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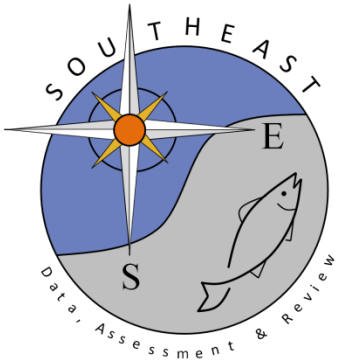

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Preliminary catches of smoothhound sharks

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ABSTRACT

This document presents commercial landings, recreational catches, and discard estimates of smoothhound sharks (genus *Mustelus*) for 1981-2012. Information on the geographical distribution of both commercial landings and recreational catches and live discards is presented along with gear-specific information of commercial landings. Data on the disposition of smoothhound sharks in two commercial observer programs and length composition information and trends in average size of the catches from several commercial and recreational sources are also presented.

KEYWORDS

Catch, Landings, Discards, Commercial fishing, Long lining, Shark fisheries, Bycatch, Observer programs, Smoothhound sharks, Mustelus canis

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1. Background

The status of smoothhound sharks (genus *Mustelus*) has never been assessed. In preparation for the SEDAR 39 Data Workshop, the purpose of the present document is to develop preliminary catch tables to facilitate input into stock assessments. Information on geographical distribution of commercial landings and recreational catches as well as gear-specific information of commercial landings from several sources is presented. Size (length compositions and trends in average length and weight) information from several commercial and recreational sources is also compiled and analyzed.

2. Catch streams

2.1. Commercial landings

U.S. commercial landings in weight were compiled from two sources: Northeast regional general canvass landings data (gcd) and Atlantic Coastal Cooperative Statistics Program (ACCSP) data for the Atlantic region and GulfFIN (Gulf Fisheries Information Network) data for the Gulf of Mexico region. ACCSP data cover all Atlantic states and were available for smooth dogfish (*Mustelus canis*) starting in 1991. The Northeast gcd ranged from the northern states south to Virginia and were available for smooth dogfish as well starting in 1982. Total Atlantic shark landings of smooth dogfish were thus taken from the Northeast gcd for 1982-1990 and from ACCSP for 1991-2012 (Table 1; Figure 1).

The initial extraction of data from the ACCSP database revealed a very large peak in 1994 corresponding to gillnet catches in North Carolina. After consultation, it was clarified that the state of NC did not differentiate between smooth dogfish and spiny dogfish (*Squalus acanthias*) until 1995. The state of NC lumped all landings into an unclassified dogfish category in 1991-1993 and in 1994, although they appeared identified as 8,642,748 lb whole weight (ww) of smooth dogfish and 1,234,931 lb ww of spiny dogfish (total 9,877,658 ww) in the ACCSP database, they were still unclassified dogfish (Alan Bianchi, NC Division of Marine Fisheries, pers. comm. to H. Balchowsky). To account for NC unclassified dogfish (smooth and spiny dogfish) that could have been smooth dogfish in 1991-1993, we calculated the ratio of smooth to spiny dogfish for the first four years (1995-1998) with data reported by species. The ratio (0.11) was then multiplied by the reported NC unclassified dogfish to yield estimates of smooth dogfish landings for 1991, 1992, and 1993. For 1994, the ratio of 0.11 was multiplied by the sum of reported smooth dogfish and spiny dogfish to yield an estimate of smooth dogfish.

Landings showed an increasing trend from 1982 to 2012, punctuated by two peaks, the largest one in 2010 and a secondary peak in 1995 (Table 1; Figure 1). No landings of other *Mustelus* species were found in these two databases. For the Gulf of Mexico region, the GulfFIN database essentially contained no landings of *Mustelus*.

Commercial landings were dominated by gillnets, followed by trawls and a “not coded” gear category, both of which were an order of magnitude lower than gillnets (Table 2; Figure 2).

Averaged over 1982-2012, 83% of smooth dogfish were caught in gillnets, 8% in trawls, 7% in the "not coded" gear category, and 1% in longlines. Geographically, most landings occurred in NC (45%), followed by VA (23%), NJ (18%), MD (6%), and NY (5%), with the contribution from the rest of the Atlantic states being almost negligible (ca. 3%) (Table 3; Figure 3).

Commercial landings in numbers can be calculated by dividing annual landings in weight by average weights from the Gillnet Observer Program (GNOP) and Reef Fish and Shark Bottom Longline Observer Programs (collectively referred to as BLLOP hereforth) as appropriate. All weights from the GNOP and BLLOP were predicted from fork length measurements taken by observers in gillnet and longline fisheries, respectively, using a length-weight regression. Average weights were available for 2002-2012 from the GNOP and for 1994-2012 from the BLLOP.

2.2 Recreational catches

Recreational catches of smoothhound sharks correspond to estimates from three data collection programs: the Marine Recreational Information Program (MRIP), the NMFS Headboat Survey (HBOAT) operated by the SEFSC Beaufort Laboratory, and the Texas Parks and Wildlife Department Recreational Fishing Survey (TXPWD). The MRIP has effectively replaced MRFSS (Marine Recreational Fishery Statistics Survey), but new estimates for a suite of fish species, including sharks, are only available for the period 2004-2012. For 1981-2003, MRFSS estimates were adjusted to MRIP using ratio estimators (see SEDAR32-WP-02). Annual recreational catch estimates of smoothhound sharks were computed as the sum of the MRIP (A+B1=fished landed or killed), HBOAT (fish landed), and TXPWD (fish landed) survey estimates as appropriate.

In the Atlantic region, virtually all catches were of smooth dogfish and, overwhelmingly, from the MRIP. Catches in numbers showed a decreasing trend from 1982 to 2012, punctuated by a peak in 1984 (Table 4; Figure 4, top panel). Most of the catches corresponded to NJ, DE, NY, NC, VA, MA, and MD, respectively, with those states accounting for about 88% of the total catches in both the Atlantic and Gulf of Mexico (Table 5; Figure 5, top panel). Catches in weight followed a similar trend to those in numbers (Table 4; Figure 4, middle panel). Catches in weight corresponded to NJ, DE, NC, MA, NY, VA, MD, and SC, respectively, with those states accounting for about 88% of the total catches in both the Atlantic and Gulf of Mexico (Table 6; Figure 5, bottom panel).

We computed B2s (sharks released alive) in MRIP to calculate live post-release mortality once the hook-and-line post-release mortality rate for smooth dogfish is estimated (Courtney 2014). B2 catches (available only in numbers) in the Atlantic followed an almost opposite trend to A+B1 catches (Tables 4, 7; Figure 4 bottom panel, Figure 5 bottom panel). The states of NJ (54%) and DE (21%) accounted for three quarters of all live releases.

In the Gulf of Mexico region, the vast majority of catches were also of smooth dogfish and also came predominantly from the MRIP. There were some isolated catches of Florida

smoothhound (*Mustelus norrisi*) reported in the MRIP totaling ca. 10,000 animals over 1995, 1997, 1999, 2001, 2002, 2004, and 2005. With the exception of a peak of almost 24,000 animals (120,000 lb ww) in 1984, annual catches never exceeded 8,000 animals (55,000 lb ww) (Table 8, Figure 6 top and middle panels). Most of the catches both in numbers and weight were from the west coast of Florida (Figure 7 top and middle panels). The sporadic live releases (B2) were mostly from Louisiana (Figures 6 and 7 bottom panels).

We also calculated confidence intervals for A+B1 and B2 catches of smooth dogfish in the Atlantic and A+B1 catches of smooth dogfish in the Gulf of Mexico (Figure 8).

2.3 Bottom longline and gillnet dead discards and live post-release mortality

Dead discard estimates will be obtained from the Coastal Fishery Logbook program and the Reef Fish Bottom Longline Observer Program and Gillnet Observer Program (GNOP), respectively (Carlson 2014a,b).

We will also account for live post-release mortality (the proportion of sharks released alive that die) in commercial gear by multiplying landings from gillnets and longlines by the percentage released alive in each of these gears (from observer programs) and the post-release mortality rate estimated for each of these gears (Courtney 2014). The proportion of smooth dogfish released alive was 0.33 (for the period 2001-2012 from the GNOP) for gillnets and the proportion of *Mustelus* spp. released alive was 0.57 (for the period 1994-2012 from the BLLOP) for longline. Table 9 and Figure 9 summarize the disposition (action taken) of smooth dogfish from the GNOP and of *Mustelus* spp. from the BLLOP. It is assumed there are no animals observed to be released alive in the shrimp trawl fishery.

2.4 Shrimp trawl fishery discards

Dead discard estimates from the shrimp trawl fishery in the Gulf of Mexico and Atlantic will be taken from Zhang et al. (2014) and subsequent analyses.

2.5 Average size (length and weight) and length compositions

The predicted average weight (lb whole weight) and observed fork length of *Mustelus* spp. from the BLLOP showed a slightly increasing trend from 1994 to 2012 (Fig. 10). Average weight and fork length from the GNOP also showed an increasing trend from 2005 to 2012 for *Mustelus* spp. (Fig. 11). Average size information for smooth dogfish from the MRIP showed a very slight decreasing trend in length and a very slight increasing trend in weight (Fig. 12).

Length-frequency distributions of *Mustelus* spp. observed in the BLLOP show that mostly mature individuals were caught (ca. $\geq$ 82 cm FL for sexes combined; Fig. 13). More *Mustelus canis* observed in the GNOP appeared to be mature than immature (Fig. 14). Recreationally caught smooth dogfish were mostly immature, but mature animals were also caught (Fig. 15).

