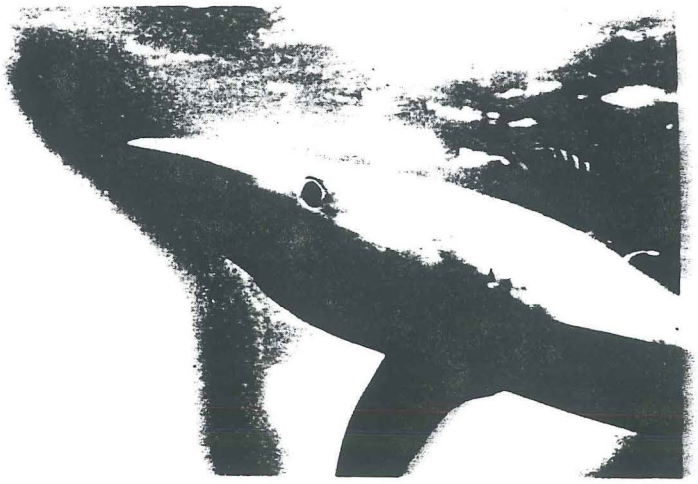
THE SHARK TAGGER
1981 SUMMARY



JOHN CASEY, HAROLD WES PRATT, CHARLES STILLWELL

PHOTO BY H. W. PRATT

1981 OVERVIEW

- BLUE SHARKS TRAVEL FROM NORTH AMERICA TO EUROPE AND AFRICAN COASTS
- MAKO RECAPTURED IN WEST INDIES AFTER 4 YEARS
- SANDBAR AND DUSKY SHARKS SHOW MOVEMENTS FROM NY AND NEW ENGLAND TO MEXICO
- SECOND SWORDFISH TAGGED OFF NEW ENGLAND RECAPTURED IN STRAITS OF FLORIDA
- FIRST PREGNANT BLUE SHARK RECAPTURED (USA TO EUROPE)
- BERMUDA TAGGED TIGER SHARK CAUGHT IN GULF OF MEXICO
- SWORDFISH TIME RECORD, 5 YR 10 MONTHS AT LIBERTY
- BLUE SHARK RECAPTURED TWICE AND STILL FREE
- BLUE SHARK TAGGED OFF PORTUGAL AND RE-CAPTURED OFF NEWFOUNDLAND

BIGEYE THRESHER
Alopias superciliosus
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During 1981, participants in the NMFS Cooperative Shark Tagging Program tagged and released 5,222 sharks representing 34 species and 157 teleosts of 9 species. Volunteer taggers accounted for 99% of the releases (see Table). In the same period 153 tags were returned from 12 species of sharks and 1 teleost. Recaptures came from blue sharks (99), sandbar

(Continued on page 2)

Distribution of this newsletter is limited to active participants in the NMFS Cooperative Shark Tagging Program. This information is preliminary and subject to revision.

Printed compliments of the Bay Shore Tuna Club.

Newsletter of the
Cooperative Shark Tagging Program
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Narragansett, Rhode Island 02882

SUMMARY OF SHARKS AND TELEOSTS TAGGED

January-December 1981

SPECIES	TAGGED BY COOPERATIVE TAGGERS	NARRAGANSETT BIOLOGISTS	TOTALS
Sharks			
Blue shark	2751	56	2807
Sandbar shark	652	0	652
Dusky shark	379	1	380
Bull shark	16	1	17
Blacktip shark	84	0	84
Spinner shark	6	0	6
Oceanic whitetip shark	64	0	64
Silky shark	129	1	130
White shark	8	0	8
Shortfin mako shark	181	1	182
Longfin mako shark	11	0	11
Porbeagle shark	22	0	22
Sand tiger shark	3	0	3
Spiny dogfish shark	3	0	3
Smooth dogfish shark	13	0	13
Bonnethead shark	38	0	38
Great hammerhead shark	9	0	9
Scalloped hammerhead shark	87	1	88
Smooth hammerhead shark	6	0	6
Atlantic sharpnose shark	219	1	220
Blacknose shark	13	0	13
Tiger shark	122	0	122
Finetooth shark	14	0	14
Lemon shark	35	0	35
Nurse shark	35	0	35
Bigeye thresher shark	46	0	46
Common thresher shark	13	0	13
Night shark	25	7	32
Bignose shark	3	0	3
Angel shark	1	0	1
Basking shark	5	0	5
Reef shark	26	0	26
Florida smoothhound shark	2	0	2
Galapagos shark	1	0	1
Hammerhead unspecified	67	0	67
Thresher unspecified	1	0	1
Sand unspecified	4	0	4
Blacktip unspecified	4	0	4
Grey unspecified	2	0	2
Brown/Dusky unspecified	33	0	33
Carcharhinus unspecified	14	0	14
Unknown*	6	0	6
Total sharks	5153	69	5222
Teleosts			
Swordfish	90	1	91
Sailfish	4	0	4
White marlin	25	6	31
Blue marlin	4	0	4
Bluefin tuna	12	0	12
Bigeye tuna	1	0	1
Tuna unspecified	2	0	2
Miscellaneous teleosts	12	0	12
Total teleosts	150	7	157
Grand Total	5303	76	5379

*Includes species reported as "shark".

OVERVIEW *(Continued from page 1)*

(14), shortfin mako (10), dusky (8), tiger (6), and 14 from other sharks. Tags from 2 swordfish were also returned. U.S. fishermen accounted for 127 (83%) of the recaptures, of which 78 were by rod and reel fishermen, 33 by longliners, and 16 by other U.S. fishermen. Foreign fishermen accounted for 26 (17%) of the tag returns. These came from fishermen representing the following 11 countries and island territories: Spain (5), Japan (5), Mexico (5), Canada (2), Korea (2), St. Lucia (2), and one each from Cuba, Dominican Republic, Taiwan, Bermuda, and Grenada. Seventeen of the foreign recaptures were taken by longlines; 9 by other gear.

Fish released by Captain Stephen Connett aboard the R/V *Geronimo* (St. Georges School, Newport, R.I.) accounted for 25 tag returns. Releases by NMFS Foreign Fishery Observers resulted in 15 returns, and releases by Narragansett biologists accounted for 5 returns. Polish biologists aboard the R/V *Wieczno*, which we have used on several cruises (see cruise summary), have been tagging sharks off the west coast of Africa during their tuna exploration and 2 of these were recaptured. Releases by other cooperators, primarily sport fishermen and commercial longliners accounted for the remaining 106 returns.

• Blue Sharks • Of the 99 blue sharks recaptured, 41 were at liberty for periods greater than 3 months and 36 travelled distances greater than 100 miles. In addition, 18 were retagged including one that had been recaptured and retagged a second time. That blue shark is still at liberty carrying its third tag. Unfortunately, at its original tagging in July 1980, no length estimate was made, and valuable data was lost. At its second and third recapture in September 1980 and June 1981 its length increased from 5 feet 1 inch to 5 feet 10 inches.

Seven blue sharks showed transatlantic movements, six from the U.S. to the European and African coasts, and one from Portugal to Newfoundland. All were at liberty from 12 to 45 months and travelled straight line distances of from 2,600 to 2,900 miles. Undoubtedly, the actual distances travelled were greater as the sharks probably followed the Gulf Stream across the Atlantic. One of the most enlightening of these long distance returns came from a Spanish longliner who wrote that the shark contained 28 embryos approximately 16 inches long (40 cm). This blue shark was tagged by Stephen Connett aboard the R/V *Geronimo* off Georges Bank on September 27, 1978. In past newsletters, we have discussed blue shark reproduction and our studies have indicated that the area off southern New England is a primary mating area. Wes Pratt's work has shown that female blue sharks store sperm until the eggs are ready for fertilization. The pregnant shark was free for about 2½ years and assuming a 9 month gestation period the shark could have stored sperm for 22 months. Other interesting recaptures from the eastern Atlantic include the 2 blue sharks which were tagged on the same day 500 miles SW of the Cape Verde islands by biologists aboard the R/V *Wieczno*. Both fish travelled in a southwesterly direction and were recaptured by longliners from Japan and Korea. One was free for 2 months and travelled 183 miles while the other was free for 5 months and travelled 275 miles. As we've said in past newsletters, none of our data shows movement of sharks across the equator. The fact that these fish were travelling in a westerly direction rather than south, and remained in this area just north of the equator for several months, suggests there is little or no exchange between the North and South Atlantic populations.

