

## SHARK BY-CATCH FROM THE U.S. LONGLINE FLEET 1982 THROUGH 1992

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### SUMMARY

*Landings records, mandatory logbook and observer records from the U.S. longline fleet were used to estimate yearly by-catch of large coastal and pelagic shark species for 1982 through 1992. Size frequencies of landed sharks for 13 species were also reported, when available, during this period. By-catch from the U.S. longline fleet represents only a portion of the total U.S. landings of large coastal and pelagic sharks. However, these data are representative of fishing effort from a wide geographical range in the western North Atlantic Ocean.*

### RÉSUMÉ

*Des registres de débarquement, des carnets de pêche obligatoires et des registres d'observateurs concernant la flottille palangrière américaine ont servi à estimer la prise accessoire annuelle des grands requins côtiers et pélagiques de 1982 à 1992. On indique également, lorsque ceci est possible, la fréquence des tailles des 13 espèces de requins débarquées pendant cette période. La capture accessoire de cette flottille ne représente qu'une partie des débarquements américains totaux de grands requins côtiers et pélagiques. Ces données illustrent toutefois l'effort de pêche d'un ample secteur géographique de l'Atlantique nord-ouest.*

### RESUMEN

*Se usaron registros de desembarques, cuadernos de pesca de uso obligatorio y registros de observadores, relacionados con la flota de palangre estadounidense para estimar la captura secundaria anual de especies de grandes tiburones pelágicos y costeros, de 1982 a finales de 1992. También se notificó la frecuencia de desembarques de tiburones de 13 especies, cuando se disponía de datos, en dicho periodo. La captura secundaria de la flota palangrera de Estados Unidos representa tan solo una parte de los desembarques totales de especies de grandes tiburones pelágicos y costeros. Sin embargo, estos datos representan el esfuerzo de pesca de una amplia zona geográfica en el Atlántico noroeste.*

## **INTRODUCTION**

Estimates of size frequencies of landed sharks and total weight of sharks landed or discarded dead by the U.S. pelagic longline fleet from 1993 through 1997 were reported to ICCAT in 1998. Further estimates have been made in order to provide a longer time series for analysis. This paper includes estimates of sharks landed or discarded dead by the U.S. pelagic longline fleet from 1982 through 1992.

## **METHODS**

The 1982 through 1992 shark landings and size frequencies in this report are based on weighout sheets from the landed catch of U.S. longline fishermen who hold permits to land and sell swordfish caught in the Atlantic. Discard estimates are based on mandatory logbook and observer records from this fishery (Cramer, 1996). As these landings and discard estimates relate to U.S. Atlantic longline effort directed toward tunas and tuna-like fishes, they represent only a portion of the total U.S. Atlantic shark landings and discards.

Conversion ratios applied to the landed weights come from observations made by scientific observers. For the large coastal shark complex, a total of 68 paired observations of dressed (HGGW) weights and round weights were collected in 1994 and 1995. The average ratio of round to dressed weights from this sample was 2.02. For the pelagic shark complex, only 1 paired observation was available. Thus, the sample available for all sharks (large and small coastal sharks and pelagic sharks) totaling 110 observations, with an average ratio of round to dressed weights of 1.96 was used for the pelagic shark complex.

## **RESULTS**

Size frequency files were generated for 13 species or groupings of sharks for the years 1982 through 1992. Species codes in the size frequency files are often different than the ICCAT species codes (table 1). The format for the size frequency files is given in table 2. Appendix 1 includes size frequencies of sandbar, thresher and mako sharks. Numbers and metric tons of sharks landed by the U.S. pelagic longline, troll, trawl, pair trawl and gillnet fisheries in the Gulf of Mexico (Area 91), north western Atlantic (Area 92), Caribbean (Area 93), and north central Atlantic (Area 94) from 1982 to 1992 area reported in table 3. Numbers and metric tons of sharks discarded dead by the U.S. pelagic longline fishery in the Gulf of Mexico (Area 91), north western Atlantic (Area 92), Caribbean (Area 93), and north central Atlantic (Area 94) from 1987 to 1991 and for combined areas in 1992 area reported in table 4.

## **REFERENCES**

- J. Cramer. 1996. Estimates of the numbers and metric tons of sharks discarded by U.S. pelagic longline vessels from 1987-1995. 1997 ICCAT Working Document. Vol XLVI(4): 436-445.