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Table 1. Commercial landings (lb whole weight) of smooth dogfish in the Atlantic region. NE GCL is Northeast General Canvass Landings and ACCSP is Atlantic Coastal Cooperative Statistics Program.

year	NE gcd	ACCSP	Total landings
1982	7493		7493
1983	24748		24748
1984	1305		1305
1985	7864		7864
1986	4878		4878
1987	69728		69728
1988	1642		1642
1989	250143		250143
1990	310776		310776
1991	569572	732194	732194
1992	854480	1812297	1812297
1993	703634	1680469	1680469
1994	664660	1762497	1762497
1995	513538	2696337	2696337
1996	890083	1578134	1578134
1997	455299	982797	982797
1998	602667	1092116	1092116
1999	820182	1326997	1326997
2000	738023	1079259	1079259
2001	705126	1223791	1223791
2002	1085591	1442041	1442041
2003	1097765	1484908	1484908
2004	1136639	1765486	1765486
2005	560856	1236309	1236309
2006	525852	1141605	1141605
2007	804662	1658633	1658633
2008	979655	1815707	1815707
2009	1450603	2714633	2714633
2010	2240492	3901806	3901806
2011	1751022	2793519	2793519
2012	1243698	2239335	2239335

Table 2. Commercial landings (lb whole weight) of smooth dogfish in the Atlantic region by gear type.

year	BY HAND	DIP NETS	DREDGE	FIXED NETS	GILL NETS	HAND LINE	HAUL SEINE	HOOK AND LINE	LONG LINES	NOT CODED	OTHER GEAR	POTS AND TRAPS	SPEARS AND GIGS	TRAWLS
1982														7493
1983					475	257			308					23708
1984														1305
1985					737	144								6983
1986					126									4752
1987					7794	28			3107					58799
1988					912									730
1989					150000									100143
1990					230190									80586
1991					670686				36					40669
1992					1751896				227					41707
1993					1546616				1428					104837
1994					1564725	65	21426	211.2	45108	30587		304		130071
1995				227	2638083		4256.6	925	4265	1917		80		46583
1996					1530412	632	756	2034	197	235				43868
1997					922865	10718	40	666	1469			90		46949
1998				867	738864	292	29	372	388	204861		366		146077
1999				302	1256674	30	56	624	3675	926		148	5	64557
2000				603	1012549		128	40	8433			86		57420
2001				6473	1081385	1520	1112	674	8933	223		4241		119230
2002			86	13197	1251700	484		204	21309	127		1592	30	153312
2003				14462	1282200	1354		754	18385	3287		387		164079
2004	1007		3643	209	1584542	301	274	448	14244	46775	9962	8988		95093
2005	70		567	620	1041220	3155	11	4758	51029	95274	717	5149		33740
2006			4764	2107	918482	1108	1158	3522	14426	88988	2224	4743		100083
2007	90	370	3260.4	3362	1313988	287	1769.4	60	16211	219724	25	704		98781
2008			10831	2496	1337729	613	40	13395	30830	237584		7213		174974.7
2009			28547	40991	1854673	305	2154	7287	80642	398952	39	9996		291046
2010			16442	17035	3027477	50	16	4323	56914	545585		1317		232648.22
2011			4339	27169	2067545		346	1863	15464.67	361443		163		315186.6
2012			1762	1525	1521430	10	94	2083	8862.22	520289	420	7072		175789.1
Total	1,167	370	74,241	131,645	32,305,973	21,353	33,666	44,244	405,890	2,756,777	13,387	52,639	35	2,961,200

Table 3. Commercial landings (lb whole weight) of smooth dogfish in the Atlantic region by state of landing.

year	CT	DE	MA	MD	ME	NC	NJ	NY	RI	SC	VA
1982											7493
1983			42	10064					272		14370
1984											1305
1985			5794	881							1189
1986				186							4692
1987			140	68193			362		622		411
1988							912				730
1989			250102					41			
1990			275000	7513				2210			26053
1991			4400	18746		162627	530557				15864
1992			9700	25994		959715	809664				7224
1993				156890		978736	310518		4738		229587
1994			12795	233616		1097837	112410	68	4848		300923
1995	743		45	79766		2182799	139241	130			293613
1996			6	142621		463023	70886	5612	3128		892858
1997			11245	74539		527498	212651	3014	2802		151048
1998				300237		489451	184223	21554	15896		80755
1999				124751		505039	309097	4570	43874	1777	337889
2000			311	36458		335282	409589	23149	4052	5954	264464
2001	1919	792		7010	270	510383	280885	116840	248	8283	297161
2002	3128	131	1307	15440		341672	248222	149006	3367	14780	664988
2003	3524	273		14193		373056	86426	164879	4833	14090	823634
2004	6459	475	1281	12203		623696	213565	96093	3954		807760
2005	3823	538	15263	9286		647578	97978	80878	8544	21019	351403
2006	4066	46	45206	14433		610247	89614	114165	4063	5456	254309
2007	1955	457	6386	9477		638906	77534	103600	14003	15597	790719
2008	4375	432		14380	3000	826274	186649	151252	9460	20801	599085
2009	9991	32799	589	313619		1221150	446419	158538	56653	19691	455184
2010	1988	17352	1000	301433		1614844	846916	258878	65334	367	793695
2011	617	6486	25892	212208		1241252	732487	267037	21874	597	285071
2012	2759	90	108	140455		980275	711527	233369	16097	2772	151883
Total	45,347	59,870	666,612	2,344,590	3,270	17,331,339	7,108,332	1,954,882	288,661	131,183	8,905,361

Table 4. Recreational catches (A+B1) of smooth dogfish in the Atlantic region in numbers and weight (lb whole weight). B2s are sharks released alive (in numbers).

			Total catches		
year	MRIP	HBOAT	(number)	(weight)	B2s
1981	120779	18	120797	483684	259744
1982	32058	9	32067	99148	551026
1983	167992	70	168062	398513	1421070
1984	328002	0	328002	1090071	507449
1985	106385	10	106395	363366	314483
1986	154158	81	154239	696378	407200
1987	171570	163	171733	424872	566682
1988	98337	19	98356	408454	312863
1989	113197	67	113264	395156	612883
1990	69366	0	69366	186795	524904
1991	58244	308	58552	182571	490215
1992	62320	461	62781	179842	455512
1993	97910	727	98637	294512	459827
1994	32878	356	33234	118903	454408
1995	46339	480	46819	154399	429199
1996	29727	1214	30941	110983	587200
1997	49619	895	50514	161911	873908
1998	34119	727	34846	110258	676530
1999	15091	410	15501	53793	710108
2000	52995	407	53402	166651	777195
2001	39261	632	39893	105755	1592040
2002	24607	1059	25666	86144	962222
2003	51640	343	51983	186666	1374290
2004	14434	1239	15673	57662	1224213
2005	47479	1569	49048	182730	1738714
2006	13480	1016	14496	48386	2111439
2007	93718	1023	94741	322588	1389123
2008	47113	711	47824	168107	1995356
2009	17496	605	18101	78672	1034333
2010	18166	1495	19661	56757	852882
2011	19804	1237	21041	64792	780287
2012	31527	142	31669	96736	1032240

Table 5. Recreational catches (A+B1, numbers) of smooth dogfish by state.

year	AL	CT	DE	FLE	FLW	GA	LA	MA	MD	ME	MS	NC	NH	NJ	NY	RI	SC	TX	VA
1981		28121		18				31212				16371		8489	9609				26976
1982		0	13011	1561				0	0			0		3213	5190		0		9091
1983			14242	1856			1718	0	2399			19378		63281	42677		19		24210
1984			1248	3136	19426			20346	25095			30184		85166	123629	1140	12457		25602
1985		3264	0		5276	95	0	0	2160	1124		8578		71756	11006		480	565	7933
1986		0	3248	77	3560	674	94	64479	19870			12273	1138	15114	7401		438	5	29527
1987	10	6100	27744	92	2221	0			100052		2698	25007	92	2192	2168		71	81	8214
1988	29	5589	17470	1181				27661	0	6592		31965	175	6850	0	0	416	8	457
1989	14	1113	45896	1988				21314	9669		7696	17205	1203	4945	710	1135	926		7161
1990	32	0	27504	736	1988		3009	3305	2908	0		2300	2212	25716	3162	0	790		735
1991	53	0	27794	184		601		2974	0	0		2479		15031	8854	362	124		148
1992	684	6224	25700	56	626		0	0	449	11774	603	1412		11249	1965	0	375	1	3577
1993	1833	0	27610	26				585	4186			5226		54772	1259	1158	318		3498
1994	1742	0	14990	6				0	0			4764		3280	7788	285	259	3	1863
1995	1	0	10979	5				3077	264			4711		24638	1423		952		770
1996	5	5157	15156	399		6		1176	1048		411	2382		3857	0	0	1697	3	63
1997	2	0	13342	86		23		0	0			1469		29742	792	213	3197		1650
1998	2	289	9811	61		71		0	128			1534		21472	0		880		599
1999		0	4037	2650		1		0	374			1453		6147	0	0	839		0
2000		0	5507	1194				0	0			844		34474	1609		1804		7970
2001		0	7963	584					0			1036		26431	1635	813	620	1	811
2002		0	7284	2976				0	325			613		12920	0		1469		79
2003		3767	4182	1			0	0	1375			642		21460	15383	0	50		5123
2004		0	5457	31				3305	0			2036		2182	849	0	1072	1	741
2005		7571	5518	41	1543			0	0			9971		14543	7432	0	1346		2625
2006		0	5939	15		28		0	2269			1222		4175	0	56	771	2	21
2007		0	8082	607		22		0	2005			3514		21775	8105	0	44778		5853
2008		283	15411	445				0	35			3378		13615	9697	0	668		4292
2009		0	6895	2801		39		0	0			963		5146	0	0	532		1725
2010		97	2730	4		13		0	100			1560	185	10959	443	0	1458	190	2111
2011		0	2707	66		6		127	0			3152		5683	0	0	1102		8198
2012			3096		1258			2.45034006	0			247		27554	0	0	71		698
Total	4,406	67,575	380,554	22,883	35,898	1,578	4,821	179,562	174,711	19,490	11,408	217,868	5,005	657,829	272,785	5,163	79,979	860	192,321

Table 6. Recreational catches (A+B1, lb whole weight) of smooth dogfish by state.

