

# THE SHARK TAGGER 1986 SUMMARY

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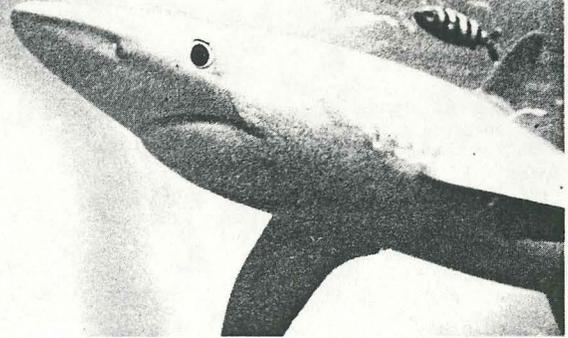


PHOTO BY H. W. PRATT



## 1986 OVERVIEW

- THREE SANDBAR SHARKS RECAPTURED AFTER 20+ YEARS
- NEW TIME AT LIBERTY RECORD—21.3 YEARS FOR A SANDBAR SHARK
- MAKO SHARK SETS SPEED RECORD—36 MILES PER DAY
- FIRST TAG RETURN FROM A GREAT HAMMERHEAD SHARK
- BLUE SHARK TRAVELS 1000 MILES FROM ATLANTIC INTO MEDITERRANEAN
- FIRST COMPREHENSIVE SHARK SURVEY OF THE U.S. EAST COAST
- THREE GIANT WHITE SHARKS CAUGHT OFF NEW YORK

A total of 5,013 fish were tagged during 1986 under the Cooperative Shark Tagging Program. These included 34 species of sharks and 14 species of bony fishes (Table 1). The number of releases last year were about 2,000 fewer than in 1985 and 1,200 more than in 1984. The differences in the numbers of fish tagged over the past few years are due primarily to fluctuations in the number of tagged blue sharks. Total releases last year were about average for the past ten years. Sport fishermen ac-

*(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.



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

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Table 1. Summary of sharks and teleosts tagged, January-December 1986.

SPECIES	TAGGED BY		TOTALS
	COOPERATIVE TAGGERS	NARRAGANSETT BIOLOGISTS	
Blue shark	2,615	25	2,640
Sandbar shark	524	273	797
Dusky shark	189	2	191
Tiger shark	160	20	180
Shortfin mako shark	172	2	174
Lemon shark	138	0	138
Atlantic sharpnose shark	64	36	100
Scalloped hammerhead shark	59	27	86
Blacktip shark	62	0	62
Nurse shark	57	0	57
Reef shark	55	0	55
Porbeagle shark	35	0	35
Sand tiger shark	27	0	27
Great hammerhead shark	24	1	25
Night shark	3	19	22
Bigeye thresher shark	14	7	21
Bonnethead shark	15	0	15
Silky shark	7	6	13
Spinner shark	12	0	12
Basking shark	11	0	11
Bignose shark	4	6	10
Blacknose shark	10	0	10
Bull shark	7	0	7
Common thresher shark	7	0	7
Smooth dogfish shark	4	2	6
Finetooth shark	4	0	4
Greenland shark	3	0	3
Angel shark	2	0	2
Longfin mako shark	2	0	2
Smooth hammerhead shark	2	0	2
Oceanic whitetip shark	1	0	1
Spiny dogfish shark	1	0	1
White shark	1	0	1
Small tail shark	1	0	1
Hammerhead unspecified	13	0	13
Sand unspecified	8	0	8
Thresher unspecified	5	0	5
Blacktip unspecified	4	0	4
Carcharhinus unspecified	3	0	3
Dogfish unspecified	1	0	1
Miscellaneous*	4	7	11
Total sharks	4,330	433	4,763
Teleosts			
Swordfish	128	0	128
White marlin	74	2	76
Yellowfin tuna	14	2	16
Sailfish	8	0	8
Blue marlin	7	0	7
Striped marlin	5	0	5
Bluefin tuna	1	0	1
Miscellaneous	5	4	9
Total teleosts	242	8	250
Grand Total	4,572	441	5,013

\*Includes species reported as "shark".

*(Overview 1986 continued)*

counted for 47% of the releases followed by U.S. foreign fisheries observers (33%), NMFS and other biologists (12%) and U.S. commercial fishermen (8%). The countries of origin of the vessels from which sharks were tagged and released

**Cover Photo**—N. Kohler, C. Stillwell, and J. Casey releasing tagged blue shark on R/V WIECZNO. Photo by G. Skomal.

were U.S. (sport and commercial) 58%, Japan (U.S. observers aboard tuna longliners) 29%, Poland (R/V *Wieczno*) 9% and Italy (U.S. observers aboard squid trawlers) 3%. The remaining releases were from vessels representing nine additional countries and island territories. The types of gear used in the capture of the fish prior to tagging were about equally divided between rod and reel (45%) and longline (49%) with trawl nets, gillnets, handlines and fish tagged while free swimming making up the remainder.