In addition to the transatlantic movements, 2 blue sharks tagged off the U.S. northeast travelled 1,650 miles to the West Indies, while another travelled 2,150 miles to Trinidad, off the NE coast of South America. These fish were at liberty from 5 to 12 months. Two additional blue sharks tagged in the Mid-Atlantic Bight were recaptured off Bermuda after 15 and 19 months.

Movements of blue sharks in and out of the Gulf of Maine have been unknown probably because our tagging effort is very low north of Cape Cod. This year, however, a blue shark tagged in August on Fippennies Ledge in the Gulf of Maine was recaptured by a commercial longliner near Corsair Canyon on Georges Bank. This is the first recapture documenting movements out of the Gulf of Maine.

• Mako Sharks • The ten mako sharks recaptured this year equaled the number recaptured last year. Distances between tag and recovery locations include one over 1,000 miles, one between 500 and 1,000, seven between 100 and 500 miles, and one under 100 miles. Times at liberty ranged from one month to almost four years. The mako that travelled the farthest (1,592 mi) was out 3.8 years. It was tagged off North Carolina and recaptured off Grenada in the West Indies. Two makos were recaptured by Japanese longliners fishing south of the Grand Banks. Both fishermen provided detailed recapture data including measured lengths and weights. Of the seven remaining recaptures three were tagged by Stephen Connett and four were tagged by NMFS observers. Sport fishermen

recaptured four of these off Long Island with three showing localized movements less than 150 miles within the Mid-Atlantic Bight, while the fourth was tagged just north of Cape Hatteras and travelled 285 miles NE. American commercial longliners were responsible for the three remaining recaptures. Two of these showed movements between Cape Hatteras, North Carolina, and Georges Bank, while the last was tagged and recaptured in the Gulf of Mexico south of the Mississippi River.

•Sandbar Sharks• Of the 14 sandbar sharks recaptured this year, 8 travelled over 500 miles, 5 travelled between 100 and 500 miles, and only 1 travelled less than 100 miles. Ten of the recaptured sandbars were at liberty for greater than 1 year with a maximum time at liberty of 5 years. Three sandbar sharks travelled over 2,000 miles — New York to Mexico. These distances represent straight line travel, which would cut across the Gulf of Mexico. The sandbar shark is considered a shelf species and if the distance along the shelf is calculated, it is approximately 3,500 miles. The longest time at liberty (5 years) was recorded for a shark tagged off New York and recaptured off Fort Pierce, Florida (860 miles). Of the 10 remaining recaptures, 1 was recaptured off Mayport, Florida, after being tagged off Virgina (531 miles) while another tagged off Mobile, Alabama, travelled across the Gulf of Mexico (705 miles) to Tabasco, Mexico. Three of 8 sandbar sharks tagged off Long Island, N.Y., were recaptured within 200 miles of the tagging site. The other 5 were taken off Virginia (1), North Carolina (2), and South Carolina (2).

•Dusky Sharks• Of the 8 dusky sharks recaptured, two travelled from North Carolina to New Jersey and two travelled south from New Jersey to Florida. The two longest distances recorded this year for dusky sharks were from North Carolina to Cuba (790 miles) and from off Massachusetts to Mexico (2,015 miles).

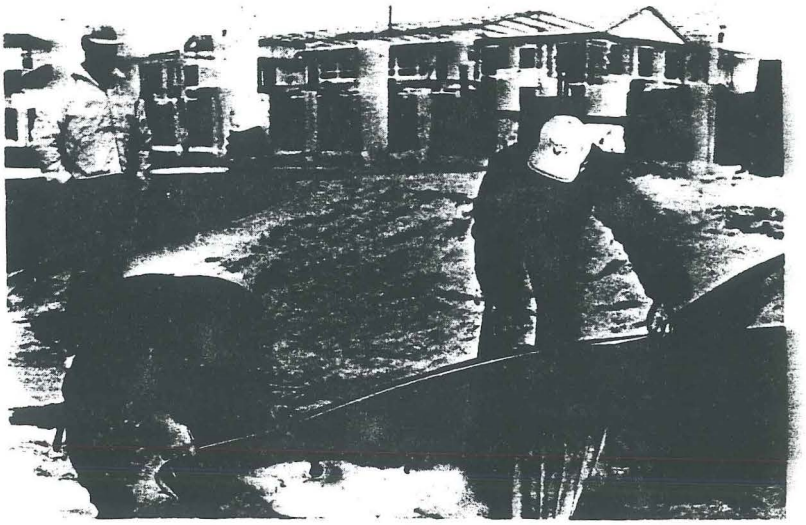
SOURCE FOR TUNA INFORMATION

We encourage fishermen to participate in other research programs. If you plan on tagging tunas and billfish, please contact:

Edwin L. Scott
NOAA-NMFS
Southeast Fisheries Center
75 Virginia Beach Drive
Miami, FL 33149

For regulatory information on tunas, please contact:

Allen Peterson, Jr.
Dir., Northeast Region
NOAA-NMFS
Federal Building — 14 Elm St.
Gloucester, MA 01930



WHITE SHARK SIGHTINGS

We are assembling a sighting file of large white sharks landed or sighted along the Atlantic coast. We need detailed information on location, date, size, sex, photographs, notes on behavior and any identifying marks on the shark. Despite our biological fascination with white sharks, we do not recommend that they be indiscriminately killed. However, if any large white sharks are landed, we would like to be notified at once (401-789-9326 or 401-789-7368) as much life history information can be gained by studying their anatomy.

•Other Sharks• Recaptures from other species of sharks included 3 tiger sharks: 1 showing transgulf movement from Florida to Texas (656 miles), another from New York to Florida (945 miles) and 1 from Bermuda to the Dry Tortugas (1,142 miles). Recaptures of sharpnose (3), blacktip (2), and nurse sharks (5) all showed localized movements less than 60 miles. Silky and lemon sharks (1 each) travelled slightly greater distances but were still recaptured within 130 miles of the tagging site. A spiny dogfish at liberty for 3 years travelled 270 miles from off N.Y. into the Gulf of Maine.

•Swordfish• Two swordfish were recaptured this year one after 3 years at liberty, the other after 5.8 years. The 3-year recapture, was recaptured on the southeast portion of Georges Bank, within 28 miles, of the tagging site. The other travelled over 1,000 miles from Georges Bank to Florida. The latter swordfish was tagged at approximately 30 lb and after almost 6 years at liberty weighed approximately 250 lb (a growth of about 37 lb per year). This is the second tagged swordfish to show movements from Georges Bank to the Florida Straits.

TAGGING PROGRAM NOT A CONTEST

This entire newsletter could be filled with the names of fishing clubs, outdoor writers, tournament officials, and individual fishermen who have contributed to our studies over the years. We have never asked for anything but your continued interest, and we certainly have not given you much of anything tangible in return. Interest is the driving force in the program and we seldom acknowledge anyone's contribution because everyone contributes. How can we acknowledge the longliner or charter captain who tags 100 sharks a year and not think about the 12-year old who tagged the only mako he every caught?

We do not believe in elaborate tagging prizes at tournaments and yet we encourage tagging as an important scientific tool.

