	72737	30436	12507	5390	2486	1228	646	358	77	46	29
1997	348217	307835	223116	140248	68342	28597	11751	5065	2336	1154	607	337	72	44	27
1998	487385	430864	312286	196300	95655	40026	16448	7089	3269	1615	849	471	101	61	38
1999	659811	583294	422766	265746	129496	54186	22267	9597	4425	2186	1149	638	136	82	52
2000	695415	614769	445579	280086	136483	57110	23469	10115	4664	2304	1211	672	144	87	54
2001	524136	463353	335834	211102	102868	43044	17688	7623	3515	1736	913	507	108	66	41
2002	606245	535940	388444	244172	118983	49787	20459	8818	4066	2008	1056	586	125	76	47
2003	655623	579591	420083	264059	128674	53842	22126	9536	4397	2172	1142	634	135	82	51
2004	984275	870130	630662	396428	193176	80832	33217	14316	6602	3261	1714	951	203	123	77
2005	552962	488836	354304	222712	108525	45411	18661	8043	3709	1832	963	534	114	69	43

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Recreational (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	26	17	12	8	5	4	3	2	1	1	1	1	0	0
1991	48	32	21	14	10	7	5	4	3	2	1	1	1	1
1992	42	28	19	13	9	6	4	3	2	2	1	1	1	0
1993	27	18	12	8	6	4	3	2	1	1	1	1	0	0
1994	26	17	12	8	5	4	3	2	1	1	1	1	0	0
1995	26	17	12	8	5	4	3	2	1	1	1	1	0	0
1996	19	12	8	6	4	3	2	1	1	1	1	0	0	0
1997	17	11	8	5	4	3	2	1	1	1	0	0	0	0
1998	24	16	11	7	5	4	3	2	1	1	1	0	0	0
1999	33	22	15	10	7	5	3	2	2	1	1	1	0	0
2000	35	23	15	11	7	5	4	3	2	1	1	1	1	0
2001	26	17	12	8	5	4	3	2	1	1	1	1	0	0
2002	30	20	13	9	6	4	3	2	2	1	1	1	0	0
2003	33	22	15	10	7	5	3	2	2	1	1	1	0	0
2004	49	32	22	15	10	7	5	4	3	2	1	1	1	1
2005	28	18	12	8	6	4	3	2	1	1	1	1	0	0

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Longline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1986	0	26020	3679	464	91	24	8	3	1	1	0	0	0	0	0
1987	0	26016	8309	1073	183	43	13	5	1	1	0	0	0	0	0
1988	0	24239	5738	639	108	26	8	3	1	0	0	0	0	0	0
1989	0	5451	2190	343	68	19	6	3	1	1	0	0	0	0	0
1990	0	1675	27142	38606	26116	13946	6971	3475	1768	929	505	284	166	99	62
1991	0	40293	98430	96445	53032	24020	10621	4836	2295	1138	591	321	181	106	64
1992	0	20372	44179	63765	45899	23054	10515	4808	2273	1123	580	313	176	103	62
1993	0	84719	154666	135898	81039	39880	18344	8422	3977	1955	1005	540	302	176	106
1994	0	232439	184161	107792	56361	26476	11936	5405	2518	1223	622	331	183	106	63
1995	0	135315	148821	113711	59299	25939	11026	4821	2203	1058	534	282	156	90	53
1996	0	435886	301972	170025	79665	33606	13965	5971	2671	1258	625	326	179	102	60
1997	0	368232	255828	162765	80677	34193	14149	6068	2742	1310	659	349	193	111	66
1998	0	290905	192733	120897	63594	29446	12991	5740	2612	1242	620	324	178	102	61
1999	0	298247	244744	172248	92245	41656	18018	7909	3603	1720	862	454	250	143	85
2000	0	204565	154624	110124	62040	29009	12912	5830	2728	1334	682	366	204	118	71
2001	0	178956	188477	157323	87220	39072	16672	7234	3266	1547	772	404	222	126	75
2002	0	152099	145208	134087	78898	35630	15101	6510	2931	1390	694	364	200	115	68
2003	0	193328	177114	133754	72166	32335	13940	6115	2784	1328	666	351	193	111	67
2004	0	64959	203251	180920	99450	42497	17158	7144	3145	1469	727	380	207	118	71
2005	0	15338	127602	145826	84478	37425	15615	6689	3019	1443	727	385	214	123	74