The total number of fish recaptured in 1986 was 242 including 21 species of sharks (Table 2). This is a near record number of recaptures (256 in 1985) and provided new information on several species. The sources of the recaptures were from: anglers (45%), commercial fishermen (36%), U.S. observers on foreign vessels (10%) and NMFS and other biologists (9%). Tags were returned from fishermen representing the following 19 countries and territories: United States (168), Japan (27), Spain (14), Mexico (7), Taiwan (6), Canada (4), Cuba (2), Faroe Islands (2), Puerto Rico (2); and one each from Korea, Norway, Poland, USSR, Bahamas, Barbados, Venezuela, Bermuda, Grenada and Tobago.

Sharks recaptured in 1986 had originally been tagged by the following groups: anglers (55%), U.S. observers (19%), R/V *Geronimo* (10%), NMFS and other biologists (9%) and commercial fishermen (7%).

**BLUE SHARKS** (123 returns) were recaptured after a maximum time at liberty of three years and a maximum distance of 2,857 miles. Eleven blue sharks were retagged after the first tag had been retrieved. Five blue sharks showed west to east trans-Atlantic movements from North America to the Azores, Spain and Africa. Other blue sharks tagged between New Jersey and Georges Bank were recaptured over an area extending from the Grand Banks and the Flemish Cap, to Venezuela. We have discussed long-range movements of blue sharks in past newsletters and we will provide copies to new taggers on request. Although the 1986 recaptures did not include new records for time at liberty (maximum eight years in 1985), or maximum distance (3,740 miles in 1984) the 1986 returns are meaningful in other respects. Several blue sharks at liberty for over two years were recaptured close to where they were tagged off New York and southern New England. Others travelled long distances in a relatively short time. One blue shark tagged north of the Azores in late April was recaptured three months later (1,000 miles) in the Mediterranean Sea. This is the second tagged blue shark to show movement from the Atlantic into the Mediterranean. Other interesting blue shark returns included ten that came from Spanish longliners

fishing in the western Atlantic. Although we have previously received tags from Spanish fishermen, these have usually come from the eastern Atlantic. Information from U.S. fishermen and the Spanish returns show that U.S., Japanese and Spanish longliners are fishing the same areas along the northern margin of the Gulf Stream in the vicinity of the Grand Banks. Another interesting blue shark return was taken by a Russian tuna factory ship off Africa from which the Captain kindly telexed the recapture information directly to the NMFS Gloucester laboratory. We also heard from a Taiwanese fisherman who wanted "T" shirts (which we don't have) instead of the reward. Many foreign fishermen provided very detailed recapture information. Many U.S. fishermen who have discovered our program by catching a tagged shark are now tagging their catches. In 1986 we also received size measurements from blue shark recaptures that are invaluable to ongoing age studies.

**SANDBAR SHARKS** (16 returns) were recaptured after a maximum time at liberty of 21.3 years and a maximum distance of 1,578 miles. Twenty-one years at liberty represents a new record for any species tagged under our program. The fish was tagged by C. Stillwell at Great Machipongo Inlet, VA in June 1965 and was recaptured by a commercial shark fisherman off Tarpon Springs, FL in October 1986. Two additional sandbar sharks were recaptured in 1986 after 20+ years at liberty, one tagged by C. Stillwell at Great Machipongo Inlet, in June 1966 was recaptured by a commercial fisherman off St. Petersburg, FL in November 1986. The other was tagged in Delaware Bay by J. Casey in July 1965 and recaptured off Ponce Inlet, FL in March 1986.

Excluding two individuals tagged and recaptured in 1986 the average time at liberty for sandbar returns was ten years. The tags on the three, 20+ year returns were plastic fin tags (Roto-tags) attached through the first dorsal fin. These were badly worn and would not have lasted much longer. Also the address on these tags was unreadable. Fortunately the fishermen knew about our program. As we reported last year, dart tags have remained on sandbar sharks for over 19 years and were in good condition. It is

often difficult to tell how long a fish has been at liberty from the condition of the tag. If you catch a tagged shark or hear of someone who has, do not hesitate to telephone us (collect 401-782-3200) for instructions.