Because the subject of "recognition" is so complex, we avoid its use as an incentive. For most shark taggers, participation in learning about sharks seems to be its own reward. We bring up the subject only to answer questions we have received on the possibility of annual prizes for the most fish tagged; do we have lists of exceptional fishermen? Will we provide tags to every boat in any tournament? The answer to questions such as these is simply, No. But we hope you realize that we deeply appreciate the efforts of every one of you who share our curiosity about the sea.

TAG RECOVERIES: JANUARY - DECEMBER 1981

SPECIES	GENERAL LOCATIONS TAGGED	RECAPTURED	MONTHS/ LIBERTY	DIST. & DIR. TRAVELED		CAPTURE METHOD TAGGING	RECAPT.	TAGGED BY TAGGER	RESIDENCE
Blue shark	34 mi SE Manasquan Inlet, NJ	23 mi S Fire Is. Inlet, NY	<1	28	NNE	RR	RR	Frank Janusz	NJ
" "	26 mi SW Martha's Vineyard, MA	29 mi SW Martha's Vineyard, MA	10	7	SE	FS	RR	Charlie Donilon	RI
" "	27 mi SE Moriches Inlet, NY	20 mi SE Fire Is. Inl., NY	<1	30	W	RR	RR	Butch Arsenault	NY
" "	20 mi SE Moriches Inlet, NY	23 mi SE Shinnecock Inl, NY	<1	12	E	RR	RR	Tony Rizzo	NY
" "	40 mi SE Fire Is. Inlet, NY	40 mi SW Fire Is. Inlet, NY	<1	28	W	RR	RR	Al Andrus	NY
" "	25 mi SE Manasquan Inl, NJ	38 mi S Fire Is. Inlet, NY	<1	14	E	RR	RR	Steve Pepe	NJ
" "	20 mi SE Moriches Inl, NY	23 mi SE Montauk Pt, NY	<1	40	NE	RR	RR	Stephen Stidd	NY
" "	31 mi S Fire Is. Inl, NY	45 mi SE Jones Inlet, NY	12	17	SE	RR	RR	Roger Schultz	NY
" "	32 mi S Moriches Inl, NY	30 mi SE Jones Inlet, NY	<1	33	W	RR	RR	Tom Cashman	NY
" "	31 mi S Fire Is. Inl, NY	45 mi SE Fire Is. Inl, NY	<1	19	SE	RR	RR	James Schaefer	NY
" "	30 mi S Jones Inlet, NY	50 mi S Fire Is. Inlet, NY	<1	21	S	RR	RR	Leonard Richards	NY
" "	24 mi SE Fire Is. Inlet, NY	30 mi SE Fire Is. Inlet, NY	<1	12	W	FS	RR	Morty Michaels	NY
" "	20 mi SE Shinnecock Inl, NY	25 mi SE Fire Island Inl, NY	10	40	WSW	RR	RR	Ray Hendrickson	NY
" "	30 mi SW Montauk, NY	28 mi SE Moriches Inlet, NY	<1	20	WSW	FS	RR	Gloria Hayn	NY
" "	23 mi SE Shinnecock Inl, NY	31 mi S Fire Is. Inlet, NY	<1	53	SW	FS	RR	Robert Bangston	NY
" "	19 mi E Block Is, RI	Tenerife, Canary Is.	18	2763	SE	RR	LL	Dave Laurie	RI
" "	30 mi S Montauk, NY	15 mi SE Shinnecock Inl, NY	<1	18	NW	RR	RR	Ken Nyman	RI
" "	26 mi SE Moriches Inl, NY	18 mi SE Moriches Inl, NY	1	9	N	RR	RR	Tom Montalbano	NY
" "	28 mi SE Shinnecock Inl, NY	210 mi SE Bermuda	15	825	SE	FS	LL	Floyd Carrington	NY
" "	49 mi S Nantucket Is, MA	69 mi NE Cape Canaveral, FL	8	845	SW	LL	LL	Stephen Connett	RI
" "	32 mi S Martha's Vineyard, MA	35 mi SE Fire Is. Inl, NY	10	102	WSW	LL	RR	Stephen Connett	RI
" "	20 mi SE Block Is, RI	130 mi SW Cape St. Vincent, Portugal	31	2745	SE	LL	LL	Stephen Connett	RI
" "	39 mi S Martha's Vineyard, MA	24 mi S Montauk, NY	12	42	W	LL	RR	Stephen Connett	RI
" "	43 mi E Barnegat Inl, NJ	S Cape St. Vincent, Portugal	45	2959	SE	LL	UNK	Stephen Connett	RI
" "	37 mi S Nantucket Is, MA	83 mi SE Nantucket Is, MA	21	54	SE	LL	LL	Stephen Connett	RI
" "	25 mi SE Montauk, NY	430 mi E Trinidad	10	2071	SE	RR	LL	Frank Mundus	NY
" "	25 mi S Montauk, NY	30 mi S Montauk, NY	10	5	S	RR	RR	Frank Mundus	NY
" "	46 mi SE Montauk, NY	46 mi SE Montauk, NY	11	0	O	FS	RR	Frank Mundus	NY
" "	27 mi SE Montauk, NY	25 mi S Montauk, NY	11	11	W	FS	RR	Robert Hauser	NY
" "	39 mi SE Montauk, NY	35 mi S Moriches Inl, NY	11	91	SW	RR	RR	Frank Mundus	NY
" "	25 mi SE Montauk, NY	25 mi SE Shinnecock Inl, NY	10	28	SW	RR	RR	Frank Mundus	NY
" "	39 mi S Nantucket Is, MA	Las Palmas, Canary Is.	17	2727	SE	LL	LL	Stephen Connett	RI
Blue shark	30 mi SE Barnegat Inl, NJ	25 mi S Montauk, NY	15	99	NE	RR	RR	Paul Folla	NJ
" "	11 mi E Block Is, RI	25 mi SE Montauk, NY	<1	23	S	RR	RR	Fred Gallagher	RI
" "	22 mi SE Moriches Inl, NY	175 mi SSE Cape Sable, NS	12	348	E	RR	LL	William Grunseich	NY
" "	36 mi S Montauk, NY	140 mi SE Nantucket Is, MA	46	215	E	RR	LL	Paul Sundberg	NY
" "	17 mi E Block Is, RI	68 mi E Ocean City, MA	<1	210	SW	RR	LL	Fred Gallagher	RI
" "	22 mi SSW Fire Is. Inl, NY	45 mi SE Jones Inl, NY	1	30	SE	RR	RR	Capt. Arnold	NY
" "	78 mi SE Fire Is. Inl, NY	30 mi S Ocean City, NJ	<1	112	WSW	FS	RR	Ray Wittman	NY
" "	85 mi E Oregon Inl, NC	37 mi E Fort Pierce, FL	34	610	SW	LL	LL	Biologist	RI
" "	20 mi SE Moriches Inl, NY	55 mi SE Block Is., RI	<1	82	E	FS	RR	Lou Pastore	NY
" "	43 mi SE Fire Is. Inl, NY	75 mi SE Cape May, NJ	1	120	SW	RR	LL	Norman Docteroff	NY
" "	195 mi SE Nantucket Is., MA	E Coast St. Lucia (WI)	12	1530	SE	LL	HL	Bill Young, NMFS Obs.	MS
" "	93 mi E Ocean City, MD	10 mi S St. Lucia (WI)	5	1610	SE	LL	HL	Greg Spake, NMFS Obs.	MS
" "	320 mi SE Cape Sable, NS	150 mi SE Nantucket Is, MA	<1	300	W	LL	LL	Alan Criss, NMFS Obs.	MS
" "	66 mi NE Oregon Inl, NC	25 mi S Montauk, NY	8	282	NE	LL	RR	Mark Houck, NMFS Obs.	MS