**Table 1. Size frequency file species codes.**

<u>Code in File</u>	<u>ICCAT code</u>	<u>Common name</u>	<u>Species</u>
SBR	CP	andbar	<i>Carcharhinus plumbeus</i>
SLK	AL	ilky	<i>Carcharhinus falciformis</i>
TGR	IG	iger	<i>Galeocerdo cuvieri</i>
WTS	CS	ceanic whitetip	<i>Carcharhinus longimanus</i>
BSH	SH	lue shark	<i>Lamna nasus</i>
BTP	CL	lacktip	<i>Carcharhinus limbatus</i>
DSK	US	usky	<i>Carcharhinus obscurus</i>
LFM	MA	ngfin mako	<i>Isurus paucus</i>
MAK	MA	hortfin mako	<i>Isurus oxyrinchus</i>
POB	POB	porbeagle	<i>Lamna nasus</i>
THR		thresher spp	<i>Alopias</i>
HMH		hammerhead spp	<i>Sphyrna</i>
SHK		unclassified sharks	

**Table 2. Format for U.S. shark size frequency data (Revised Sept. 29, 1998)**

<i>Information</i>	<i>Format</i>	<i>Columns</i>	<i>Comments</i>
NATION	A3	1-3	USA
GEAR	A4	4-7	LL=Longline GILL = gillnet PT = pair trawl
YEAR	I2	8-11	
MONTH	I2	12-13	
SPECIES	A3	14-16	ICCAT ALPHA
AREA (ICCAT AREA)	I2	17-18	
TYPE OF SIZE	A5	25-29	CL, JFL SFL, CFL HGTW...
ROUND OFF INTERVAL (FOR EXAMPLE 57.5-58.4 - 58)			
LOWER BOUND	F2.1	30-31	ALWAYS .5
UPPER BOUND	F2.1	32-33	ALWAYS .4
UNIT OF MEASURE	A2	34-35	CM,KG
SIZE FREQUENCIES (14 PAIRS) (EXAMPLE 58 999 = 999 FISH AT 58 CM)			
SIZE	I3		
FREQUENCY	I4		

**Table 3. Numbers and metric tons whole weight of sharks landed by the U.S. pelagic longline (LL), trol (TROL), otter trawl (TRAW), pair trawl (PT), and gillnet (GN) fisheries in the Gulf of Mexico (Area 91), northwestern Atlantic (Area 92), Caribbean (Area 93), and north central Atlantic (Area 94) from 1982 to 1992.**

**Year 1982**

Gear		Area 91		Area 92		Area 94	
		Number	MT	Number	MT	Number	MT
HP	Mako spp.			1	0.04		
LL	Thresher	2	0.09	51	3.06		
LL	FAL Silky			1	0.02		
LL	OCS Oceanic whitetip						
LL	Mako spp.	54	2.15	1110	35.31	133	4.62
LL	LMA Longfin mako	1	0.06	1	0.05		
LL	POB Porbeagle			1	0.03		
	total pelagic	57	2.3	1165	38.51	133	4.62
LL	CCL Blacktip				2	0.01	
LL	CCE Bull			1	0.05		
LL	DUS Dusky			1	0.036		
LL	CCP Sandbar			1	0.01		
LL	TIG Tiger	1	0.03	2	0.14		
LL	Hammerhead spp.			2	0.1		
LL	Unclassified	17	0.85	572	17.67		
	total costal	18	0.88	581	18.02		

**Year 1983**

Gear		Area 91		Area 92		Area 94	
		Number	MT	Number	MT	Number	MT
LL	Thresher			146	9.3712		
LL	FAL Silky						
LL	OCS Oceanic whitetip			30	0.59		
LL	Mako spp.	73	2.33	1248	35.62	147	4.24
LL	LMA Longfin mako			5	0.21		
LL	POB Porbeagle						
	total pelagic	73	2.33	1439	45.79	147	4.24
LL	CCL Blacktip	8	0.08	8	0.12		
LL	CCE Bull						
LL	DUS Dusky						
LL	CCP Sandbar			1	0.01		
LL	TIG Tiger			6	0.33		
LL	Hammerhead spp.						
LL	Unclassified	14	0.56	618	13.2		
	total costal	22	0.63	633	13.66		