New insights about the movements of the sandbar sharks are provided by evidence that 44% of the sandbar returns came from fish that were tagged off the Northeast coast and were recaptured off Florida's east coast or in the Gulf of Mexico. Although the sandbar shark is distributed primarily in inshore waters of the continental shelf (Page 9), they obviously travel beyond the shelf on occasion. One recaptured off Cuba after six years was the third sandbar shark to demonstrate movement across the Florida Straits. One interesting aspect of the 1986 recaptures is that no sandbar sharks were returned from Mexico for the first time in seven years. This could be due simply to chance, or a decrease in fishing activity in Mexico or changes in the distribution of sandbar sharks there. We do not have an obvious explanation but we are continuing our attempts to expand cooperative shark studies with Mexican biologists. Joint U.S.-Mexican studies will help to answer some of the questions on sharks that are common to both countries.

Long distance movements by tagged fish are always interesting but those returns which show little movement, such as the recapture of a sandbar shark in the same New Jersey Bay after 12 years (Table 2), can be equally significant. In the 1960's we worked with commercial shark gillnetters and tagged hundreds of young (2-4 feet) sandbar sharks on their inshore nursery grounds in Virginia. In succeeding years some of those tagged sharks were recaptured in the same nets some after five years at liberty. Although the relationship between nursery areas and the health of any stock of sharks has not been studied intensively, inshore nursery grounds are quite specific for some segments of the sandbar shark population and perhaps for other species as well.

**MAKO SHARKS** (17 returns) were recaptured after four years at liberty and over a maximum distance of 1,906 miles. Nearly all the recaptures (13) came from makos tagged by U.S. foreign fisheries observers aboard Japanese longline vessels.

Four of the returns show movements from the Middle Atlantic Bight (between North Carolina and Georges Bank) to the Grand Banks-Flemish Cap region. One of two makos tagged by U.S. longliners in the Grand Banks-Flemish Cap region was recaptured there after a year, the other was recaptured off New Jersey after four years. Four of the long distance mako returns were recovered by Spanish longliners. Other long distance returns include a mako tagged off New England and recaptured near Green Turtle Cay in the Bahamas and one tagged off North Carolina that was recaptured 48 miles northeast of Georges Bank.

The fastest rate of travel shown by a tagged mako was 36 miles per day (1,321 miles in 37 days) between Veatch Canyon and approximately 175 miles east of the Flemish Cap. This is preliminary data in that we are awaiting confirmation of the exact recapture position. This rate is reasonable and it exceeds our previous record of 27 miles per day (1,714 miles in 64 days) by a blue shark in 1969.

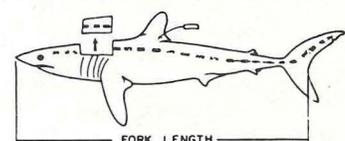
A few points worth reemphasizing about makos are: 1) most of the tagging is being done by fisheries observers and commercial fishermen, 2) recaptures have come from U.S. anglers as well as commercial

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#### 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  
(401-782-3200)