year	AL	CT	DE	FLE	FLW	GA	LA	MA	MD	ME	MS	NC	NH	NJ	NY	RI	SC	TX	VA
1981		130371		99.207				144699				72184		25676	29064				81589.64
1982		0	39352	6883				0	0			0		9719	15697		0		27497.46
1983			29565	8202			10412	0	4981			85447		131372	88597		90.05791		50259.12
1984			3776	13828	117740			94326	75899			133092		257587	373918	5286.182	54926		77433.47
1985		15130	0		31976	419	0	0	7040	5211		37822		233896	35876		2115	3424	25857
1986		0	15599	289	21574	2971	570	298924	95439			54118	5276	72593	35548		1961	89	113659
1987	43	28280	56416	203	13463	0			203449		16354	110267	426	4458	4409		260	465	16703
1988	155	25910	52838	5195				128236	0	30562		140943	811	20718	0	0	1858	43	1383
1989	98	5160	132277	8767				98813	25450		53318	75864	5576	13016	1869	5260.103	4255		18849
1990	203	0	61721	3247	12050		18235	15320	7389	0		10139	10255	65342	8033	0	3482		1867
1991	487	0	74497	619		2649		13789	0	0		10929		48537	28589	1679.379	804		479
1992	4145	28855	48539	826	3794		0	0	1018	54585	3653	6196		25499	4454	0	1760	6	8109
1993	11111	0	77415	287				2711	12099			23081		158323	3638	5367.944	1480		10110
1994	10590	0	51030	26				0	0			21252		11166	26511	1322.353	1255	51	6341
1995	5	0	33208	29				14263	800			20590		74519	4305		4357		2328
1996	52	23906	45840	1848		62		5451	3169		2488	10787		11666	0	0	8064	31	189
1997	15	0	40353	614		144		0	0			6377		89955	2396	989.1279	16094		4990
1998	17	1340	29673	522		487		0	388			6830		64944	0		4261		1813
1999		0	12209	11684		4		0	1132			6374		18591	0	0	3799		0
2000		0	16657	5266				0	0			3570		104268	4865		7919		24106
2001		0	19811	2575					0			4567		65753	4067	3769.978	3194	6	2017
2002		0	22030	13123				0	984			3452		39076	0		7238		240
2003		17466	14637	6			0	0	4814			2566		75114	53843	0	287		17933
2004		0	16506	326				15320	0			9065		6598	2568	0	5038	10	2240
2005		35101	17776	423	9354			0	0			43954		46852	23943	0	6224		8456
2006		0	17964	69		122		0	6862			5458		12628	0	260.3797	4960	10	63
2007		0	17711	2676		96		0	4393			16587		47717	17761	0	202820.4		12826
2008		1312	49170	1975				0	118			15154		46031	32784	0	7052.055		14510
2009		0	30751	12349		412		0	0			4449		18892	0	0	5488.539		6332
2010		450	7024	61		197		0	214			6947	858	23433	947	0	12112.13	1252	4513
2011		0	6536	1002		91		588	0			14130		13719	0	0	8934.607		19791.52
2012			9365		7624			11.35983	0			1326		83339	0	0	582.0673		2112.459
Total	46,718	181,195	878,171	141,191	232,378	9,476	39,983	550,027	801,484	54,557	101,725	1,364,411	19,755	2,162,415	532,357	1,117	18,300	374,610	5,934

Table 7. Recreational catches (B2, numbers) of smooth dogfish by state.

year	AL	CT	DE	FLE	FLW	GA	LA	MA	MD	ME	MS	NC	NH	NJ	NY	RI	SC	TX	VA
1981		14811						11407				85159		98147	46154				4066
1982		103485	182911	0				21740	13553.74635			35174		57156	93504		13360		30143
1983			20629	0			0	12162	14003			53509		785787	58303				476677
1984			3666	5605	0			100831	15172			166079		16037	93333	0	0		106727
1985		20646	651		0	1277	3142	7729	3745	0		31576		221342	17559		0		9957
1986		11695	64719		0	2188	0	0	42070			168347	0	73456	9358		0		35366
1987		8479	115298		0	338			323604		548	60446	2805	22339	23496				9877
1988		10712	117098	2226				27550	11081	0		116758	261	20076	3709	3391	0		0
1989		6122	426615	1434				49296	1003		0	87349	13233	18422	2508	5565	513		823
1990		1051	183945	4087	0		0	16978	20687	1557		41207	986	236254	14184	1584	557		1827
1991		12069	158323			0		30911	1754	560		53759		205834	21194	4610			1201
1992	0	10558	132625		0		11511.42322	24275	9261	128	0	60816		190361	25495	314			1681
1993	0	13758	164574	1234				10819	2065			10866		229938	11489	726			14358
1994	0	1607	138070					18330	5322			23043		221028	37572	221	1184		8031
1995		492	114800					4261	5516			88293		207621	6610		0		1607
1996		5861	215709	0				12419	2548		1064	13893		276138	5831	972	29114		24715
1997		1145	407347					7125	2653			24835		419130	6909	390	3344		1031
1998		680	181613					2706	11549			23649		374242	7352		73807		929
1999		7258	167995	13801				13499	5833			8844		471625	17456	992	2432		372
2000		710	156894	11493				5076	6397			38405		531743	16340		1756		8380
2001		16314	393418	7908					30897			69908		1017270	50293	286			5747
2002		27672	174640	20487				902	5328			36784		616829	47707		0		31873
2003		22978	181563	149			92.10581398	6608	8256			109762		966856	70555	173			7391
2004		2003	226875					6361	1027			160864		636546	112815	440	346		76936
2005		16638	407160	21564	0			11155	7249			187096		817908	196026	44	65395		8479
2006		4176	398498	7352		91		2185	3283			16068		1148293	499860	1160	25600		4873
2007		26917	222330	540		0		4686	10078			34958		876127	59821	108	44650		108908
2008		14005	271140	6824				410	4214			41265		1570660	26556	2418	13685		44180
2009		1635	182659	1142		133.95603		21394	10312			19972		642527	48786	116	16089		89569
2010		6057	165764			479.29572		342	28622			55306	29	485242	11444	382	3949		95266
2011		679	70740					1014	12268.81752			95873		576652	5659.191109	43	288		17069
2012			88526		0			12988.89547	1102.888196			3951		868143	31264.44611	18493			7771
Total	-	370,213	5,736,797	105,845	-	4,507	14,746	445,159	620,454	2,245	1,613	2,023,813	17,313	14,899,728	1,679,143	42,428	296,068	-	1,235,832

Table 8. Recreational catches (A+B1) of smooth dogfish in the Gulf of Mexico region in numbers and weight (lb whole weight). B2s are sharks released alive (in numbers).

				Total catches		
year	MRIP	HBOAT	TXPWD	(number)	(weight)	B2s
1981	0	0	0	0	0	0
1982	0	0	0	0	0	0
1983	1718	0	0	1718	10412	0
1984	19426	0	0	19426	117740	0
1985	5841	0	565	6406	35400	3142
1986	3659	5	0	3664	22233	0
1987	5010	25	66	5101	30325	548
1988	37	37	0	74	197	0
1989	7710	14	0	7724	53416	0
1990	5029	32	0	5061	30488	0
1991	53	53	0	106	487	0
1992	1913	2	0	1915	11598	11511
1993	1833	8	0	1841	11111	0
1994	1745	6	0	1751	10641	0
1995	1	1	0	2	5	0
1996	419	8	0	427	2572	1064
1997	2	2	0	4	15	0
1998	2	2	0	4	17	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	1	1	0	2	6	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	92
2004	1	1	0	2	10	0
2005	1543	0	0	1543	9354	0
2006	2	2	0	4	10	0
2007	0	0	0	0	0	0
2008	0	0	0	0	0	0
2009	0	0	0	0	0	0
2010	190	11	179	380	1252	0
2011	0	0	0	0	0	0
2012	1258	0	0	1258	7624	0

Table 9. Disposition (action taken) for smooth dogfish from the GNOP (top) and for *Mustelus* spp. from the BLLOP (bottom) by year.

Year	Kept	Released alive	Discarded dead
2001	0	27	0
2005	0	0	1
2006	24	9	2
2007	78	231	0
2008	1843	490	0
2009	989	205	7
2010	70	817	17
2011	75	52	4
2012	649	17	2
total	3728	1848	33

year	Finned and carcass disc	Kept	Kept as bait	Lost at surface	Released alive	Discarded dead	Unknown
1994			27	2			
1995			2		1		
1996			13		1	1	
1997			3		2		
1998		2	41		31	12	1
1999		3	16		1		
2001		60	156				
2002		1	18		47	7	
2003		2	288	1	6	2	
2004		0	81		4		
2005		9	14		5	5	
2006	2	1	13		6	3	
2007		1	10		42		
2008		1	26	1	533	14	
2009		5	1		50	3	1
2010		4	2	1	136	8	
2011		35	16		57	5	1
2012		61	1		443	40	
total	2	185	728	5	1365	100	3

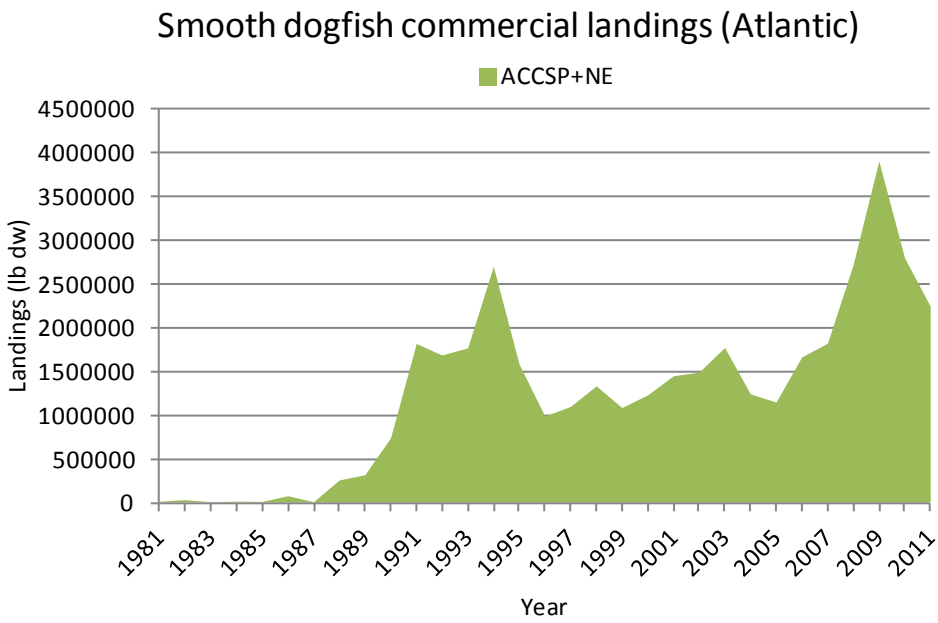


Figure 1. Commercial landings of smooth dogfish in the Atlantic region, 1982-2012.