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Longline (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	39	25	17	12	8	6	3	3	2	1	1	0	0
1991	40	26	17	11	7	5	4	2	2	1	1	1	0
1992	39	24	16	11	7	5	3	2	2	1	1	1	0
1993	66	42	28	18	12	8	5	4	3	3	1	1	1
1994	39	25	16	11	7	5	4	2	1	1	1	1	0
1995	34	21	13	9	6	4	3	2	1	1	1	0	0
1996	38	24	15	10	6	5	4	2	1	1	1	0	0
1997	41	26	17	12	8	5	4	3	1	1	1	0	0
1998	37	24	15	10	7	5	3	2	1	1	1	0	0
1999	52	33	21	14	9	6	5	3	2	1	1	1	1
2000	44	27	19	12	9	5	4	3	2	1	1	1	0
2001	46	29	19	13	9	5	4	3	2	1	1	1	0
2002	42	27	17	11	8	5	4	3	1	1	1	1	0
2003	40	25	17	11	8	5	4	3	1	1	1	1	0
2004	43	27	17	12	7	5	4	2	1	1	1	1	0
2005	46	29	19	12	9	6	4	3	2	2	1	0	0

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Trap

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1986	0	6932	4146	442	61	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	13241	3611	308	35	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	15423	3958	352	41	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	8051	18719	17980	9695	4003	1518	581	233	100	46	22	12	6	4	2	1	1	1	0	0	0
1991	0	15161	41650	33635	15593	5903	2119	779	303	127	57	28	14	7	4	3	1	1	0	0	0	0
1992	0	10638	17590	23807	14282	6326	2673	1166	534	257	131	70	38	23	14	8	5	4	3	1	1	1
1993	0	358	35237	65714	33436	11979	4101	1480	578	245	112	55	29	16	9	5	4	2	1	1	1	0
1994	0	946	9938	18159	11206	4922	1951	770	316	138	64	32	16	9	5	3	2	1	1	1	0	0
1995	0	11661	44457	30183	13928	5666	2253	920	394	178	86	43	23	13	8	5	3	2	1	1	1	0
1996	0	383502	138745	56654	21287	7546	2727	1047	432	192	91	46	25	14	8	5	3	2	2	0	0	0
1997	0	294261	119284	52325	21726	8463	3310	1355	588	272	133	68	38	21	13	7	5	3	2	2	1	0
1998	0	4140	10185	14341	8786	3924	1607	663	286	131	63	32	17	10	6	4	2	2	0	0	0	0
1999	0	1458	21180	33897	21436	9728	4033	1677	725	331	160	81	44	25	15	8	5	3	2	2	1	0
2000	0	39897	65382	52835	28278	12598	5286	2225	969	444	215	110	59	33	19	12	8	5	3	2	1	1
2001	0	21852	43176	43272	22666	9475	3821	1589	695	321	157	81	44	25	15	9	5	3	2	2	1	0
2002	0	17627	29145	32933	22646	11418	5039	2164	952	439	213	109	59	33	20	12	8	5	3	2	2	1
2003	0	18716	39058	30235	16689	7952	3541	1549	690	320	156	80	43	24	14	9	6	3	3	1	1	0
2004	0	526	14425	25758	18591	8823	3805	1662	757	361	181	96	53	30	18	11	7	5	3	2	2	1
2005	0	3584	27733	37119	21837	9279	3589	1394	567	246	114	56	29	16	10	6	4	2	2	0	0	0

Commercial Electric Reel

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
2002	0	40755	57568	44429	23209	9959	4135	1772	796	377	187	98	53	31	18	11	7	5	3	2	2	1
2003	0	23239	36310	33248	18048	7948	3349	1434	640	300	148	77	42	24	14	8	6	4	2	2	1	0
2004	0	32385	82912	62293	29362	11498	4392	1760	755	347	170	88	48	27	16	10	6	4	2	2	2	0
2005	0	357	12304	38961	30138	14176	5776	2347	1000	453	219	113	60	34	20	13	8	5	3	2	2	1