Table 2. Tag recoveries: January-December 1986

SPECIES	TAGGED	GENERAL LOCATIONS	RECAPTURED	MONTHS/ LIBERTY	DIST. & DIR. TRAVELLED	CAPTURE METHOD TAGGING RECAPT.	TAGGER	TAGGED BY	RESIDENCE
Blue shark	SE Pt Judith, RI		SE Pt Judith, RI	13	20 SE	RR	BT	Charlie Donilon	RI
"	SE Shinnecock Inlet, NY		SE Moriches Inlet, NY	11	8 W	RR	RR	James Gubista	NY
"	S Pt Judith, RI		SE Pt Judith, RI	13	46 NE	HL	TN	Rodman Sykes	RI
"	S Shinnecock Inlet, NY		SE Montauk Pt, NY	<1	50 NE	RR	RR	Bill Dunn	NY
"	SE Pt Judith, RI		SE Montauk Pt, NY	<1	21 S	LL	RR	Biologist (NMFS)	RI
"	SE Fire Island Inlet, NY		SSE Moriches Inlet, NY	2	25 E	RR	RR	Bill Haga	NY
"	S Oceanographer Canyon		SE Veatch Canyon	11	45 W	LL	LL	Roger Dow, NMFS Obs	MA
"	SW Block Canyon		S Powell Canyon	11	189 E	FS	LL	Robin Lehman	NY
"	S Veatch Canyon		S Veatch Canyon	0	0	LL	LL	Walter Quinn, NMFS Obs.	MA
"	E Atlantic City, NJ		S Munson Canyon	2	308 E	RR	LL	Ralph Leyrer	NJ
"	SE Veatch Canyon		SE Veatch Canyon	<1	14 W	LL	LL	Walter Quinn, NMFS Obs.	MA
"	SE Pt Judith, RI		SE Oceanographer Canyon	1	175 E	RR	LL	Joe Pagano	RI
"	S Oceanographer Canyon		SE Flemish Cap	21	1164 E	LL	LL	J. Cahill, NMFS Obs.	MA
"	SW Oceanographer Canyon		SE Flemish Cap	9	1230 NE	LL	LL	Pat Michalik, NMFS Obs.	MA
"	S Montauk Pt, NY		S Oceanographer Canyon	4	172 E	RR	LL	Frank Mundus	NY
"	SE Montauk Pt, NY		S Baltimore Canyon	16	203 SW	RR	LL	Frank Braddick	NY
"	W Block Canyon		SE Oceanographer Canyon	11	185 E	LL	LL	Lou Puskas	NJ
"	SE Pt Judith, RI		S Hydrographer Canyon	39	104 SE	HL	LL	Stephen Connett	RI
"	S Veatch Canyon		SE Munson Canyon	23	166 E	LL	LL	Martin Williamowsky, NMFS Obs.	MA
"	S Pt Judith, RI		S Powell Canyon	2	189 E	RR	LL	Al Anderson	RI
"	SE Munson Canyon		S Munson Canyon	<1	23 SW	LL	LL	Martha Rowan, NMFS Obs.	MA
"	S Montauk Pt, NY		SE Powell Canyon	2	210 E	RR	LL	Charles Berwind	NY
"	S Montauk Pt, NY		SE Powell Canyon	3	224 E	RR	LL	Ron DiCostanzo	NY
"	SE Lydonia Canyon		S Munson Canyon	16	23 E	LL	LL	Rene Eppi, NMFS Obs.	MA
"	S Munson Canyon		S Powell Canyon	<1	33 SW	LL	LL	David Gallagher, NMFS Obs.	MA
"	S Hydrographer Canyon		NW Corsair Canyon	2	185 NE	LL	RR	Martha Rowan, NMFS Obs.	MA
"	S Shinnecock Inlet, NY		SE Montauk Pt, NY	3	57 E	RR	RR	Bill Imperiale	NY
"	S Montauk Pt, NY		Georges Bank	1	NR	RR	SD	Stephen Babbitz	CT
"	SE Ocean City, MD		NE Cape Ann, MA	15	346 NE	RR	HL	Rick Carney	DE
"	S Powell Canyon		N St. Phillips, Tobago, W. Indies	13	1711 S	LL	RR	Georg Hinteregger, NMFS Obs.	MA
"	S Shinnecock Inlet, NY		SW Veatch Canyon	4	124 E	RR	LL	Cliff Burnett	NY
"	SE Veatch Canyon		NE Blanquilla Is., Venezuela	3	1670 S	LL	LL	Georg Hinteregger, NMFS Obs.	MA
"	S Fire Island Inlet, NY		SE Fire Island Inlet, NY	3	23 E	RR	RR	Joe Winter	NY
"	S Powell Canyon		SE Pt Judith, RI	9	158 NW	LL	HL	Pat Michalik, NMFS Obs.	MA
"	S Martha's Vineyard, MA		SE Hydrographer Canyon	28	108 SE	LL	LL	Stephen Connett	RI
"	Gilbert Canyon		E Hydrographer Canyon	1	41 SW	LL	LL	Frank Carey	MA
"	S Hudson Canyon		S Block Canyon	<1	72 E	LL	LL	Lou Puskas	NJ
"	NE Sao Miguel, Azores		S Cabo Sacratif, Spain	3	999 E	LL	LL	Butch Winter	FL
"	SE Martha's Vineyard, MA		SE Pt Judith, RI	23	48 W	LL	RR	Stephen Connett	RI
Blue shark	S Montauk Pt, NY		SE Montauk Pt, NY	1	18 NE	RR	RR	Frank Braddick	NY
"	E Manasquan Inlet, NJ		E Manasquan Inlet, NJ	1	41 W	RR	RR	Bob Baltrunas	NY
"	NE Cape Hatteras, NC		N Canary Is.	19	2839 E	LL	LL	M. Kirby, NMFS Obs.	MA