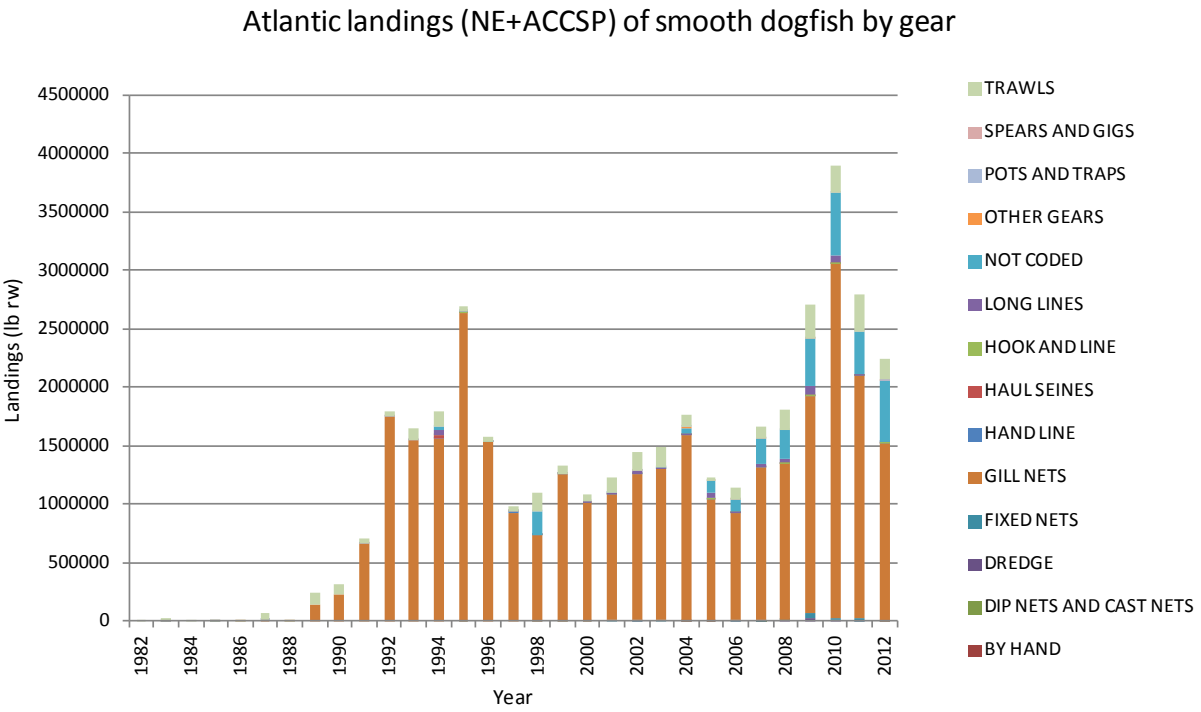


Figure 2. Commercial landings of smooth dogfish in the Atlantic region by gear type.

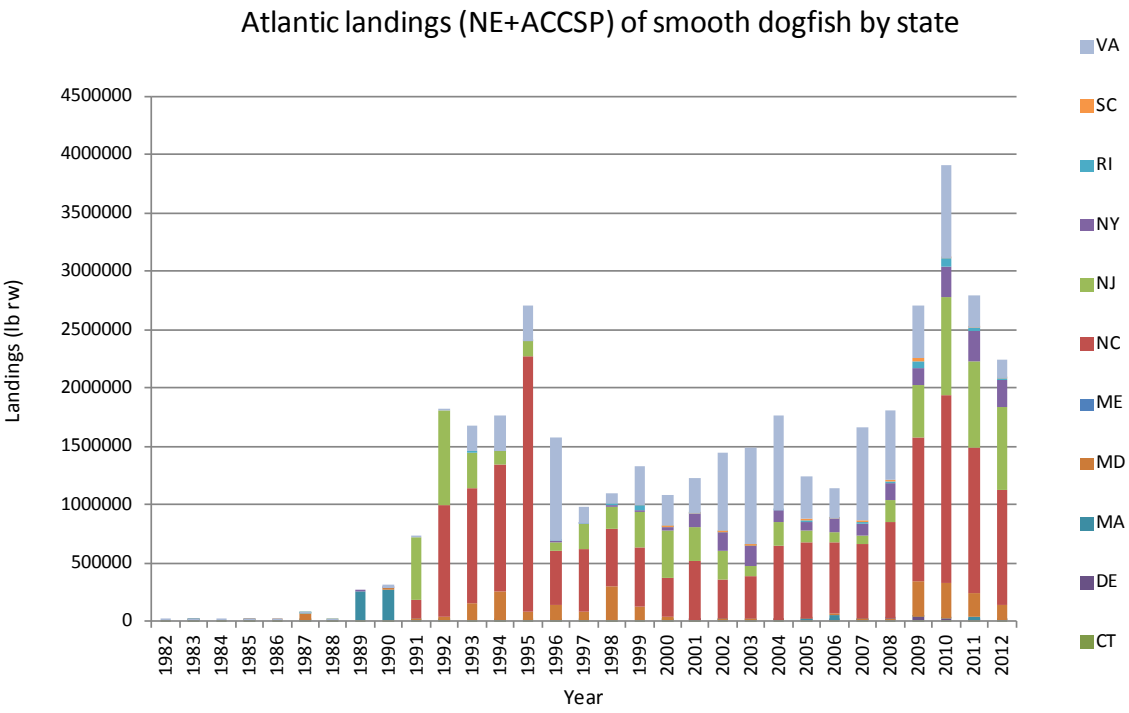
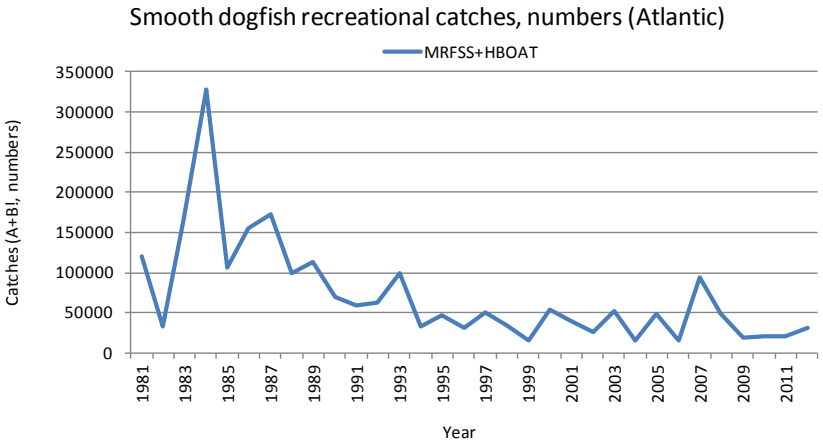
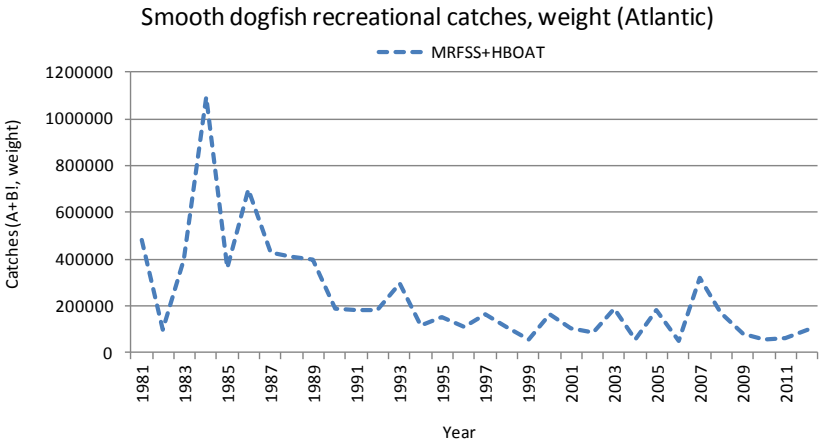


Figure 3. Commercial landings of smooth dogfish in the Atlantic region by state of landing.





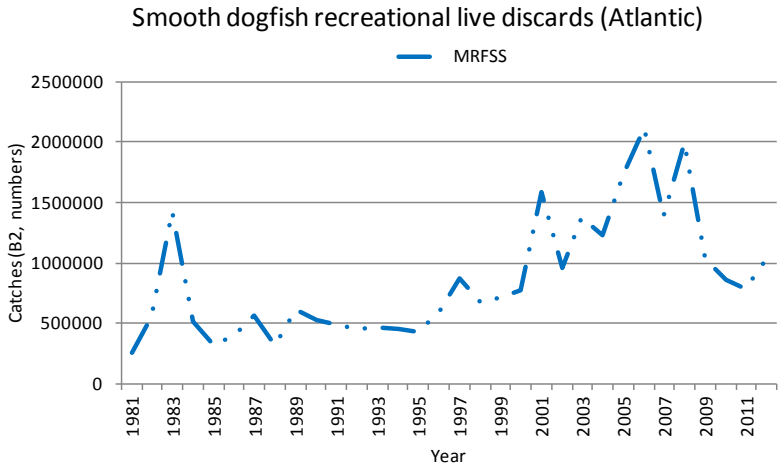


Figure 4. Recreational catches of smooth dogfish in the Atlantic region in numbers (A+B1, top), weight (lb ww, A+B1, middle), and numbers (B2, bottom).