" "	95 mi SE Nantucket Is., MA	20 mi SE Montauk, NY	<1	144	NW	LL	RR	Alan Criss, NMFS Obs.	MS
" "	43 mi SE Montauk, NY	15 mi S Martha's Vineyard, MA	<1	19	NE	FS	RR	Stephen Connett	RI
" "	44 mi S Martha's Vineyard, MA	17 mi S Montauk Pt., NY	2	55	NW	LL	RR	Stephen Connett	RI
" "	40 mi S Nantucket Is., MA	36 mi S Nantucket Is., MA	24	9	NW	LL	LL	Stephen Connett	RI
" "	33 mi S Nantucket Is., MA	203 mi SW Bermuda	19	570	SSW	LL	LL	Stephen Connett	RI
" "	40 mi SE Block Is., RI	36 mi S Nantucket Is., MA	<1	36	W	RR	LL	Robert Flanagan	NY
" "	25 mi S Montauk Pt., NY	34 mi SE Block Is., RI	10	43	ENE	RR	LL	Garry Kieffer	NY
" "	25 mi SE Montauk Pt., NY	38 mi SE Block Is., RI	<1	28	E	RR	LL	Art Johnson	CT
" "	42 mi SE Block Is., RI	42 mi SE Block Is., RI	<1	0	-	FS	LL	Lee Pepin	CT
" "	43 mi SE Montauk Pt., NY	40 mi S Montauk Pt., NY	9	25	SW	RR	RR	Charles Joscher	NY
" "	33 mi S Jones Inlet, NY	18 mi S Shinnecock Inl, NY	<1	62	NE	RR	RR	Al Reiburn	NY
" "	35 mi S Montauk Pt., NY	18 mi S Shinnecock Inl, NY	<1	32	W	RR	RR	Robert Flanagan	CT
" "	20 mi S Montauk Pt., NY	20 mi SE Montauk Pt., NY	<1	15	NE	RR	RR	Lou Rosado	NY
" "	50 mi SE Jones Inlet, NY	20 mi SE Montauk Pt., NY	36	85	NE	RR	RR	Joe Carter	NY
" "	12 mi S Block Is., RI	25 mi SE Jones Inl, NY	<1	84	SW	RR	RR	Frank Marrazzo	NY
" "	40 mi SE Shinnecock Inl, NY	38 mi S Montauk, NY	<1	0	-	FS	RR	Ray Hendrickson	NY
" "	30 mi SE Moriches Inl, NY	20 mi SE Montauk Pt., NY	2	57	NE	RR	RR	Butch Arsenault	NY
" "	37 mi SE Block Is., RI	20 mi S Montauk Pt., NY	2	39	E	RR	RR	Robert Flanagan	CT
" "	22 mi SE Martha's Vineyard, MA	25 mi S Shinnecock Inl, NY	2	80	SW	LL	RR	Stephen Connett	RI
" "	30 mi SSE Montauk Pt, NY	40 mi SSE Montauk Pt, NY	2	12	SE	RR	RR	Harvey Smith	NY
" "	10 mi SE Block Is., RI	12 mi E Block Is., RI	1	4	NW	RR	RR	John Keet	CT
" "	35 mi S Bayshore, NY	12 mi E Block Is., RI	1	117	NW	RR	RR	Bill Venezia	NY
" "	23 mi SE Shinnecock, NY	12 mi E Block Is., RI	2	60	NE	FS	RR	Robert Bangston	NY
" "	37 mi SE Shinnecock Inl, NY	86 mi SE Barnegat Inl, NJ	<1	77	SW	FS	LL	Ray Hendrickson	NY
" "	12 mi E Block Is., RI	105 mi SE Barnegat Inl, NJ	1	103	SW	RR	LL	William Campbell	RI
" "	25 mi SE Jones Inl, NY	30 mi S Montauk, NY	1	67	NE	RR	RR	Charles Berwind	NY
" "	25 mi SE Bayshore, NY	79 mi SE Barnegat Inl, NJ	1	75	S	RR	LL	Bob Pennoton	NY
" "	25 mi S Montauk Pt, NY	25 mi SE Montauk Pt, NY	-	-		RR	RR	Zac Grossman	NY
Blue shark	330 mi SW Cape Verde Is.	590 mi SW Cape Verde Is.	5	275	SW	LL	LL	Wieczno	Poland
" "	15 mi SE Block Is., RI	6 mi SE Block Is., RI	<1	8	SW	RR	RR	Jim Humphrey	CT
" "	320 mi SW Cape Verde Is.	500 mi SW Cape Verde Is.	2	183	WSW	LL	LL	Wieczno	Poland
" "	30 mi S Montauk Pt, NY	6 mi SE Block Is., RI	1	40	NE	RR	RR	Garry Kieffer	NY
" "	33 mi S Nantucket Is, MA	15 mi SE Shinnecock Inl, NY	14	100	W	FS	RR	Stephen Connett	RI
" "	135 mi E Ocean City, MA	75 mi E Ocean City, MA	<1	63	WSW	LL	LL	Tom Graupmann,NMFS Obs	MS
"	13 mi SE Montauk Pt, NY	41 mi SE Montauk Pt, NY	12	31	E	RR	RR	Bill Hojohn	NY
" "	39 mi SE Block Is., RI	440 SW Tenerife, Canary Is.	12	2678	SE	LL	LL	Stephen Connett	RI
" "	83 mi NE Oregon Inl, NC	88 mi NE Oregon Inl, NC	<1	14	N	LL	LL	John Bazuin, NMFS Obs.	MS
" "	37 mi S Nantucket Is., MA	90 mi S Martha's Vineyard, MA	<1	50	SW	LL	LL	Stephen Connett	RI
" "	35 mi S Nantucket Is., MA	75 mi SE Cape Sable, NS	3	267	NE	LL	LL	Stephen Connett	RI
" "	150 mi E Cape May, NJ	10 mi W Rabat, Morocco	12	2797	E	LL	LL	Brad Walters,NMFS Obs.	MS
" "	Algarve, Portugal	Bay of St. George,Newfoundland	22	2290	NW	RR	TN	R. H. Streur	Portugal
" "	47 mi SE Moriches Inl., NY	85 mi E Ocean City, MA	<1	117	SW	RR	LL	Louis Pastore	NY
" "	22 mi SE Montauk, NY	85 mi E Ocean City, MA	1	166	SW	FS	LL	Jim Humphrey	CT
" "	24 mi SE Moriches Inl, NY	20 mi S Shinnecock, NY	1	11	NE	RR	RR	Frederick Wedley	NY
" "	30 mi S Montauk, NY	14 mi E Block Is., RI	<1	32	NE	RR	RR	Garry Kieffer	NY
" "	30 mi SE Montauk, NY	85 mi S Shinnecock Inl, NY	2	90	SW	RR	LL	Ken Hayn	NY
" "	36 mi SE Block Is., RI	10 mi NW Dominica, WI	12	1640	SE	LL	RR	Stephen Connett	RI
" "	35 mi SE Block Is., RI	96 mi S Montauk Pt., NY	4	81	SSW	LL	LL	Stephen Connett	RI
" "	56 mi E Cape Ann, MA	168 mi E Nantucket Is., MA	2	175	SE	LL	LL	Stephen Connett	RI
" "	23 mi NE Manasquan Inl, NJ	22 mi SSE Montauk Pt., NY	2	87	ENE	RR	RR	Ralph Leyner	NJ
" "	25 mi SE Montauk Pt., NY	70 mi E Ocean City, MA	1	185	SW	RR	TN	Mike Albronda	NY
" "	90 mi S Nantucket Is., MA	103 mi E Ocean City, MA	3	178	SW	LL	LL	Alan Criss, NMFS Obs.	MS
" "	30 mi S Montauk Pt., NY	67 mi SE Ocean City, MA	3	175	SW	RR	LL	Ken Chalson	NY
Mako shark	38 mi S Nantucket Is., MA	40 mi SE Jones Inl, NY	22	142	WSW	LL	RR	Stephen Connett	RI
" "	54 mi S Nantucket Is., MA	25 mi SE Moriches Inl, NY	9	108	W	LL	RR	Stephen Connett	RI
" "	30 mi S Nantucket Is., MA	35 mi E Oregon Inl, NC	20	334	WSW	LL	LL	Stephen Connett	RI