"	SSE Shinnecock Inlet, NY		SE Shinnecock Inlet, NY	1	16 N	RR	RR	Ray Hendrickson	NY
"	SE Block Island, RI		SE Montauk Pt, NY	12	28 W	LL	RR	Stephen Connett	RI
"	S Hydrographer Canyon		Baltimore Canyon	9	279 W	LL	RR	Georg Hinteregger, NMFS Obs.	MA
"	SE Block Island, RI		S Montauk Pt, NY	<1	40 W	RR	RR	Andy D'angelo	RI
"	SE Montauk Pt, NY		SE Block Island	2	20 N	RR	RR	Joseph McBride	NY
"	SE Block Island, RI		S Montauk Pt, NY	22	52 W	HL	RR	Stephen Connett	RI
"	S Block Island, RI		SE Block Island, RI	10	34 E	FS	HP	Rodman Sykes	RI
"	S Montauk Pt, NY		SE Jones Inlet, NY	<1	62 N	RR	RR	Ray Cadorette	NY
"	SE Martha's Vineyard, MA		Gilbert Canyon	12	94 E	HL	LL	Stephen Connett	RI
"	SE Pt Judith, RI		S Flemish Cap	25	1085 E	HL	LL	Stephen Connett	RI
"	SE Pt Judith, RI		SE Pt Judith, RI	10	16 NW	FS	RR	Rodman Sykes	NY
"	SE Fire Island Inlet, NY		Veatch Canyon	1	155 E	RR	LL	Ray Wittmann	RI
"	NR		SW Fire Island Inlet, NY	NR	NR	NR	RR	Michael D. Krokovic	NJ
"	S Pt Judith, RI		S Montauk Pt, NY	<1	18 SW	RR	RR	Joe Pagano	RI
"	SE Martha's Vineyard, MA		NNE Veatch Canyon	13	35 SE	HL	RR	Stephen Connett	RI
"	NE Little Egg Inlet, NJ		S Montauk Pt, NY	15	76 NE	RR	RR	Don Glover	NJ
"	SE Block Island, RI		S Montauk Pt, NY	2	38 SW	RR	RR	Andy D'angelo	RI
"	SE Moriches Inlet, NY		SE Rudee Inlet, VA	3	273 S	RR	LL	Harry T. Carter, Sr.	NY
"	S Martha's Vineyard, MA		S Montauk Pt, NY	12	64 W	HL	RR	Stephen Connett	RI
"	S Montauk Pt, NY		E Manasquan Inlet, NJ	<1	90 SW	FS	RR	Robert Weisz	NY
"	S Martha's Vineyard, MA		S Montauk Pt, NY	10	55 W	LL	RR	Stephen Connett	RI
"	SE Nygren Canyon		Lydonia Canyon	10	66 W	LL	LL	Biologist (NMFS)	RI
"	S Oceanographer Canyon		W Georges Canyon	11	103 N	LL	RR	Bob Thorwaldson, NMFS Obs.	MA
"	SE Martha's Vineyard, MA		W Cabo Finisterre, Spain	11	2512 E	FS	LL	Stephen Connett	RI
"	S Oceanographer Canyon		SE Montauk Pt, NY	2	160 NW	LL	RR	Martha Rowan, NMFS Obs.	MA
"	SE Montauk Pt, NY		SE Montauk Pt, NY	<1	14 S	RR	RR	Robert Weisz	NY
"	S Martha's Vineyard, MA		SE Montauk Pt, NY	3	36 W	HL	RR	Stephen Connett	RI
"	NR		S Montauk Pt, NY	NR	NR	NR	RR	John Gallagher	CT
"	S Hydrographer Canyon		S Block Canyon	22	103 SW	LL	LL	Janet Collins, NMFS Obs.	MA
"	S Hydrographer Canyon		S Hydrographer Canyon	<1	2 W	LL	LL	Georg Hinteregger, NMFS Obs.	MA
"	S Munson Canyon		NE Low Point, NS Canada	19	506 NE	LL	CJ	Georg Hinteregger, NMFS Obs.	MA
"	SSE Veatch Canyon		SE Veatch Canyon	<1	7 NE	LL	LL	Walter Quinn, NMFS Obs.	MA
"	SE Hydrographer Canyon		SE Flemish Cap	9	1173 E	LL	LL	Jay Taylor, NMFS Obs.	MA
"	SSE Moriches Inlet, NY		E Cape May, NJ	3	118 S	RR	RR	Louis Pastore	NY
"	S Martha's Vineyard, MA		E Oregon Inlet, NC	3	350 SW	LL	LL	Stephen Connett	RI
"	NE Oregon Inlet, NC		ENE Oregon Inlet, NC	8	30 S	LL	LL	Biologist (NMFS)	RI
"	SE Jones Inlet, NY		E Oregon Inlet, NC	6	279 S	RR	LL	Jesse York	NY
"	SE Cape May, NJ		NE Oregon Inlet, NC	7	136 S	RR	LL	David Cagnetti	PA
"	S Martha's Vineyard, MA		ESE Bermuda	6	734 SE	LL	LL	Stephen Connett	RI
"	SE Hydrographer Canyon		ENE Bermuda	4	529 SE	LL	LL	Anne Matherne, NMFS Obs.	MA
"	SSE Veatch Canyon		NE Cayenne, Fr Guiana	3	2124 SE	LL	LL	A. Poshkus, NMFS Obs.	MA
"	SE Block Canyon		ENE Bermuda	6	592 SE	LL	LL	Georg Hinteregger, NMFS Obs.	MA
"	SW Martha's Vineyard, MA		Oceanographer Canyon	6	147 E	RR	LL	Fred Gallagher	RI
"	SE Hydrographer Canyon		SW Dakar, Senegal	27	2857 SE	LL	LL	Rene Eppi, NMFS Obs.	MA