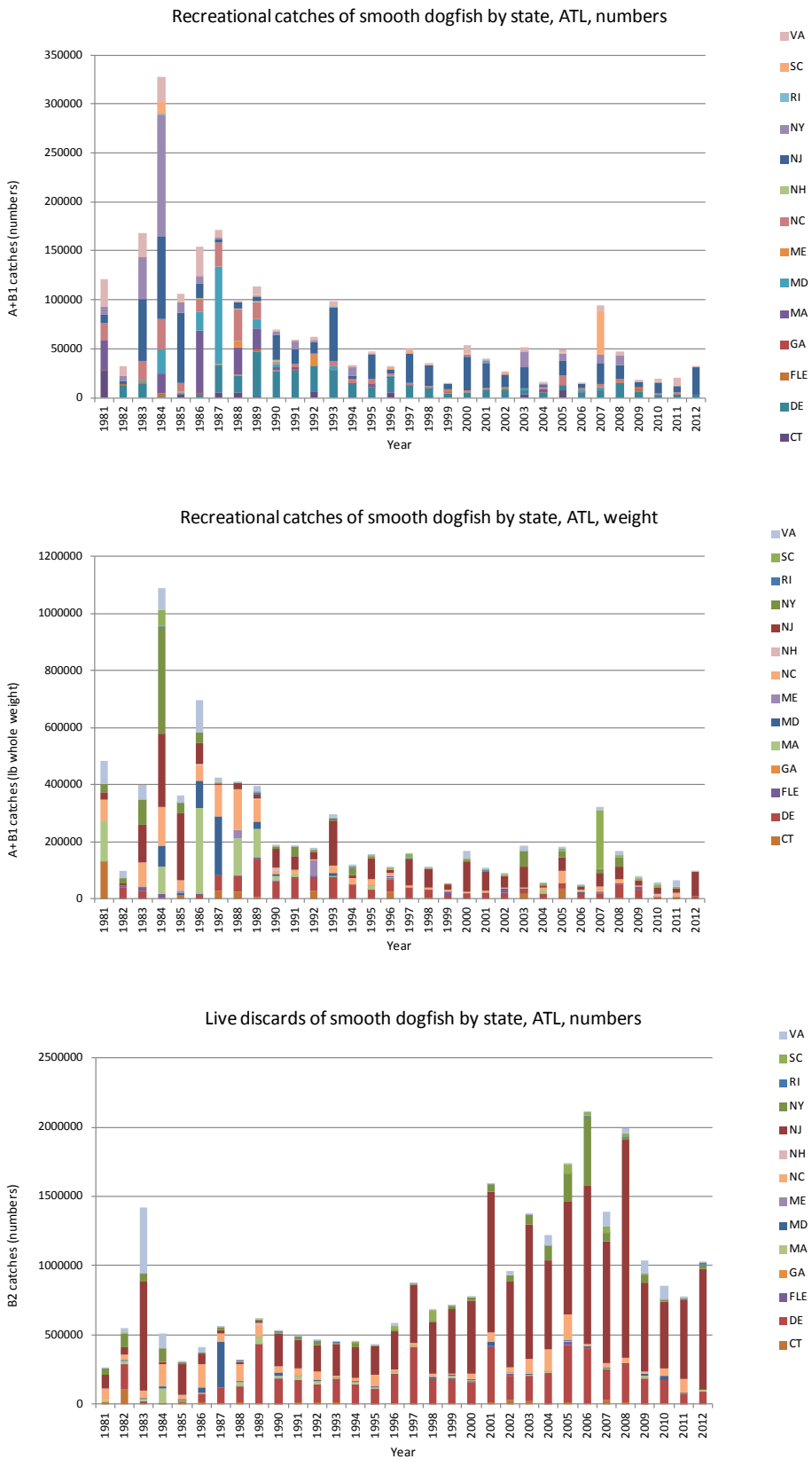
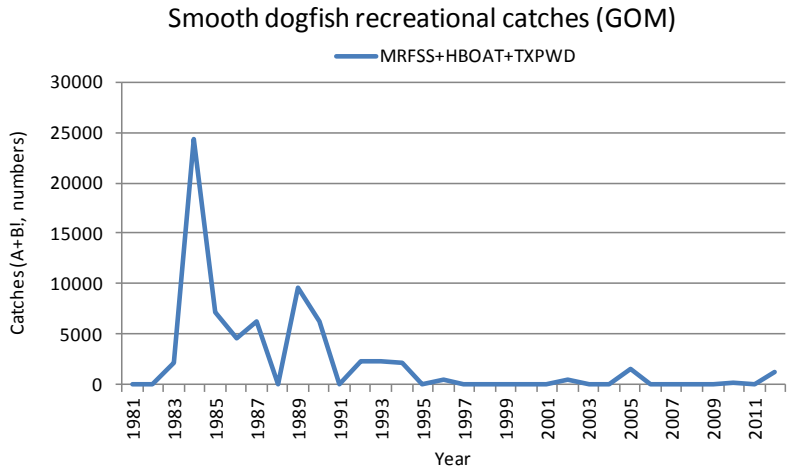
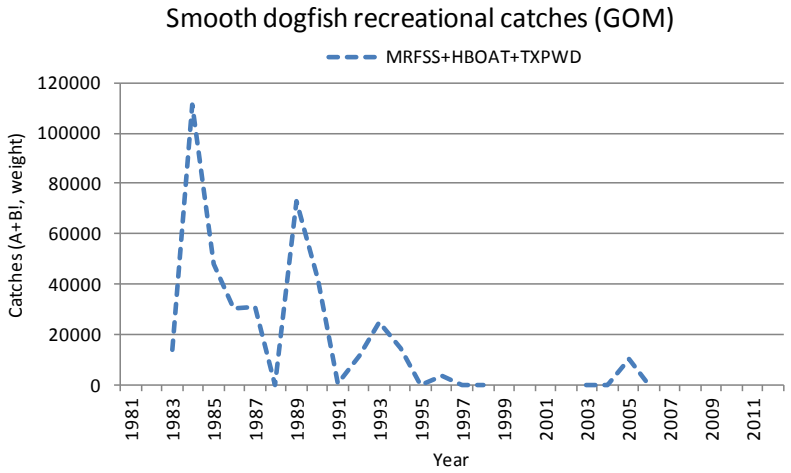


Figure 5. Recreational catches of smooth dogfish in the Atlantic region by state in numbers (A+B1, top), weight (lb ww, A+B1, middle), and numbers (B2, bottom).





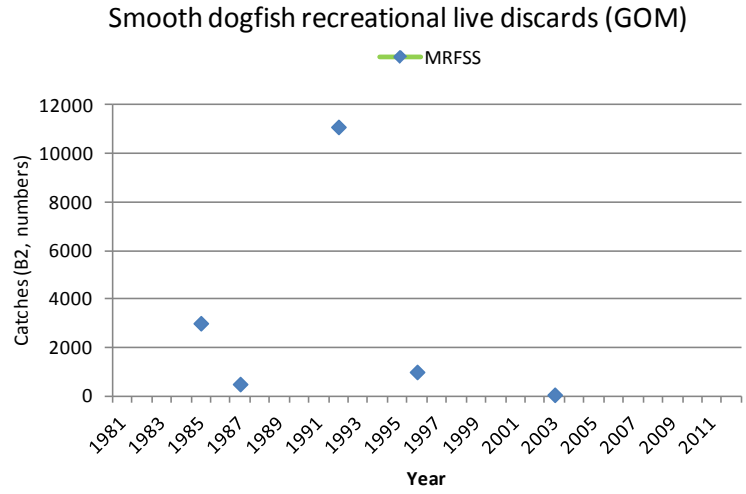


Figure 6. Recreational catches of smooth dogfish in the Gulf of Mexico region in numbers (A+B1, top), weight (lb ww, A+B1, middle), and numbers (B2, bottom).

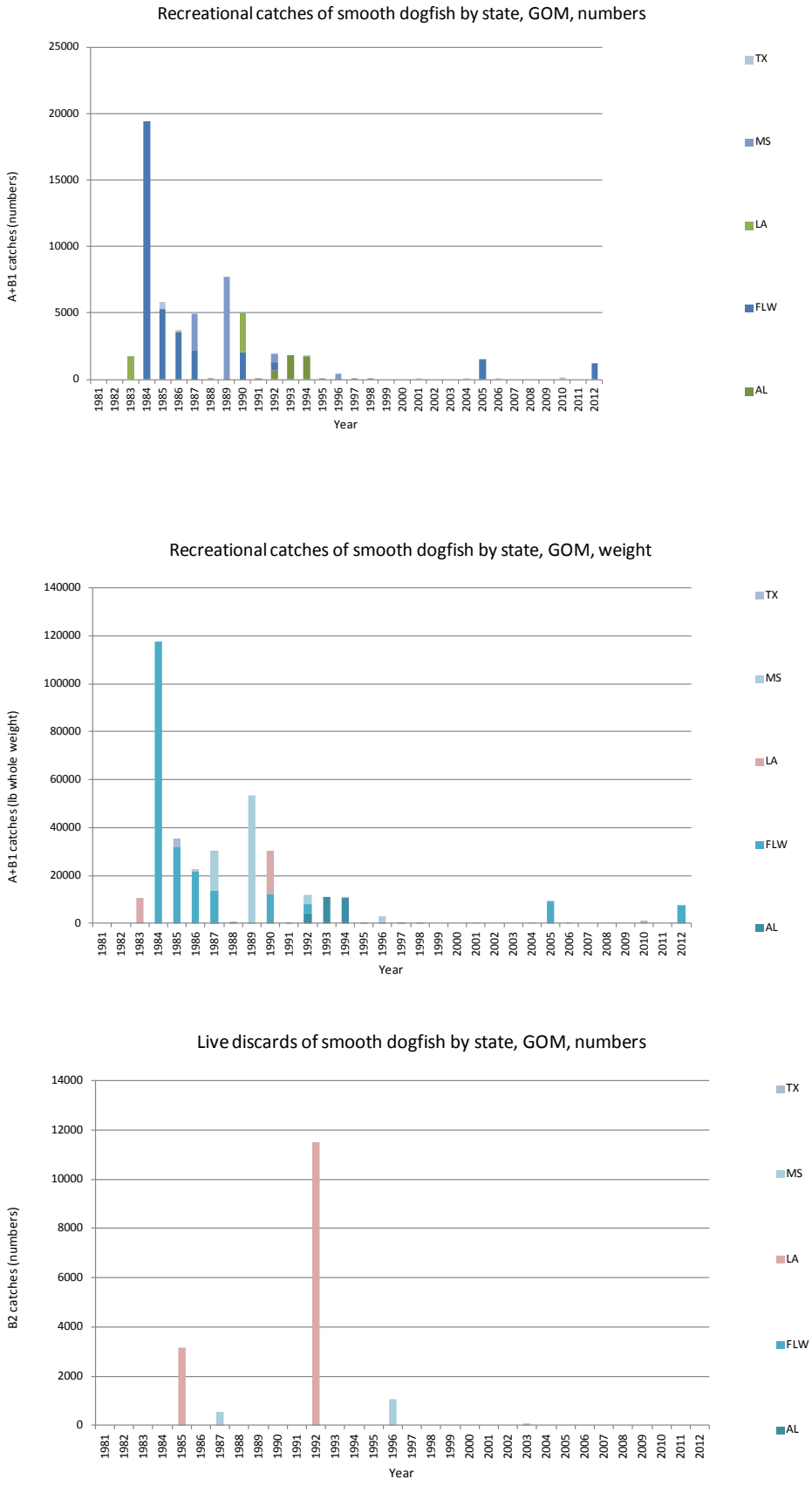
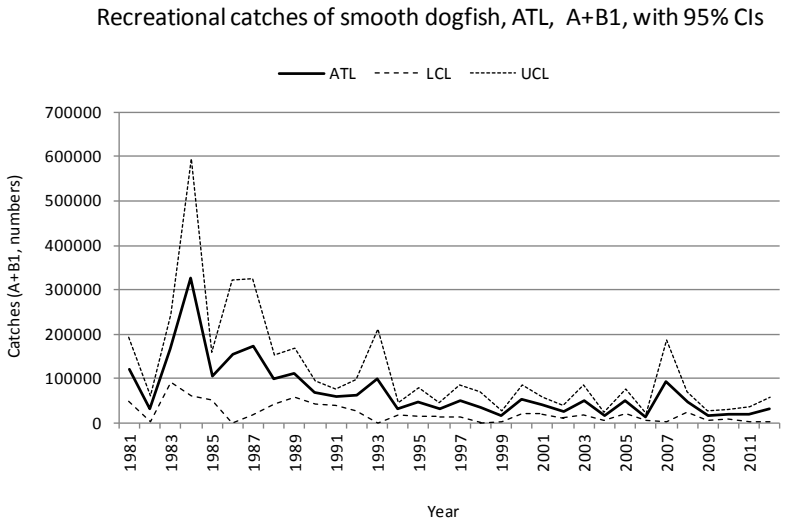
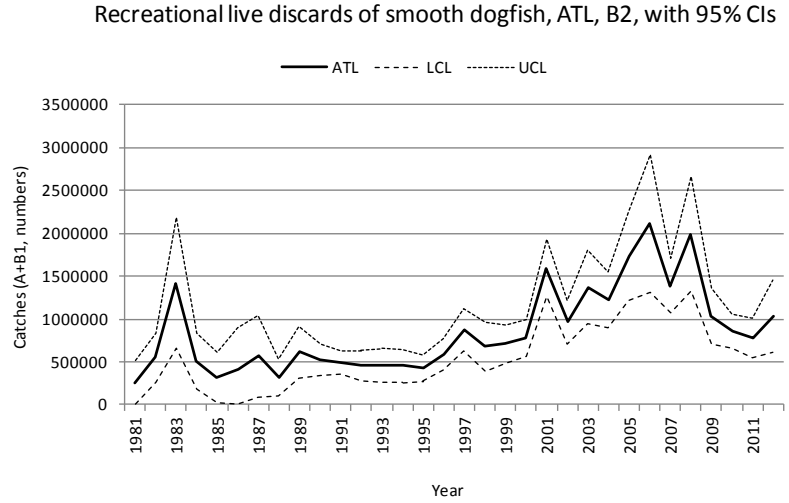