TAG RECOVERIES: JANUARY - DECEMBER 1981

SPECIES	GENERAL LOCATIONS TAGGED	RECAPTURED	MONTHS/ LIBERTY	DIST. & DIR. TRAVELED		CAPTURE METHOD TAGGING	RECAPT.	TAGGED BY TAGGER	RESIDENCE
" "	46 mi E Oregon Inl, NC	54 mi SE Fire Is. Inl, NY	8	285	NE	LL	RR	Ken Hase, NMFS Obs.	MS
" "	176 mi SW Miss. R., S Pass	35 mi S Miss. R. S Pass	23	139	NNE	LL	LL	Brad Walters, NMFS Obs	MS
" "	84 mi E Chincoteague Inl, VA	172 mi SE Nantucket Is., MA	18	376	NE	LL	LL	Mark Houck, NMFS Obs.	MS
" "	85 mi SE Montauk Pt., NY	340 mi SSE Sable Is, NS	4	588	E	LL	LL	Marty Bartlett	GA
" "	49 mi NE Oregon Inl, NC	Grenada, West Indies	46	1592	SSE	LL	HL	Biologist	RI
" "	40 mi SE Shinnecock Inl, NY	23 mi SE Moriches Inl, NY	1	22	NW	RR	RR	Ray Hendrickson	NY
" "	120 mi SE Nantucket Is., MA	110 mi SE Sable Is.	1	405	NE	LL	LL	Melford Smith,NMFS Obs	MS
Sandbar shark	37 mi S Mobile, AL	19 mi N Frontera Tabasco Mex.	21	705	SW	LL	LL	Steve Branstetter	TX
" "	10 mi SE Jones Inl, NY	Chesapeake Bay, VA	13	265	SW	RR	RR	A. Waters	NY
" "	30 mi S Montauk Pt., NY	2 mi S Drum Inl, NC	27	418	SW	RR	PS	Dave Willis	CT
" "	23 mi SE Montauk Pt., NY	19 mi E Tuxpan, Mex.	50	2016	SW	RR	LL	Walter Kaprielian	NY
" "	25 mi S Montauk Pt, NY	6 mi SW Diamond Shoals Twr,NC	5	377	SW	RR	TN	Warren Hader	NY
" "	22 mi E Rudee Inl, VA	4 mi E Mayport, FL	7	531	S	RR	TN	Bill Walker	VA
" "	20 mi S Montauk Pt., NY	38 mi E Tamaulipas, Mex.	24	1976	SW	RR	LL	Jon Semlear	NY
Sandbar shark	37 mi SE Fire Is., NY	Tampico, Mexico	24	1992	SW	RR	?	Joe Kaich	NY
" "	7 mi W Cape May, NJ	1/2 mi E Ship Bottom, NJ	35	71	NE	RR	GN	Bill Garrison	NJ
" "	33 mi S Fire Is., NY	8 mi E Ocean City, MA	12	133	SW	RR	RR	G. E. Bezold	NY
" "	12 mi SE Fire Is., NY	15 mi E Fort Pierce, FL	60	860	SW	RR	RR	David Levin	NY
" "	20 mi S Montauk Pt., NY	1 mi E Surf City, NJ	2	124	SW	RR	GN	Otto Haselman	NY
" "	90 mi SE Nantucket Is., MA	19 mi S Charleston, SC	8	687	SW	LL	TN	Biologist	RI
" "	28 mi E Barnegat Inl, NJ	St. Helena Sound, SC	12	609	SW	RR	TN	Frank Hirsh	NJ
Dusky shark	7 mi E St. Catherines Pt, Bermuda	6 mi NW Ireland Pt.., Bermuda	20	20	W	LL	LL	Stephen Connett	RI
" "	13 mi SE Sandy Hook, NJ	2 mi E Daytona Bch, FL	7	780	SW	LL	RR	Biologist	RI
" "	10 mi SE Rudee Inl, VA	3 mi E Ocean City, NJ	1	164	NE	RR	RR	Bill Walker	VA
" "	83 mi SE Nantucket Is., MA	Vega de Alatorre, Vera., Mex	60	2015	SW	LL	UNK	Stephen Connett	RI
" "	27 mi NE Cape Hatteras, NC	Caiman, Cuba	19	790	SW	UNK	LL	William Fazio,NMFS Obs	MS
" "	55 mi NE Oregon Inl, NC	100 mi E Belmar, NJ	8	213	NE	TN	RR	William Fazio,NMFS Obs	MS
" "	12 mi E Mayport, FL	3 mi E Oregon Inl, NC	7	460	SW	RR	RR	Tom Hurst	FL
" "	20 mi SE Virginia Bch, VA	10 mi E Jacksonville, FL	15	500	SW	RR	TN	Bill Walker	VA
Sandbar/Dusky	18 mi E Belmar, NJ	10 mi E Asbury Park, NJ	11	7	W	RR	DREDGE	Bill Render	NJ
Tiger shark	28 mi SE Ocean City, NJ	13 mi SE Barnegat Inl, NJ	13	48	NE	RR	RR	Dave Moss	NJ
" "	17 mi W Charlotte Hbr, FL	53 mi S Galveston, TX	2	656	WNW	RR	TN	Clark Balsinger	FL
" "	32 mi E Cape Henry, VA	32 mi E Cape Henry, VA	24	0	-	RR	RR	Brad Harvey	VA
" "	49 mi SW Dry Tortugas, FL	20 mi E Dry Tortugas, FL	37	69	NE	LL	TN	Jonathan Luces	MA
" "	12 mi E Bermuda	30 mi NW Dry Tortugas, FL	24	1142	SW	LL	LL	Stephen Connett	RI
Tiger shark	40 mi SE Jones Inlet, NY	2 1/2 mi E Miami Bch, FL	39	945	SW	RR	RR	Joe Carter	NY
Sharpnose shark	Jacksonville Bch, FL	Neptune Bch, FL	<1	3	N	RR	ON BCH	Jim Laforce	FL
" "	2 mi S Port Aransas, TX	12 mi S Port Aransas, TX	11	10	W	RR	RR	Bob Keepers	TX
" "	48 mi SW Galveston, TX	8 mi E Galveston, TX	8	52	SW	TN	RR	Mark Rockett	TX
Blacktip shark	25 mi W Key West, FL	18 mi SW Marathon, FL	67	55	NW	RR	RR	Ted Smits	FL
" "	Galveston, TX	Freeport, TX	<1	22	SW	RR	RR	Lester McLaughlin	TX
Nurse shark	40 mi SW Everglades City, FL	35 mi W Naples, FL	1	44	NW	HL	RR	James Brown	FL
" "	Satellite Bch, FL	Satellite Bch, FL	1	-	-	RR	RR	Joe Wasneski	FL
" "	Big Pine Key, FL	Big Pine Key, FL	26	<1		RR	RR	Jeff Carrier	FL
" "	Islamorada, FL	Islamorada, FL	12	-	-	RR	RR	Paul Copeland	FL
Silky shark	65 mi SE Charleston, SC	150 mi E Charleston, SC	16	128	NE	LL	LL	Biologist	RI
Lemon shark	Islamorada, FL	Fort Myers, FL	11	64	SE	RR	GN	Paul Copeland	FL
Spiny dogfish	24 mi S Jones Inl, NY	17 mi SE Cape Ann, MA	38	70	NE	RR	GN	Ronald Kluesner	NY
" "	Block Is. Sound, RI	1 mi E Jekyll Is., GA	156	930	SW	RR	TN	Thayer Schaeffer	RI
Swordfish	133 mi SE Nantucket Is., MA	110 mi SE Nantucket Is., MA	36	28	NW	LL	LL	Phil Ruhle	RI
"	143 mi SE Nantucket Is., MA	40 mi E Hillsborough Inl, FL	70	1054	SW	LL	LL	Phil Ruhle	RI

NOTE: NR=Not Reported; GN=Gill Net; LL=Longline; RR=Rod & Reel; HP=Harpoon; FS= Free Swimming; HL=Hand Line; TN=Trawl Net; Obs=Foreign Fisheries Observer; PS=Purse Seine.