Table 2. Continued

SPECIES	TAGGED	GENERAL LOCATIONS	RECAPTURED	MONTHS/ LIBERTY	DIST. & DIR. TRAVELLED	CAPTURE METHOD TAGGING RECAPT.	TAGGER	TAGGED BY	RESIDENCE
Blue shark	N Recife, Brazil	S Dakar, Senegal		16	900 E	LL LL	A. Ropelewski		Poland
"	NR	S Montauk Pt, NY		NR	NR	RR RR	Michael J. Plesch		NY
"	S Block Island, RI	SSE Nantucket, MA		2	25 E	RR RR	Charlie Donilon		RI
"	S Shinnecock Inlet, NY	S Fire Island Inlet, NY		<1	33 SW	RR RR	Bill Williams		NY
"	SE Moriches Inlet, NY	E Atlantic City, NJ		11	83 SW	RR RR	Louis Pastore		NY
"	SSE Shinnecock Inlet, NY	SE Rockaway Inlet, NY		<1	61 SW	RR RR	Ray Hendrickson		NY
"	SE Pt Judith, RI	SSE Montauk Pt, NY		10	30 SW	FS RR	Charlie Donilon		RI
"	SE Fire Island Inlet, NY	SE Moriches Inlet, NY		<1	25 N	RR RR	Bob McReynolds		NY
"	S Block Island, RI	S Montauk Pt, NY		<1	20 SW	RR RR	Edmund Sterniak		CT
"	S Martha's Vineyard, MA	SE Montauk Pt, NY		10	48 W	LL RR	Stephen Connett		RI
"	SSE Moriches Inlet, NY	SE Montauk Pt, NY		36	64 NE	FS RR	Butch Arsenault		NY
"	SE Montauk Pt, NY	S Pt Judith, RI		8	17 NE	RR RR	Robert Hauser		CT
"	S Montauk Pt, NY	SSE Moriches Inlet, NY		6	45 NW	LL RR	Lou Puskas		NJ
"	SE Nantucket, MA	ESE Beach Haven, NJ		10	199 SW	HL RR	Stephen Connett		RI
"	S Montauk Pt, NY	SE Block Island, RI		<1	38 NE	FS RR	Bill HoJohn		NY
"	NR	SE Block Island, RI		NR	NR	NR RR	Joseph Ferraro		NY
"	S Hydrographer Canyon	NW Azores		10	1502 E	LL LL	Dan Driscoll		NY
"	NE Azores	ENE Azores		<1	117 S	LL LL	Butch Winter		FL
"	SE Shinnecock Inlet, NY	E Cape May, NJ		<1	137 SW	RR RR	Bill Williams		NY
"	SE Fire Island Inlet, NY	E Cape May, NJ		1	79 SW	RR RR	Joe Rubino		NY
"	SE Cape May, NJ	SE Fire Island Inlet, NY		<1	142 NE	RR RR	Bill Garrison		NJ
"	NE Little Egg Inlet, NJ	NNW Block Canyon		1	81 E	RR LL	Tom Knoble		NJ
"	SSE Shinnecock Inlet, NY	SE Pt Judith, RI		13	63 NE	RR LL	Ray Hendrickson		NY
"	SW Montauk Pt, NY	S Montauk Pt, NY		<1	48 NE	RR RR	Arthur Raskin		NY
"	NNW Azores	S Cabo Finisterre, Spain		1	606 E	LL LL	Butch Winter		FL
"	S Montauk Pt, NY	SE Fire Island Inlet, NY		<1	59 SW	RR RR	Jim Humphrey		CT
"	SSE Montauk Pt, NY	SE Montauk Pt, NY		<1	75 NE	RR RR	Bob McReynolds		NY
"	W Block Canyon	SE Montauk Pt, NY		6	62 N	LL RR	Lou Puskas		NJ
"	SE Montauk Pt, NY	SE Pt Judith, RI		<1	24 E	RR HP	Stephen Babbitz		CT
"	SE Block Island, RI	S Shinnecock Inlet, NY		11	71 W	RR RR	George Lockhart		RI
"	SW Shinnecock Inlet, NY	NR		<1	NR	RR RR	Robin Lehman		NY
"	SW Montauk Pt, NY	SW Fire Island Inlet, NY		<1	68 W	FS RR	Floyd Carrington		NY
"	S Hydrographer Canyon	W Sao Miguel, Azores		6	1365 E	LL LL	Pat Michalik, NMFS Obs.		MA
"	S Hydrographer Canyon	NR		NR	NR	LL LL	Georg Hinteregger, NMFS Obs.		MA
"	SE Pt Judith, RI	Grenada, West Indies		16	1762 S	LL NR	Stephen Connett		RI
"	S Martha's Vineyard, MA	E Martha's Vineyard, MA		26	75 NE	LL GN	Stephen Connett		RI
Mako shark	SSE Lydonia Canyon	Green Turtle Cay, Bahamas		13	815 SW	LL LL	Georg Hinteregger, NMFS Obs.		MA
"	SE Montauk Pt, NY	SE Ocean City, MD		9	209 SW	RR RR	Charles Joscher		NY
"	S Powell Canyon	NW Azores		18	1338 E	LL LL	Brad Chase, NMFS Obs.		MA
"	E Oregon Inlet, NC	SSE Montauk Pt, NY		18	305 NE	LL RR	M. Kirby, NMFS Obs.		MA
"	NE Oregon Inlet, NC	SE Cape May, NJ		4	168 N	LL RR	Georg Hinteregger, NMFS Obs.		MA
"	SSE Veatch Canyon	SE Ocean City, NJ		19	226 W	LL RR	Tom Baum, NMFS Obs.		MA