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Handline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1986	0	14	349	157	52	22	10	5	3	1	0	0	0	0	0
1987	0	1668	2235	470	98	25	9	3	1	1	0	0	0	0	0
1988	0	24981	5963	506	62	12	3	1	0	0	0	0	0	0	0
1989	0	37205	10257	1209	190	44	13	5	2	1	0	0	0	0	0
1990	0	10575	29843	27544	19679	12395	7193	3973	2149	1166	644	366	213	128	79
1991	0	58087	157641	114131	52313	21554	9008	3939	1813	878	448	240	133	77	46
1992	0	10241	36638	43162	27152	13218	6063	2806	1341	668	347	188	106	62	38
1993	0	8215	32730	36617	23644	12159	5743	2676	1272	627	323	173	97	57	33
1994	0	36715	68515	56194	29130	12778	5521	2459	1141	554	282	150	84	48	28
1995	0	85604	84671	60641	30437	13040	5422	2321	1045	497	251	133	74	42	25
1996	0	23370	49107	43794	23525	10217	4221	1783	790	370	183	95	52	30	18
1997	0	42538	49849	47717	27178	11827	4853	2042	904	424	211	110	60	35	21
1998	0	68629	55064	39785	20514	8922	3745	1602	714	335	165	86	47	26	16
1999	0	74282	70208	57475	31468	14032	5945	2555	1142	537	266	138	75	43	26
2000	0	70304	118006	88358	43775	19002	8070	3500	1579	748	373	195	107	61	36
2001	0	74460	101665	84601	44060	18644	7666	3267	1465	694	347	182	100	57	34
2002	0	63627	71514	47863	24788	10638	4311	1773	763	347	168	85	46	25	15
2003	0	34862	33875	24005	12529	5254	2077	842	360	164	80	41	22	13	8
2004	0	9123	45646	36590	16416	6190	2324	924	393	179	87	44	24	14	8
2005	0	145	10740	22688	16025	7165	2755	1049	418	178	82	40	20	11	7

TABLE 2—Discards at Age by Sector/Gear (in numbers of fish) Derived from Size Frequencies (cont.)

Commercial Handline + (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	50	32	21	14	10	7	5	3	2	2	1	1
1991	28	18	12	8	6	3	3	2	1	1	0	0
1992	24	15	10	6	5	3	2	1	1	1	0	0
1993	21	13	9	6	4	2	2	2	0	0	0	0
1994	17	11	7	5	4	2	2	1	0	0	0	0
1995	16	10	6	4	3	2	2	1	0	0	0	0
1996	11	7	5	3	2	2	1	0	0	0	0	0
1997	12	8	5	3	2	2	1	0	0	0	0	0
1998	10	6	3	3	2	1	1	0	0	0	0	0
1999	16	10	6	4	2	2	2	0	0	0	0	0
2000	22	14	9	6	4	2	2	2	1	0	0	0
2001	21	13	9	6	4	2	2	2	0	0	0	0
2002	9	6	3	3	2	1	0	0	0	0	0	0
2003	5	3	2	1	1	0	0	0	0	0	0	0
2004	4	4	2	2	0	0	0	0	0	0	0	0
2005	4	2	2	1	0	0	0	0	0	0	0	0

TABLE 3—Observed Catches at Age by Sector/Gear (in numbers of fish)