RESEARCH CRUISES

Staff biologists participated in three cruises during 1981. One was aboard the *Darana R*, an American commercial longline vessel, and the other two were aboard the Polish vessel, R/V *Wieczno* from Gdynia, Poland. The focus of two of the cruises was to study the food habits of sharks and other large gamefish, and the third involved sonic tracking experiments. In addition, biological samples relating to reproduction and age and growth in sharks were also collected.

The *Darana R* cruise took place in August along the edge of the continental shelf (600-1000 fathoms) from east of Oregon Inlet, N.C., to Baltimore Canyon (120 mi to the north). Surface temperatures ranged from 71°-82°F (22°-28°C) with a large mass of Gulf Stream water that intruded onto the continental shelf between Cape Hatteras and Hudson Canyon in early summer. Night sharks (91), blue sharks (25), and swordfish (27) predominated in the catches on this cruise. The abundance of night sharks was associated with the warm Gulf Stream water in the fishing area. While this species is not generally considered abundant north of Cape Hatteras, we have caught them there in the past — indicating that night sharks are more common in this area than published records suggest. Of the 64 night shark stomachs examined, 50 (78%) contained food dominated by squid (*Illex* sp.) with lesser amounts of fish. Of the 15 blue shark stomachs 11 were empty and 4 contained digested squid remains. The swordfish stomachs contained a maximum of 4 lb of squid with an average of 1 lb for the 24 examined. Although predation on squid by the night sharks and swordfish was high, it was not unusual to find so few blue sharks with food.

The first R/V *Wieczno* cruise was an attempt to define changes in the amount of food in the stomachs of blue sharks as they migrated offshore for the winter. Of the 65 blue shark stomachs examined, 58 (89%) contained food consisting almost exclusively of squid and a pelagic octopus called *Alloposus mollis*. These two food items occurred in 72% of the stomachs with small amounts of fish remains occurring in 49%. The average stomach content amounted to about 8 oz of food. A comparison of stomach contents from the Shelf-Slope and Gulf Stream samples showed that the Gulf Stream sharks fed on a greater variety of fish species but that squid was still the dominant food. The average weight of food in these samples was 12 oz as opposed to an average of 3 oz in the Shelf-Slope samples.

On the *Darana R* and first *Wieczno* cruise, sharks accounted for 80% (260) of the catch that included blue sharks (135), night sharks (91), spiny dogfish (15), makos (10), and 3 miscellaneous species (dusky, silky, bigeye thresher). Unusual catches included a large Atlantic manta ray and a pelagic stingray. The latter is a relatively small (1-2 ft disc width), plum colored species that occurs near the surface in the open ocean. Another unusual "catch" was

(Continued on page 6)

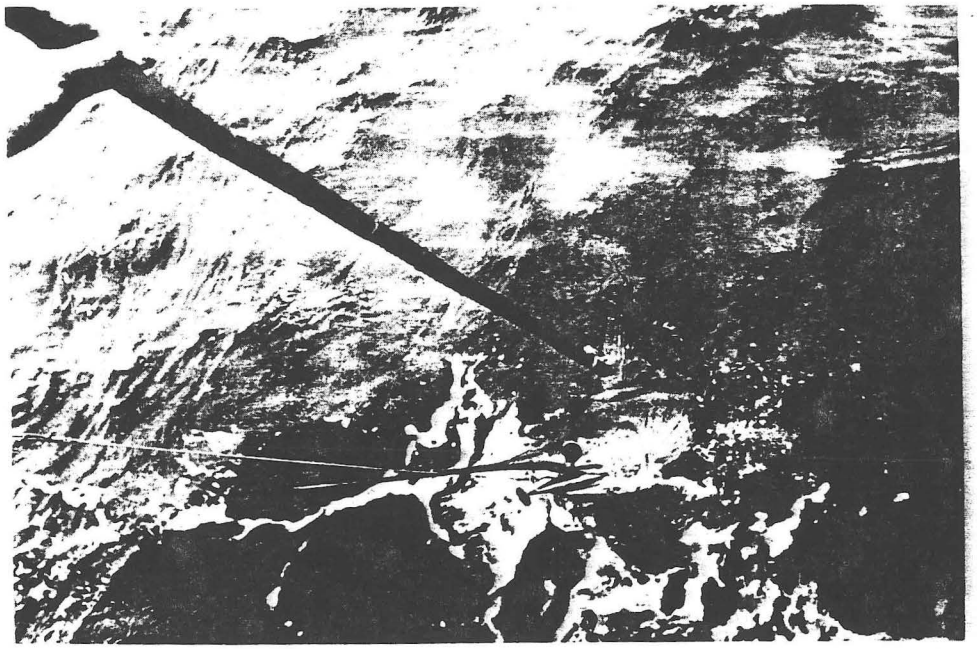


Photo by Alan Lintala

SWORDFISH FOOD HABITS

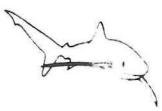
Although the major thrust of our research is oriented toward studying the biology of the larger sharks occurring in the Northwestern Atlantic, other apex predators (swordfish, tuna, marlin) are sampled opportunistically. Results of such examinations of swordfish are presented here.

Over the past 6 years, stomachs from 182 swordfish have been examined during cruises aboard research and commercial vessels and at selected sport fishing tournaments held in New Jersey and Long Island, N.Y. The sampling areas extend along the edge of the continental shelf from Cape Hatteras, N.C., to the Tail of the Grand Banks.

Of those stomachs examined, 162 (89%) contained food ranging in amounts from a few ounces to 20 pounds. The overall average was 1.4 pounds and is equivalent to 1.1% of the average body weight (128 lb), which is within the 1-3% range observed in most fish food habit studies. Those stomachs from the northern part of the area (Hudson Canyon to the Tail of the Grand Banks) contained an average of 2.3 lb of food while those from Hudson Canyon south to Cape Hatteras contained 1.1 lb. The disparity in average food volumes results from the fact that although squid comprise almost 60% of the diet in the southern area, squid flesh is rapidly digested and only the beaks remain in the stomachs. Thus, the measurable food volume in a stomach is low.

Our data show that a variety of squid species, dominated by the shortfin squid, *Illex illecebrosus*, is the primary food throughout the sampling area, occurring in 82% of the stomachs examined. Canadian studies of swordfish feeding habits in the Georges Bank to Grand Banks area have shown squid to be important in the diet, but secondary to fish. The primary fish species consumed by swordfish in our study are gadids (red and silver hake), butterfish, mackerel, bluefish, herring, and a variety of mesopelagic species. The latter are small (2-8 inches), usually dark-colored fishes that occur in mid-water depths between 80-500 fathoms. Many of them demonstrate daily vertical migrations of hundreds of feet between dusk and dawn. Recent radio telemetry experiments conducted by Dr. Frank Carey of the Woods Hole Oceanographic Institution show that vertical diurnal movements of some swordfish from near the surface to about 327 fathoms coincides with the daily movements of many mesopelagics. Feeding, however, may be incidental to the more important aspect of maintaining a particular light level as suggested by Carey's experiments.