"	E Walkers Canyon	E Manasquan Inlet, NJ		10	210 W	LL RR	Georg Hinteregger, NMFS Obs.		MA
"	SE Moriches Inlet, NY	Norfolk Canyon		31	235 SW	RR RR	Pat Martin		NY
"	SW Oceanographer Canyon	SE Flemish Cap		15	1237 NE	LL LL	Jerzy Cygler, NMFS Obs.		MA
"	NE Atlantis Canyon	S Montauk Pt, NY		50	66 W	LL RR	John Rosapepe, NMFS Obs.		MA
"	ENE Oregon Inlet, NC	NE Corsair Canyon		20	592 NE	LL LL	Jay Taylor, NMFS Obs.		MA
"	Oceanographer Canyon	S Montauk Pt, NY		48	180 W	LL RR	Robert Doane, NMFS Obs.		MA
"	SW Flemish Cap	SE Manasquan Inlet, NJ		49	1055 W	LL RR	Philip Ruhle		RI
"	E Flemish Cap	Flemish Cap		11	167 W	LL LL	Butch Winter		FL
"	SE Hydrographer Canyon	Norfolk Canyon		4	318 SW	LL LL	Georg Hinteregger, NMFS Obs.		MA
"	E Oregon Inlet, NC	E Flemish Cap		19	1906 NE	LL LL	M. Kirby, NMFS Obs.		MA
"	SE Veatch Canyon	E Flemish Cap		1	1321 NE	LL LL	Martha Rowan, NMFS Obs.		MA
Sandbar shark	ESE Barnegat Inlet, NJ	E Ponce Inlet, FL		81	724 SW	RR LL	H. Leigh Brethauer		NJ
"	SW Villas, NJ	E Ponce Inlet, FL		248	662 SW	LL LL	Biologist (NMFS)		RI
"	E Barnegat Inlet, NJ	E Georgetown, SC		94	481 SW	LL GN	Biologist (NMFS)		RI
"	Great Bay, NJ	SW Pensacola, FL		165	1578 SW	RR RR	Bob Mangold		FL
"	S Fire Island Inlet, NY	W Crystal River, FL		114	1480 SW	RR LL	Nat Mizrahi		NY
"	S Shinnecock Inlet, NY	S Pt Judith, RI		61	67 NE	RR RR	Ray Hendrickson		NY
"	New Inlet, VA	Queen Sound, VA		<1	23 E	RR RR	George Reiger		VA
"	N Cape Hatteras, NC	S Shinnecock Inlet, NY		16	366 N	LL LL	Biologist (NMFS)		RI
"	NNW Oregon Inlet, NC	SE Atlantic City, NJ		73	197 N	TN RR	Robert Guthrie		NC
"	Great Machipongo, VA	E Tarpon Springs, FL		256	686 SW	GN LL	Biologist (NMFS)		RI
"	Great Bay, NJ	Great Bay, NJ		143	1 NW	RR RR	Bob Mangold		FL
"	Rodanthe, NC	Cape Lookout, NC		12	82 SW	RR PS	Bill Moffett		VA
"	NE Ft. Pierce, FL	S Cabo Francis, Cuba		76	408 SW	LL LL	Stephen Connett		RI
"	Great Machipongo, VA	NW St. Petersburg, FL		245	686 SW	GN LL	Biologist (NMFS)		RI
"	Flagler Beach, FL	Flagler Beach, FL		<1	0	RR RR	Gary Lange		FL
"	S Shinnecock Inlet, NY	W Sarasota, FL		58	1414 SW	RR LL	Ray Hendrickson		NY
Lemon shark <sup>a</sup>	Ponte Vedra, FL	NE Daytona, FL		46	48 SE	RR LL	Steve McEvoy		FL
"	Long Point Key, FL	Long Point Key, FL		3	0	RR RR	William Botten		FL
"	Grassy Key, FL	Long Key, FL		10	8 E	RR HN	William Botten		FL
"	Fat Deer Key, FL	N Marathon, FL		13	13 W	RR RR	William Botten		FL
"	Grassy Key, FL	Grassy Key, FL		1	1 N	RR RR	William Botten		FL
"	Big Pine Key, FL	Elliott Key, FL		2	78 NE	RR RR	William Botten		FL
"	Long Point Key, FL	Long Point Key, FL		1	0	RR RR	William Botten		FL
"	No Name Key, FL	No Name Key, FL		<1	0	RR GN	William Botten		FL
"	Big Pine Key, FL	Big Pine Key, FL		1	0	RR GN	William Botten		FL
"	Fat Deer Key, FL	Fat Deer Key, FL		1	0	RR GN	William Botten		FL
"	Big Pine Key, FL	Big Pine Key, FL		3	0	RR GN	William Botten		FL
"	Big Pine Key, FL	Big Pine Key, FL		3	0	RR GN	William Botten		FL
"	No Name Key, FL	No Name Key, FL		3	0	RR GN	William Botten		FL
"	Fat Deer Key, FL	Fat Deer Key, FL		16	0	RR RR	William Botten		FL
"	Fat Deer Key, FL	Grassy Key, FL		19	2 NW	RR RR	William Botten		FL
"	Long Point Key, FL	Long Point Key, FL		<1	0	RR RR	William Botten		FL
"	Long Point Key, FL	Long Point Key, FL		<1	0	RR GN	William Botten		FL