Recreational

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1985	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0.375	0.375	0	0.125	0.125	0	0	0	0	0	0	0	0	0
1987	0	0.182	0.455	0.091	0	0.182	0	0.091	0	0	0	0	0	0	0
1988	0	0	0	0.2	0.1	0.3	0.1	0.2	0.1	0	0	0	0	0	0
1989	0	0.545	0.182	0	0	0.091	0.091	0	0	0.091	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0.011	0.045	0.145	0.056	0.022	0.034	0.011	0.034	0.011	0.011	0.011	0	0
1992	0	0	0.001	0.008	0.903	0.005	0.003	0.015	0.014	0.018	0.018	0.012	0.004	0	0
1993	0	0.001	0.003	0.903	0.009	0.013	0.025	0.018	0.015	0.003	0.006	0	0.001	0	0.001
1994	0	0	0.042	0.187	0.211	0.149	0.096	0.127	0.03	0.051	0.022	0.022	0.022	0.011	0
1995	0	0	0	0.047	0.212	0.239	0.152	0.1	0.085	0.025	0.039	0.034	0.013	0.03	0
1996	0	0	0.011	0	0.18	0.404	0.262	0.068	0.051	0.017	0	0	0.004	0	0
1997	0	0	0.079	0.087	0.253	0.235	0.27	0.041	0.006	0.002	0.01	0.004	0.004	0.004	0.004
1998	0	0	0	0.385	0.441	0.081	0.061	0.024	0.005	0	0	0	0	0.003	0
1999	0	0	0.002	0.395	0.465	0.046	0.028	0.032	0.014	0.015	0	0	0	0	0
2000	0	0	0	0.278	0.138	0.148	0.069	0.126	0.11	0.031	0.022	0	0.031	0	0.016
2001	0	0	0	0.361	0.178	0.397	0.047	0	0	0.006	0	0	0.006	0	0
2002	0	0	0.003	0.017	0.385	0.427	0.026	0.011	0.117	0.001	0.004	0.004	0.003	0.001	0.001
2003	0	0	0.038	0.465	0.121	0.098	0.183	0.018	0.027	0.014	0	0.034	0.002	0	0
2004	0	0	0.001	0.071	0.606	0.135	0.058	0.04	0.022	0.062	0.003	0	0	0.001	0
2005	0	0	0	0.019	0.234	0.592	0.054	0.021	0.062	0.002	0.014	0	0	0.002	0

TABLE 3—Observed Catches at Age by Sector/Gear (in numbers of fish) (cont.)

Recreational (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	N
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	8
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	11
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	11
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0.609	0	0	0	0	37
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	58
1993	0	0	0.001	0	0	0	0	0	0.001	0	0	0	0	83
1994	0	0	0	0	0	0.011	0	0	0.009	0.011	0	0	0	96
1995	0.008	0	0	0	0	0.009	0	0	0	0.009	0	0	0	144
1996	0	0	0	0	0	0	0	0	0.004	0	0	0	0	175
1997	0.004	0	0	0	0	0	0	0	0	0	0	0	0	98
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	97
1999	0.002	0	0	0	0	0	0	0	0	0	0	0	0.002	114
2000	0	0.016	0	0	0.016	0	0	0	0	0	0	0	0	71
2001	0	0.006	0	0	0	0	0	0	0	0	0	0	0	48
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	342
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	193
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	214
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	114

TABLE 3—Observed Catches at Age by Sector/Gear (in numbers of fish) (cont.)

Commercial Longline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1991	0	0	0	0	0.029	0.171	0.286	0.171	0.257	0	0.029	0.029	0	0	0
1992	0	0	0	0	0.076	0.19	0.329	0.203	0.127	0.025	0.013	0.025	0	0	0
1993	0	0	0	0.059	0.116	0.231	0.241	0.142	0.123	0.033	0.034	0.008	0.004	0.004	0
1994	0	0	0	0.087	0.145	0.079	0.235	0.166	0.107	0.087	0.042	0.016	0.022	0	0
1995	0	0	0	0.018	0.077	0.305	0.137	0.2	0.126	0.09	0.012	0.006	0.017	0	0
1996	0	0	0	0.01	0.052	0.146	0.271	0.083	0.26	0.125	0.021	0.01	0	0	0.01
1997	0	0	0	0.286	0.143	0.143	0.286	0	0	0	0	0	0	0	0
1998	0	0	0	0.034	0.112	0.146	0.247	0.164	0.12	0.048	0.067	0.034	0.01	0	0.019
1999	0	0	0	0.004	0.049	0.105	0.163	0.256	0.208	0.098	0.056	0.032	0.013	0.007	0.005
2000	0	0	0	0.028	0.04	0.181	0.143	0.159	0.134	0.104	0.114	0.042	0.016	0.012	0.009
2001	0	0	0	0.004	0.177	0.106	0.208	0.121	0.064	0.087	0.081	0.053	0.016	0.024	0.019
2002	0	0	0	0.003	0.036	0.204	0.123	0.144	0.111	0.057	0.072	0.074	0.049	0.032	0.026
2003	0	0	0.001	0.03	0.028	0.103	0.206	0.127	0.125	0.084	0.065	0.06	0.052	0.033	0.027
2004	0	0	0.001	0.012	0.185	0.044	0.139	0.186	0.114	0.091	0.053	0.036	0.033	0.036	0.021
2005	0	0	0	0.002	0.075	0.42	0.072	0.127	0.122	0.069	0.035	0.022	0.012	0.012	0.007