Figure 7. Recreational catches of smooth dogfish in the Gulf of Mexico region by state in numbers (A+B1, top), weight (lb ww, A+B1, middle), and numbers (B2, bottom).





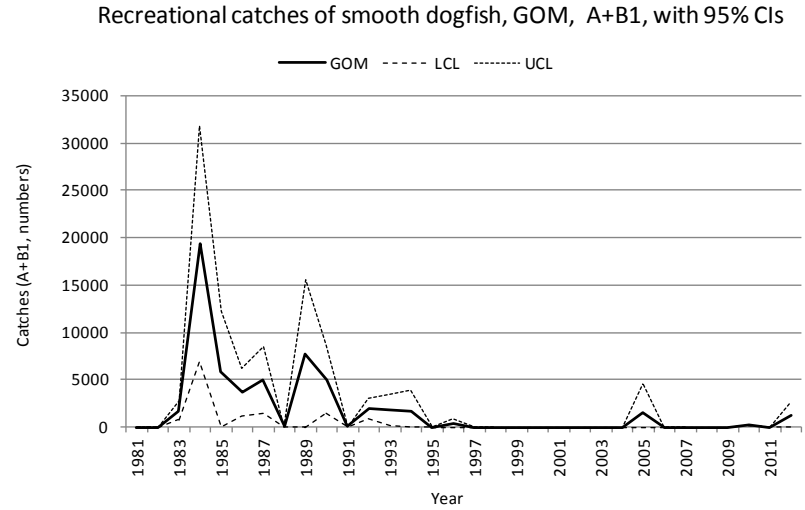
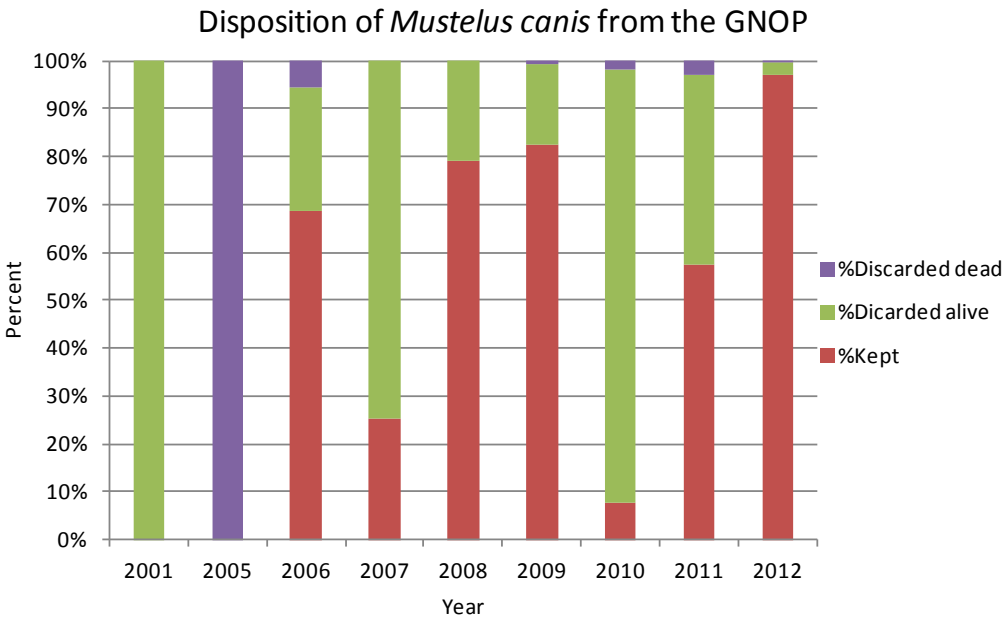


Figure 8. Variability (as 95% CIs) in estimates of recreational catches of smooth dogfish in the Atlantic (A+B1, numbers, top; B2, numbers, middle) and Gulf of Mexico (A+B1, bottom).



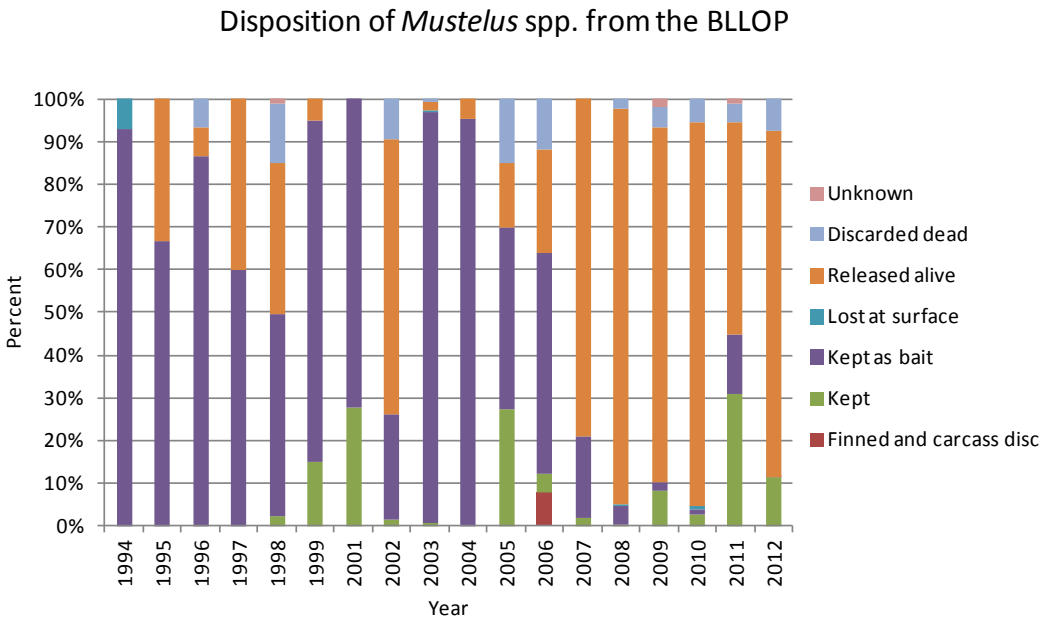


Figure 9. Disposition (action taken) for smooth dogfish from the Gillnet Observer Program (GNOP; top) and for *Mustelus* spp. from the Reef Fish and Shark Bottom Longline Observer Programs (BLLOP; bottom) by year.