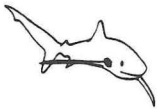
The daily food requirements of most fish is difficult to measure. This is particularly true for large species that cannot be maintained in captivity. Approximations, however, can be calculated. From our data we know that the average stomach content in swordfish amounts to 1.4 lb of food. Using this value and the assumption that it takes from 36 to 48 hours (from our mako studies) to evacuate 90% of the original food from the stomach, a predicted daily ration of 1.5 to 2.0 lb of food was calculated for the average swordfish. Taking this a step further, the total yearly food consumption per fish is approximately 566 to 790 lb, or 4.4 to 6 times the average body weight (128 lb) per year.



CRUISES *(Continued from page 5)*

five pilot whales that were tangled in the gear. These animals rarely tangle in the line and this may have occurred when an unusually large number of whales were present in the fishing area. The five had the mainline tangled around their tail flukes but all were cleared and released in good condition.

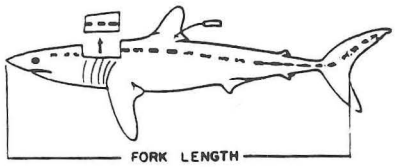
The second cruise aboard the *Wieczno* involved sonic tracking experiments of sharks by Dr. Frank Carey of the Woods Hole Oceanographic Institution. In the area between Cape Hatteras and Wilmington Canyon, a blue, bigeye thresher, and scalloped hammerhead were tracked for up to 30 hours over distances of 20 miles and averaged speeds of 0.7 knots. The blue shark's vertical excursions in the water column reached depths of 225 meters, confirming a pattern observed in a previous experiment. The hammerhead shark stayed in the mixed layer near the thermocline and remained in the same area of release. The bigeye thresher shark also remained in the release area but selected for a narrow temperature range of 14.0° to 14.5°C. In addition to these experiments, 100 sharks were tagged and stomach samples were obtained from 20 sharks for our food studies.



REQUEST FOR BACKBONES OF RECAPTURED SHARKS

The high numbers of sharks currently being recaptured by taggers offers a unique opportunity for you to assist us with age studies.

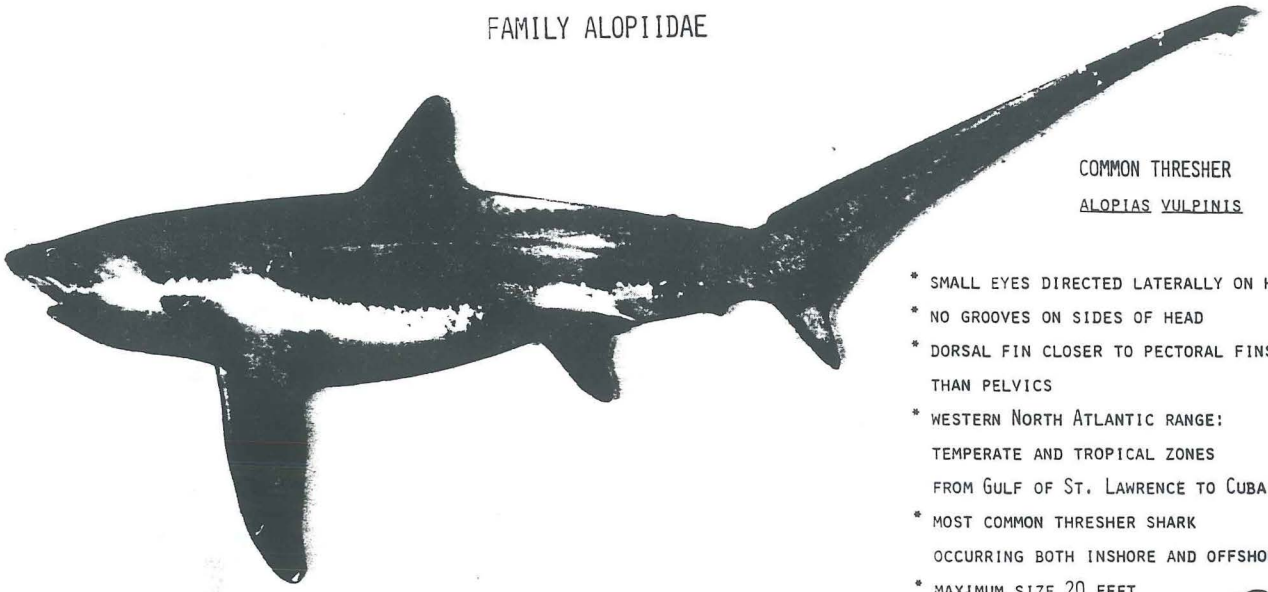
IF YOU CATCH A TAGGED SHARK



1. Measure fork length.
2. Record tag number and recapture details (date, location, sex, etc.).
3. Remove a 6 to 10 inch piece of backbone from over gills.
4. Freeze backbone overnight or pickle in rubbing alcohol.
5. Double wrap in plastic bags and airmail:
   Attention Shark Project
   Open Immediately
6. Telephone if you have any questions (401-789-9326).

ATLANTIC THRESHER SHARKS

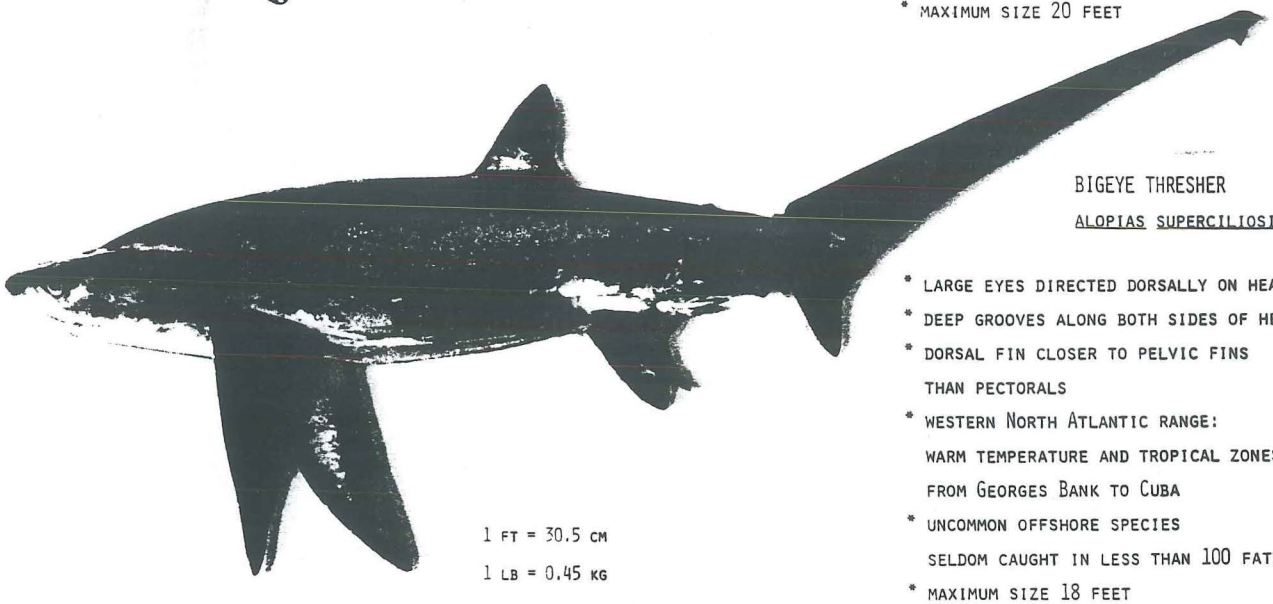
FAMILY ALOPIIDAE



COMMON THRESHER

ALOPIAS VULPINIS

* SMALL EYES DIRECTED LATERALLY ON HEAD
* NO GROOVES ON SIDES OF HEAD
* DORSAL FIN CLOSER TO PECTORAL FINS THAN PELVICS
* WESTERN NORTH ATLANTIC RANGE: TEMPERATE AND TROPICAL ZONES FROM GULF OF ST. LAWRENCE TO CUBA
* MOST COMMON THRESHER SHARK OCCURRING BOTH INSHORE AND OFFSHORE
* MAXIMUM SIZE 20 FEET