**Year 1984**

Gear		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
LL	Thresher	8	0.6	86	5.84				
LL	FAL Silky								
LL	OCS Oceanic whitetip								
LL	Mako spp.	287	8.36	916	27.36	6	0.39	227	6.35
LL	LMA Longfin mako		5	0.13					
LL	POB Porbeagle		2	0.09					
	total pelagic	295	8.96	1009	33.43	6	0.39	227	6.35

LL	CCL	Blacktip	17	0.21	144	2.66		
LL	CCE	Bull						
LL	DUS	Dusky						
LL	CCP	Sandbar						
LL	TIG	Tiger			3	0.15		
LL		Hammerhead spp.						
LL		Unclassified	40	1.13	862	22.8	1	0.03
		total costal	57	1.33	1009	25.61	1	0.03

**Year 1985**

Gear			Area 91		Area 92		Area 93		Area 94	
			Number	MT	Number	MT	Number	MT	Number	MT
GN		Mako spp.			29	1.34				
LL		Thresher	53	2.27	26	1.48	4	0.3		
LL	FAL	Silky								
LL	OCS	Oceanic whitetip	1	0.02						
LL		Mako spp.	243	7.69	1033	30.43	23	2.22	549	11.56
LL	LMA	Longfin mako			7	0.55				
LL	POB	Porbeagle			1	0.13				
		total pelagic	297	9.98	1096	33.93	27	2.51	549	11.56
GN	CCP	Sandbar			1	0.04				
GN		Unclassified			1	0.04				
LL	CCL	Blacktip	25	1.08	5	0.12				
LL	CCE	Bull								
LL	DUS	Dusky								
LL	CCP	Sandbar								
LL	TIG	Tiger	1	0.08						
LL		Hammerhead spp.								
LL		Unclassified	42	2.62	673	20.4	4	0.39		
		total costal	68	3.78	680	20.61	4	0.39		

**Year 1986**

Gear			Area 91		Area 92		Area 93		Area 94	
			Number	MT	Number	MT	Number	MT	Number	MT
GN		Mako spp.			23	0.79				
LL		Thresher	8	0.45	39	2.17	4	0.32		
LL	FAL	Silky								
LL	OCS	Oceanic whitetip	1	0.02	4	0.14				
LL		Mako spp.	91	2.87	1618	44.93	108	6.15	478	10.02
LL	LMA	Longfin mako			1	0.07	1	0.05		
LL	POB	Porbeagle	3	0.12						
LL	BSH	Blue			6	0.4				
		total pelagic	103	3.45	1691	48.5	113	6.53	478	10.02
GN	CCP	Sandbar			1	0.0603				
LL	CCL	Blacktip	41	0.72	13	0.0971				
LL	CCE	Bull								
LL	DUS	Dusky								
LL	CCP	Sandbar								
LL	TIG	Tiger	1	0.06						
LL		Hammerhead spp.								
LL		Unclassified	189	3.87	430	12.6	1	0.12		
		total costal	231	4.65	444	12.76	1	0.12		



LL	OCS	Oceanic whitetip					7	0.3		
LL		Mako spp.	279	10.39	1304	43.88	108	6.59	2605	52.97
LL	LMA	Longfin mako			6	0.48	3	0.52		
LL	POB	Porbeagle	7	0.32	9	0.36				
LL	BSH	Blue								
		total pelagic	469	19.74	1746	61.05	114	7.34	2608	53.24
GN		Unclassified			1	0.05				
LL	CCL	Blacktip	87	3.07	45	1.05				
LL	CCE	Bull								
LL	DUS	Dusky			33	0.4704				
LL	CCP	Sandbar			1	0.01				
LL	TIG	Tiger			4	0.05				
LL		Hammerhead spp.								
LL		Unclassified	227	7.55	431	14.79	6	0.14	1	0.04
		total costal	314	10.62	515	16.42	6	0.14	1	0.04