Commercial Longline (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	N
1991	0	0	0	0.029	0	0	0	0	0	0	0	0	35
1992	0	0.013	0	0	0	0	0	0	0	0	0	0	79
1993	0.004	0	0	0	0	0	0	0	0	0	0	0	200
1994	0	0	0	0	0	0	0	0	0	0	0	0.014	81
1995	0	0	0	0	0	0.006	0	0.006	0	0	0	0	140
1996	0	0.01	0	0	0	0	0	0	0	0	0	0	96
1997	0.143	0	0	0	0	0	0	0	0	0	0	0	7
1998	0	0	0	0	0	0	0	0	0	0	0	0	122
1999	0	0	0.002	0	0.002	0	0	0	0	0	0	0	552
2000	0.006	0	0.003	0.003	0.003	0.003	0	0	0	0	0	0	405
2001	0.009	0.007	0.005	0.007	0.007	0.002	0	0	0.003	0	0	0	1100
2002	0.019	0.009	0.017	0.004	0	0.007	0	0.002	0.005	0.005	0.001	0	1067
2003	0.014	0.018	0.01	0.008	0.003	0.001	0	0	0.005	0	0	0	1066
2004	0.01	0.011	0.01	0.005	0.008	0.002	0	0.002	0.001	0	0	0.001	1095
2005	0.007	0.004	0.004	0.002	0.003	0.003	0.001	0	0	0.002	0	0	1422

TABLE 3—Observed Catches at Age by Sector/Gear (in numbers of fish) (cont.)**Commercial Trap**

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	N
1993	0	0	0	0.036	0.036	0.226	0.321	0.298	0.06	0.024	0	0	0	0	0	0	0	0	84
1994	0	0	0	0	0	0.034	0.172	0.241	0.31	0.138	0.034	0.034	0	0.034	0	0	0	0	29
1995	0	0	0	0	0.051	0.462	0.103	0.154	0.128	0.026	0	0.051	0.026	0	0	0	0	0	39
1996	0	0	0	0	0	0	0.25	0.125	0.25	0.25	0	0.125	0	0	0	0	0	0	8
1997	0	0	0	0.059	0.353	0.294	0.059	0.176	0	0	0	0	0.059	0	0	0	0	0	17
1998	0	0	0.03	0.091	0.03	0.152	0.242	0.152	0.212	0.061	0	0.03	0	0	0	0	0	0	33
1999	0	0	0	0.032	0.065	0.065	0.032	0.258	0.226	0.097	0.129	0	0.065	0.032	0	0	0	0	31
2000	0	0	0	0.026	0.026	0.395	0.237	0.105	0.105	0.053	0.026	0	0.026	0	0	0	0	0	38
2001	0	0	0	0	0.138	0.277	0.096	0.202	0.021	0.202	0.011	0.032	0	0	0.011	0	0.011	0	39
2002	0	0	0	0.076	0.076	0.377	0.134	0.134	0.039	0.029	0.076	0.024	0.02	0.005	0.005	0.005	0	0	89
2003	0	0	0	0.029	0.024	0.116	0.195	0.086	0.096	0.106	0.034	0.179	0.058	0.034	0.034	0.01	0	0	65
2004	0	0	0	0.028	0.139	0.056	0.222	0.194	0.028	0.139	0.056	0	0	0.056	0	0.028	0	0.056	36

Commercial Electric Reel

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2001	0	0	0	0	0.114	0.138	0.177	0.291	0.169	0.016	0.016	0.016	0	0.04	0.008
2002	0	0	0	0.036	0.039	0.159	0.337	0.111	0.127	0.068	0.018	0.014	0.02	0.009	0.015
2003	0	0	0	0.019	0.366	0.107	0.179	0.153	0.04	0.023	0.022	0.013	0.017	0.012	0.012
2004	0	0	0	0.006	0.101	0.6	0.085	0.063	0.063	0.019	0.016	0.013	0.006	0	0.006
2005	0	0	0	0	0.114	0.138	0.177	0.291	0.169	0.016	0.016	0.016	0	0.04	0.008