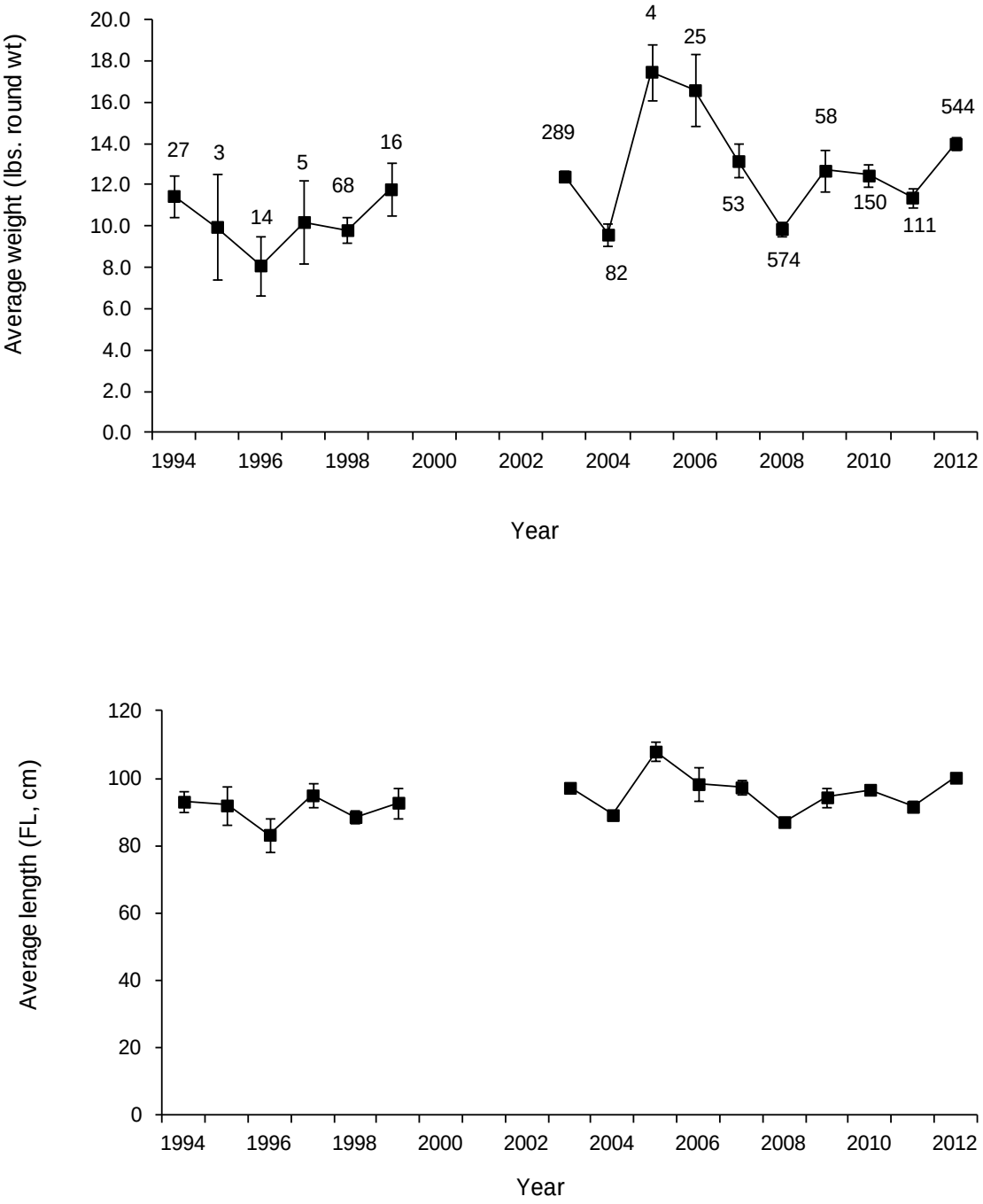


Figure 10. Average weight (top) and length (bottom) of *Mustelus* spp. observed in the Reef Fish and Shark Bottom Longline Observer Programs (BLLOP). Error bars represent +/- one standard error; sample sizes are indicated in the top panel.

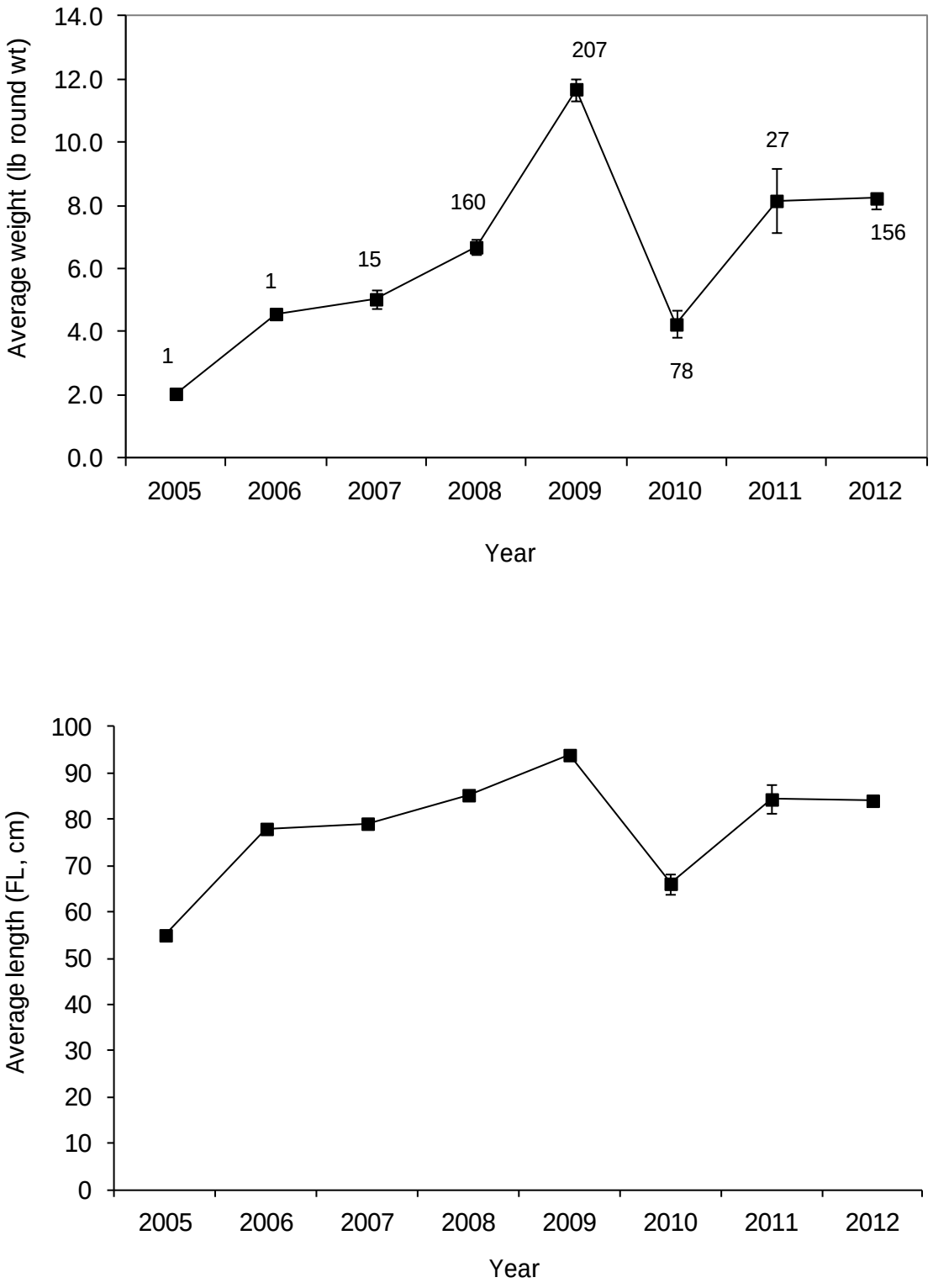


Figure 11. Average weight (top) and length (bottom) of *Mustelus canis* observed in the Gillnet Observer Program (GNOP). Error bars represent +/- one standard error; sample sizes are indicated in the top panel.

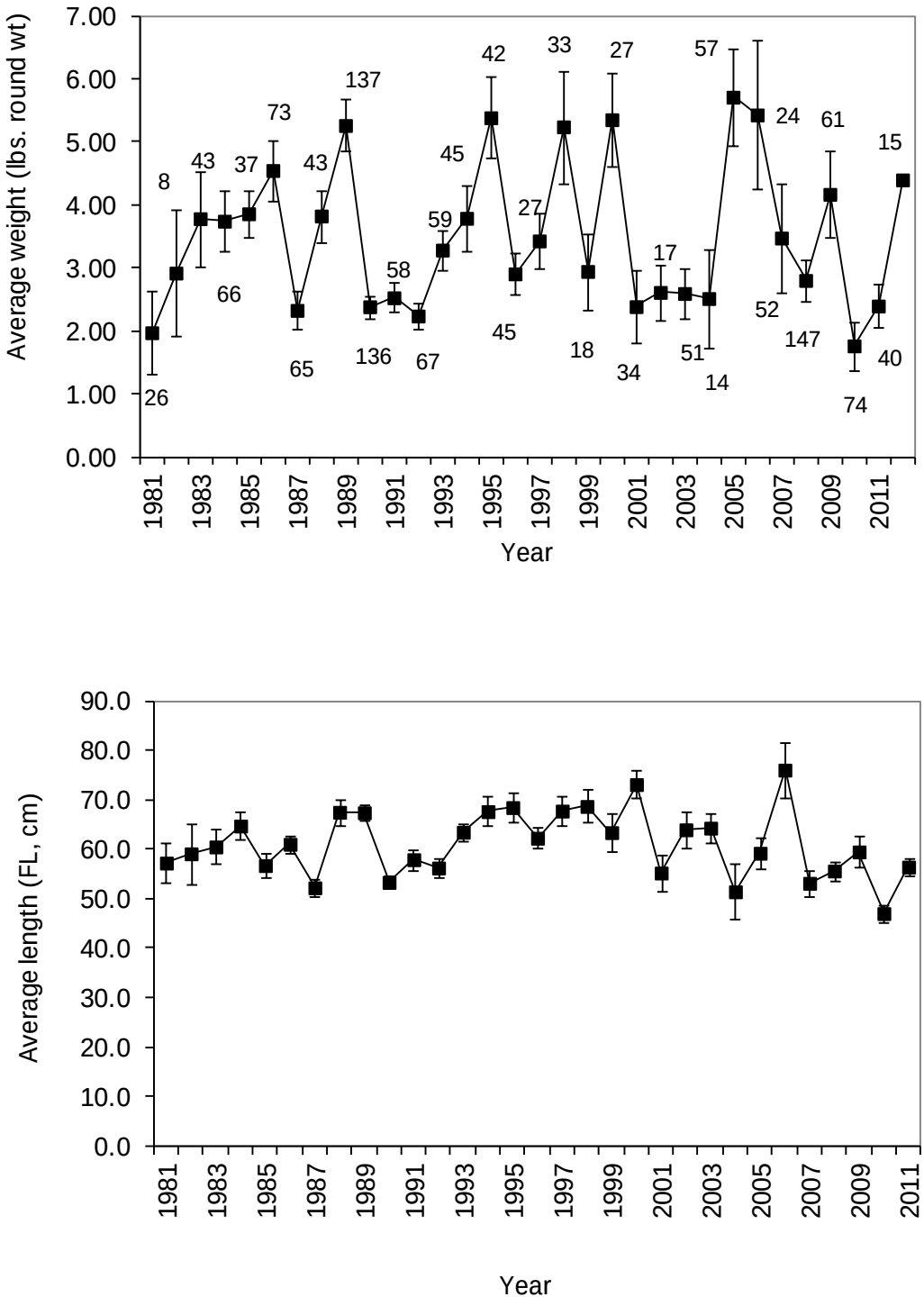


Figure 12. Average weight (top) and length (bottom) of *Mustelus canis* observed in the Marine Recreational Information Program (MRIP). Error bars represent +/- one standard error; sample sizes are indicated in the top panel