#### Year 1990

Gear			Area 91		Area 92		Area 93		Area 94	
			Number	MT	Number	MT	Number	MT	Number	MT
TROL		Mako spp.			1	0.18				
GN		Thresher			46	3.24				
GN		Mako spp.			204	8.9				
GN		Porbeagle			10	0.27				
GN		Blue			1	0.004				
LL		Thresher	60	3.14	36	1.86	1	0.04	7	0.67
LL	FAL	Silky								
LL	OCS	Oceanic whitetip					2	0.1		
LL		Mako spp.	297	11.87	1259	40.44	38	3.04	1282	27.34
LL	LMA	Longfin mako			11	0.65				
LL	POB	Porbeagle	13	0.69	1	0.06				
LL	BSH	Blue	5	0.25						
		total pelagic	375	15.96	1569	55.6	41	3.17	1289	28
GN		Hammerhead spp.			21	0.89				
GN		Unclassified			3	0.13				
LL	CCL	Blacktip	96	2.13	87	1.56				
LL	CCE	Bull								
LL	DUS	Dusky			30	0.82				
LL	CCP	Sandbar			4	0.06				
LL	TIG	Tiger	1	0.04	1	0.02				
LL		Hammerhead spp.								
LL		Unclassified	425	15.06	392	15.52	11	0.77	21	0.53
		total costal	522	17.23	538	19	11	0.77	21	0.53

#### Year 1991

Gear			Area 91		Area 92		Area 93		Area 94	
			Number	MT	Number	MT	Number	MT	Number	MT
PT		Mako spp.			2	0.04				
TRAW		Thresher			3	0.2				
GN		Mako spp.			80	3.29				
GN		Thresher			2	0.13				
GN		Porbeagle			19	0.47				
LL		Thresher	53	2.8	58	2.96	5	0.22		
LL	FAL	Silky								
LL	OCS	Oceanic whitetip			4	0.11				
LL		Mako spp.	271	10.39	1798	65.5	38	2.56	896	23.09

LL	LMA	Longfin mako	1	0.04	9	0.55				
LL	POB	Porbeagle	17	0.86	34	1.11				
LL	BSH	Blue								
		total pelagic	342	14.09	2009	74.37	43	2.78	896	23.09
LL	CCL	Blacktip	81	2.46	149	3.99	3	0.07		
LL	CCE	Bull			1	0.06				
LL	DUS	Dusky			28	0.63				
LL	CCP	Sandbar			54	0.61				
LL	TIG	Tiger	2	0.04	7	0.18	2	0.21		
LL		Hammerhead spp.			6	0.16				
LL		Unclassified	421	13.4	478	14.68	28	0.89	2	0.03
		total costal	504	15.91	723	20.31	33	1.16	2	0.03

### Year 1992

Gear	Area 91		Area 92		Area 93		Area 94			
	Number	MT	Number	MT	Number	MT	Number	MT		
PT				9	0.41					
GN				42	2.62					
GN				70	3.17					
LL			86	3.98	102	3.5	6	0.2	2	0.12
LL	FAL	Silky								
LL	OCS	Oceanic whitetip				30	0.91			
LL		Mako spp.	591	20.18	1575	58.6	74	5.36	1463	38.25
LL	LMA	Longfin mako			18	1.23			1	0.04
LL	POB	Porbeagle	6	0.35	22	0.42				
LL	BSH	Blue			7	0.16	7	0.31		
		total pelagic	683	24.51	1845	70.11	117	6.78	1466	38.41
PT		Unclassified			2	0.14				
GN		Hammerhead spp.			14	0.43				
LL	CCL	Blacktip	231	6.93	462	11.97	6	0.31		
LL	CCE	Bull								
LL	DUS	Dusky	2	0.26	47	0.61	2	0.12		
LL	CCP	Sandbar	31	2.2	2764	50.49				
LL	TIG	Tiger	6	0.31	7	0.19	9	0.49		
LL		Hammerhead spp.	48	1.77	50	1.92	1	0.09		
LL		Unclassified	1346	58.82	1412	36.08	91	2.25		
		total costal	1664	70.29	4758	101.83	109	3.26		

**Table 4. Numbers and metric tons whole weight of sharks discarded dead by the U.S. pelagic longline (LL) fishery in the Gulf of Mexico (Area 91), northwestern Atlantic (Area 92), Caribbean (Area 93), and north central Atlantic (Area 94) from 1987 to 1991 and for combined areas in 1992.**