Commercial Electric Reel (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	N
2002	0.008	0	0	0	0	0.008	0	0	0	0	0	0	52
2003	0.012	0.008	0.003	0.009	0.003	0	0.003	0	0	0.009	0	0	220
2004	0.007	0	0.01	0.008	0	0	0.004	0	0	0.004	0	0.004	368
2005	0.003	0.003	0	0.003	0	0.006	0	0.006	0	0	0	0	316

TABLE 3—Observed Catches at Age by Sector/Gear (in numbers of fish) (cont.)

Commercial Handline

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1991	0	0	0.055	0.055	0.11	0.275	0.055	0	0.123	0.136	0	0.123	0	0	0.068
1992	0	0	0	0	0.178	0.219	0.278	0.224	0	0.041	0.018	0	0.041	0	0
1993	0	0	0.011	0.107	0.198	0.345	0.209	0.12	0	0	0	0.011	0	0	0
1994	0	0	0.003	0.145	0.316	0.186	0.173	0.108	0.033	0.015	0.006	0.009	0.003	0	0.003
1995	0	0	0	0.014	0.107	0.652	0.145	0.035	0.012	0.014	0.012	0	0.006	0	0
1996	0	0	0	0.161	0.216	0.34	0.136	0.056	0.085	0	0.006	0	0	0	0
1997	0	0	0	0	0.173	0.087	0.653	0.087	0	0	0	0	0	0	0
1998	0	0	0.024	0.151	0.309	0.151	0.095	0.048	0.127	0.072	0	0	0	0.024	0
1999	0	0	0	0.018	0.166	0.134	0.159	0.273	0.109	0.094	0	0.015	0.015	0	0
2000	0	0	0	0.257	0.144	0.168	0.109	0.075	0.079	0.052	0.018	0.024	0.024	0.019	0.016
2001	0	0	0	0.047	0.342	0.121	0.168	0.086	0.03	0.058	0.039	0.024	0.03	0.014	0.01
2002	0	0	0.014	0.049	0.141	0.346	0.123	0.102	0.07	0.05	0.026	0.032	0.016	0.005	0.005
2003	0	0	0.004	0.114	0.143	0.198	0.218	0.133	0.07	0.022	0.036	0.018	0.006	0	0.007
2004	0	0	0	0.022	0.351	0.127	0.148	0.139	0.064	0.057	0.027	0.021	0.015	0.012	0.005
2005	0	0	0	0.003	0.094	0.58	0.064	0.092	0.081	0.032	0.014	0.016	0.009	0.012	0

Commercial Handline (cont.)

Year	16	17	18	19	20	21	22	23	24	25	26	27	N
1991	0	0	0	0	0	0	0	0	0	0	0	0	17
1992	0	0	0	0	0	0	0	0	0	0	0	0	31
1993	0	0	0	0	0	0	0	0	0	0	0	0	61
1994	0	0	0	0	0	0	0	0	0	0	0	0	233
1995	0	0	0	0	0	0	0.003	0	0	0	0	0	180
1996	0	0	0	0	0	0	0	0	0	0	0	0	85
1997	0	0	0	0	0	0	0	0	0	0	0	0	7
1998	0	0	0	0	0	0	0	0	0	0	0	0	28
1999	0	0.018	0	0	0	0	0	0	0	0	0	0	63
2000	0	0	0	0.008	0	0	0	0.008	0	0	0	0	207
2001	0.017	0.008	0.002	0	0	0.002	0	0	0	0	0	0	572
2002	0.004	0.003	0.001	0.009	0.001	0.001	0	0	0	0	0	0.001	491
2003	0	0.003	0.004	0.004	0.004	0	0.004	0.004	0	0.007	0	0	318
2004	0.005	0.004	0.001	0.001	0	0.001	0.001	0	0	0	0	0	681
2005	0.004	0	0	0	0	0	0	0	0	0	0	0	348