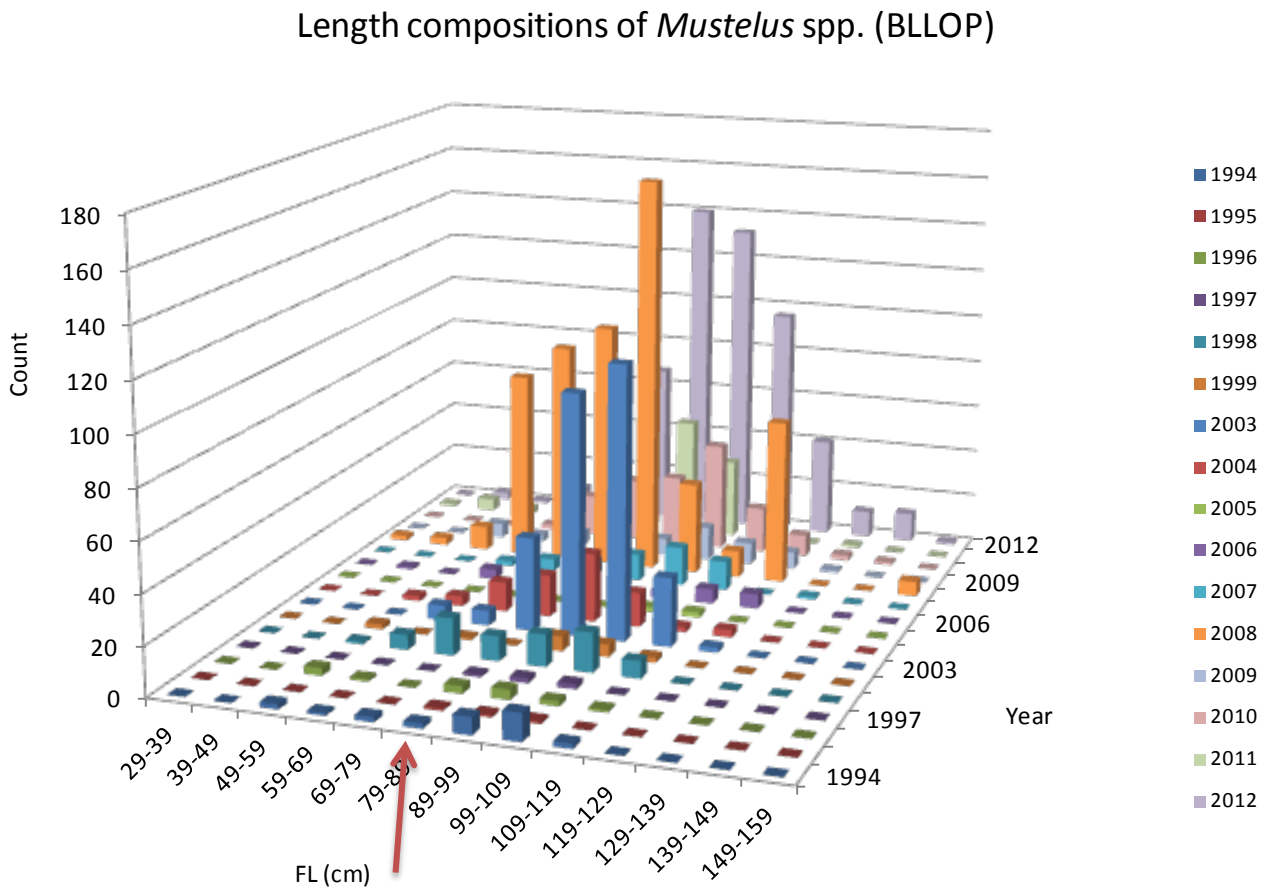


Figure 13. Length-frequency distribution of *Mustelus* spp. from the Reef Fish and Shark Bottom Longline Observer Programs (BLLOP). The arrow indicates the approximate midpoint of length at maturity for males and females combined. Note that lengths are fork lengths.

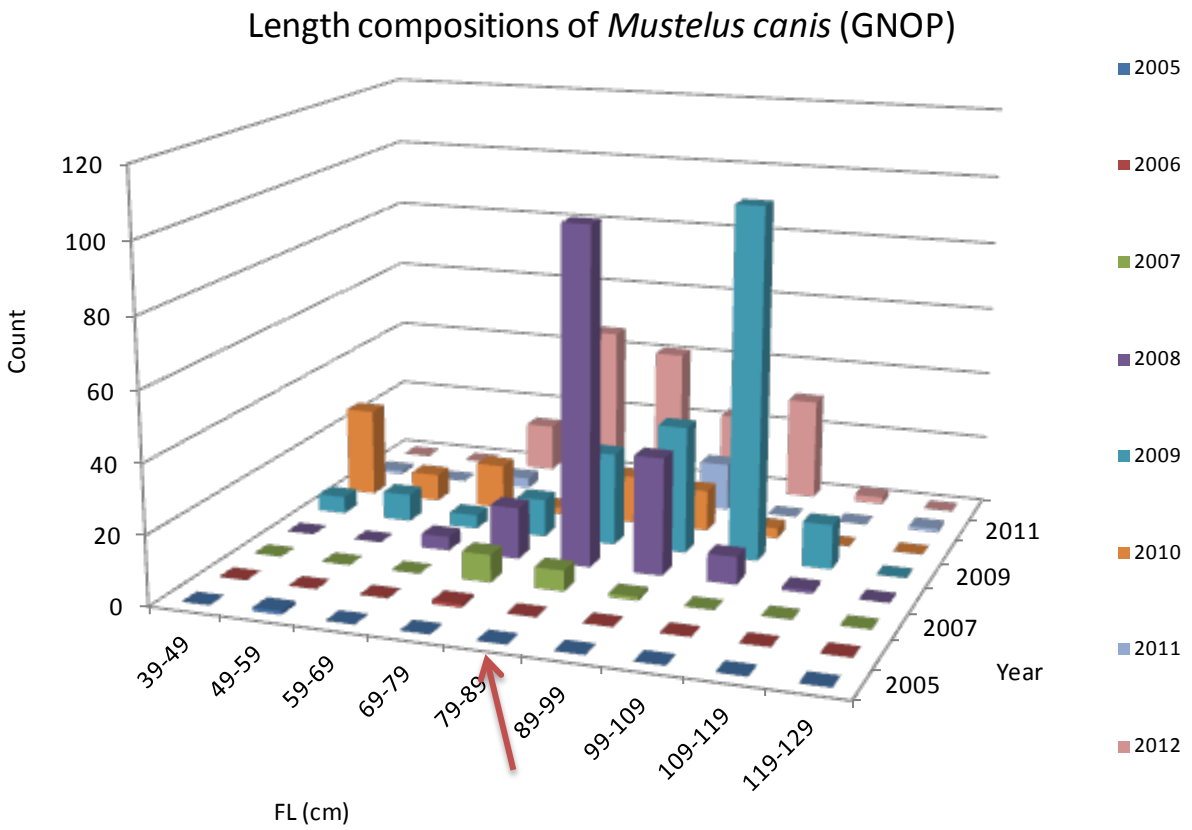


Figure 14. Length-frequency distribution of *Mustelus canis* from the Gillnet Observer Program (GNOP). The arrow indicates the approximate midpoint of length at maturity for males and females combined. Note that lengths are fork lengths.

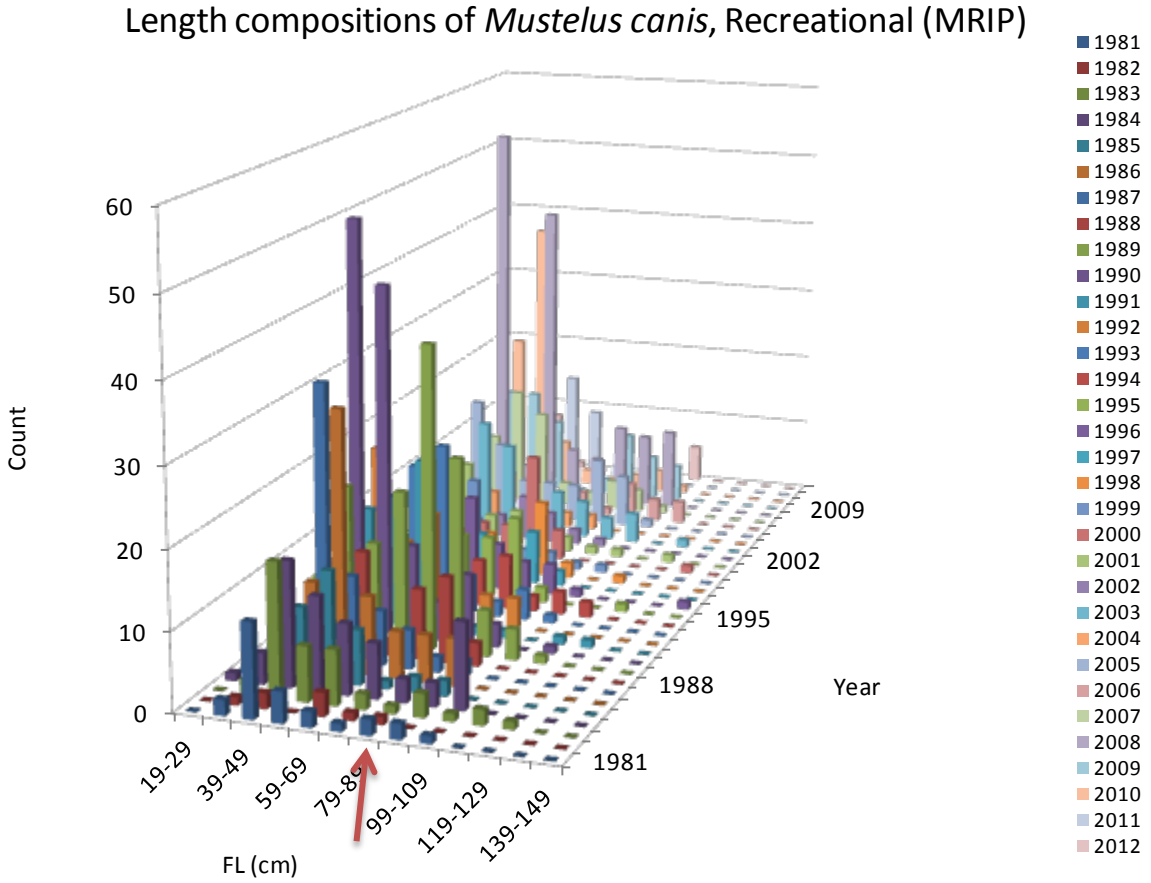


Figure 15. Length-frequency distribution of *Mustelus canis* from the MRIP. The arrow indicates the approximate midpoint of length at maturity for males and females combined. Note that lengths are fork lengths.