BIGEYE THRESHER

ALOPIAS SUPERCILIOSIS

* LARGE EYES DIRECTED DORSALLY ON HEAD
* DEEP GROOVES ALONG BOTH SIDES OF HEAD
* DORSAL FIN CLOSER TO PELVIC FINS THAN PECTORALS
* WESTERN NORTH ATLANTIC RANGE: WARM TEMPERATURE AND TROPICAL ZONES FROM GEORGES BANK TO CUBA
* UNCOMMON OFFSHORE SPECIES SELDOM CAUGHT IN LESS THAN 100 FATHOMS
* MAXIMUM SIZE 18 FEET

1 FT = 30.5 CM

1 LB = 0.45 KG

SHARK IDENTIFICATION

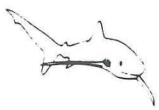
Atlantic Thresher Sharks
(Family Alopiidae)

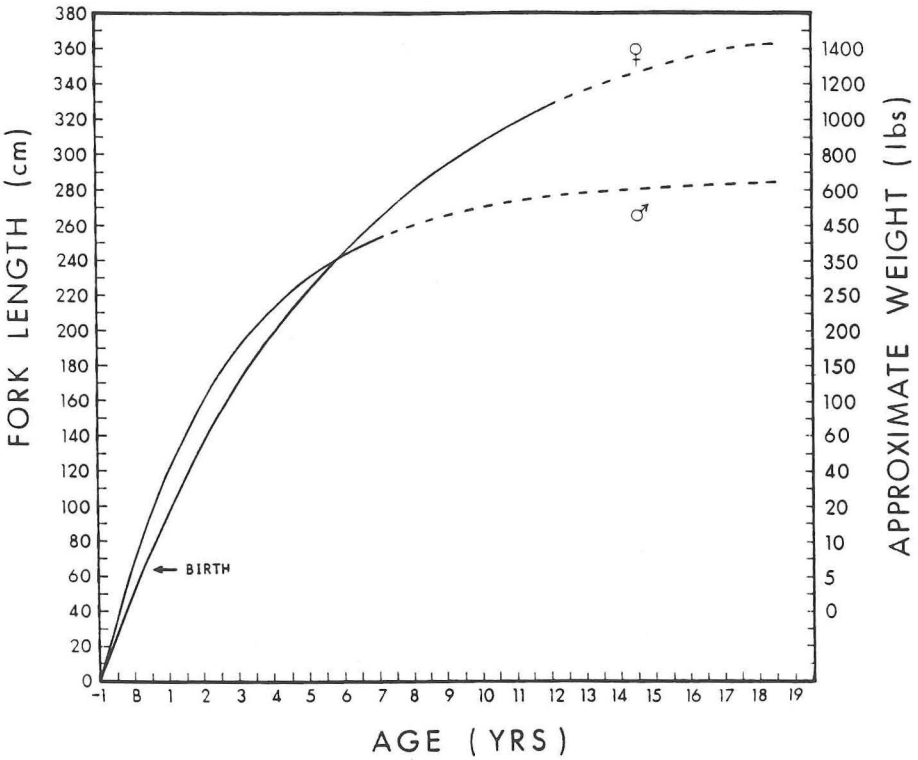
The most distinguishing charactertistic of the thresher sharks are their enormously long, sickle-shaped tails. Only two species occur in the Atlantic, the common and bigeye thresher. Threshers have small mouths with small teeth in relation to body length. Their second dorsal fin, and anal fin, are very small.

Threshers feed mostly on small schooling fishes. They have been reported to use their long tails to herd and stun their prey. Threshers give birth to 2-4 young, which are approximately 3.5-4 feet total length at birth.

•Common thresher• Common threshers occur along the Atlantic coast, both inshore and offshore. They have been observed as far north as the Gulf of St. Lawrence from the spring to the fall. Common threshers account for 99% of the threshers caught off the Atlantic coast on sport gear. Historical reports suggest the common thresher was one of the most abundant sharks in the area from Cape Hatteras to Cape Cod. Our observations over the past twenty years suggest that the thresher shark may go through long cycles of abundance and decline. More common threshers were taken by sportsmen off the Middle Atlantic States in the past 5 years than in the previous 15 years. However, the total number of thresher sharks taken by U.S. sportsmen in the Atlantic is still probably less than 50 per year.

•Bigeye thresher• The bigeye thresher is a little-known species that is rarely caught by sport fishermen. They inhabit the edges of the continental shelf and the open ocean. Some are taken by longliners every year, particularly between April and June off Cape Hatteras, N.C. However, the center of abundance of the bigeye thresher is probably off the northern coast of Cuba and in the Straits of Florida, where more are taken on commercial gear (and recently on sport tackle) than anywhere in the Atlantic.





AGE AND GROWTH OF THE SHORTFIN MAKO

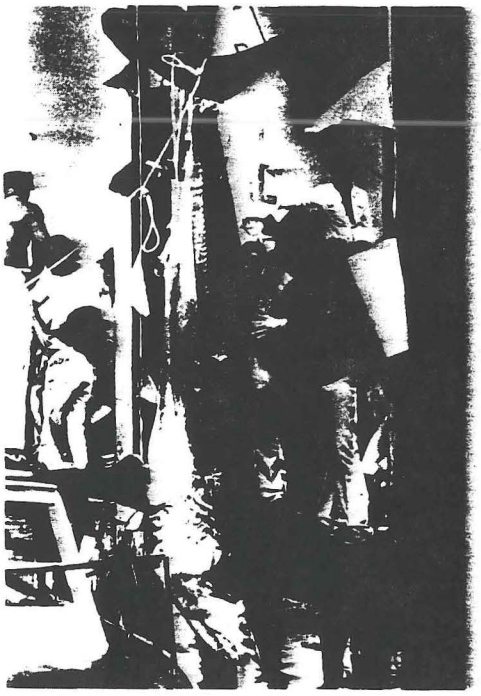
Age and growth information are fundamental to understanding and managing animal populations. Although there have been some intensive studies on age in sharks, little of this work has been directed toward the large pelagic sharks. The shortfin mako, *Isurus oxyrinchus*, is an important member of the pelagic community in temperate waters of the world ocean. There have been no formal attempts to age it. Pratt and Casey have been deliberately working toward this end for several years. We have used four techniques to reveal the mako's age. Growth of very young sharks can be determined when length-weight information is arranged monthly. Makos in their first year of life grow 40-50 cm fork length (FL). Forty-five tagged and recaptured makos that had usable growth information indicated an overall growth rate of 31 cm/yr. Length-frequency information from 16 years of tournament sampling, and an analysis of vertebral rings completed the study and yielded the age and growth estimates depicted in the figure on this page.

The shortfin mako is a fast-growing species in which males and females show similar growth rates but different life expectancies. Males mature at 3 years and live at least to age 5 at which time they are 220 cm (250 lb). Female makos mature at 8 years, (270 cm 550 lb) live at least to age 11 and reach 330 cm (1100 lb). Results will be completed this year and published during the winter of 1982-83.

This is another area of our research that cooperative sport fishermen have helped us implement. We would like to thank those of you who have tagged makos, allowed us to dissect your valuable catch to obtain backbones, and acknowledge the many people who are instrumental in record keeping at tournaments — Thank you.

Mako in first year of life (10 lb, 75 cm)

Immature female mako (518 lb, 267 cm)



Mature female mako (1039 lb, 339 cm)

Photos by LINTALA/PRATT