**Year 1987**

		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
BSH	Blue	23	0.97	8567	360.46	394	16.58	3522	148.19
	Mako spp.	45	1.81	67	2.69	22	0.88	83	3.34
	Thresher spp.	41	2.86	254	17.69	62	4.32	12	0.85
	total pelagic	109	5.63	8888	380.86	478	21.78	3617	152.36
	Hammerhead spp.	243	6.71	2329	64.29	389	10.74	69	1.91
	Unclassified	1113	30.72	3192	88.11	2132	58.85	85	2.35
TIG	Tiger	33	2.32	25	1.76	20	1.4	1	0.07
	white	6	0.17	16	0.44	13	0.36		
	total costal	1395	39.91	5562	154.6	2554	71.35	155	4.32

**Year 1988**

		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
BSH	Blue	18	0.59	7397	240.86	289	9.41	5230	170.3
	Mako spp.	31	1.24	40	1.6	34	1.36	22	0.88
	Thresher spp.	60	4.29	469	33.56	56	4.01	9	0.64
	total pelagic	109	6.12	7906	276.02	379	14.78	5261	171.82
	Hammerhead spp.	317	20.9	3159	208.27	560	36.92	94	6.2
	Unclassified	1172	34.71	3823	113.21	1849	54.76	291	8.62
TIG	Tiger	40	1.19	23	0.68	13	0.39		
	white	5	0.15	34	1.01	13	0.39		
	total costal	1534	56.94	7039	323.17	2435	92.45	385	14.82

**Year 1989**

		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
BSH	Blue	25	0.96	6066	232.47	123	4.71	6311	241.86
	Mako spp.	83	3	67	2.42	22	0.8	77	2.79
	Thresher spp.	96	6.69	571	39.79	25	1.74	14	0.98
	total pelagic	204	10.65	6704	274.69	170	7.25	6402	245.62
	Hammerhead spp.	378	13.88	2758	101.26	95	3.49	196	7.2
	Unclassified	1548	56.84	4355	159.9	589	21.63	351	12.89
TIG	Tiger	72	1.2	46	0.76	8	0.13	1	0.02
	white	23	0.84	28	1.03	8	0.29		
	total costal	2021	72.76	7187	262.95	700	25.54	548	20.1

**Year 1990**

		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
BSH	Blue	30	1.69	6983	393.94	116	6.54	6012	339.16
	Mako spp.	38	1.51	94	3.74	17	0.677	110	4.38
	Thresher spp.	34	2.72	483	38.57	23	1.84	15	1.2
	total pelagic	102	5.92	7560	436.25	156	9.06	6137	344.74

	Hammerhead spp.	346	19.71	2380	135.54	83	4.73	30	1.71
	Unclassified	1196	36.86	3018	93.01	679	20.93	68	2.1
TIG	Tiger	39	1.61	43	1.77	6	0.25		
	white	19	0.59	30	0.92	18	0.555		
	total costal	1600	58.76	5471	231.26	786	26.46	98	3.8

#### Year 1991

		Area 91		Area 92		Area 93		Area 94	
		Number	MT	Number	MT	Number	MT	Number	MT
BSH	Blue	21	0.98	8033	374.59	90	4.2	8418	392.55
	Mako spp.	38	1.73	121	5.51	17	0.78	69	3.14
	Thresher spp.	56	3.92	358	25.04	6	0.42	5	0.35
	total pelagic	115	6.63	8512	405.15	113	5.39	8492	396.04
	Hammerhead spp.	249	9.11	2703	98.88	33	1.21	28	1.02
	Unclassified	939	31.71	3122	105.42	218	7.36	37	1.25
TIG	Tiger	74	3.9	42	2.21	4	0.21		
	white	18	0.61	27	0.91	36	1.22		
	total costal	1280	45.32	5894	207.43	291	10	65	2.27

#### Year 1992

		ALL areas	
		Number	MT
	Thresher spp.	471	39.4
FAL	Silky	10444	319.93
OCS	Oceanic whitetip	2.06	7.53
	Mako spp.	334	12.84
SMA	Shortfin mako	437	25.57
LMA	Longfin mako	419	26.44
POB	Porbeagle	29	2.14
BSH	Blue	7043	184.39
	total pelagic	19383	618.24
	sharpnose	1941	1.88
	reef	217	5.82
	spinner	32	0.85
	bignose	68	4.76
CCL	Blacktip	263	1.34
CCE	Bull	279	18.68
DUS	Dusky	1499	62.35
CCP	Sandbar	125	4.54
TIG	Tiger	329	11.29
	Hammerhead spp.	7428	395.58
	Unclassified	255	1.35
	total costal	12436	508.44