Table 2. Continued

SPECIES	TAGGED	GENERAL LOCATIONS	RECAPTURED	MONTHS/ LIBERTY	DIST. & DIR. TRAVELLED	CAPTURE METHOD TAGGING RECAPT.	TAGGER	TAGGED BY	RESIDENCE
Lemon shark	Long Point Key, FL		Long Point Key, FL	<1	0	RR GN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	1	0	RR GN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	<1	0	RR GN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	<1	0	RR GN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	<1	0	RR GN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	<1	0	RR GN	William Botten		FL
Tiger shark <sup>a</sup>	NW Boqueron, Puerto Rico		W Cabo Rojo, Puerto Rico	8	10 S	LL RR	Hector E. Dixon		P. Rico
"	ESE Ocean City, MD		SE Cape Fear, NC	5	332 SW	TN RR	Steven Slota, NMFS Obs.		MA
"	E Virginia Beach, VA		SE Fire Island Inlet, NY	1	240 NE	RR RR	John Thurston, Jr.		VA
"	Bimini, Bahamas		W Cat Cay, Bahamas	4	11 S	LL RR	Samuel Gruber		FL
"	NE Ponce Inlet, FL		NE Ponce Inlet, FL	<1	1 NE	LL LL	Tris Colket		FL
"	E Ponce Inlet, FL		E Ponce Inlet, FL	<1	12 W	LL LL	Tris Colket		FL
"	ENE Ponce Inlet, FL		N Dzilande Bravo, Mexico	2	777 SW	LL HL	Tris Colket		FL
"	Bimini, Bahamas		E Flagler Beach, FL	3	242 N	LL LL	Samuel Gruber		FL
"	SE Manasquan Inlet, NJ		SE Fire Island Inlet, NY	35	49 NE	RR RR	Thomas Daly		NJ
"	SW Montauk Pt, NY		E Ponce Inlet, FL	48	805 SW	RR LL	Charles Joscher		NY
"	NE Virginia Beach, VA		Nags Head, NC	26	64 S	RR RR	Craig R. Paige		VA
"	Bimini, Bahamas		Eleuthera Is., Bahamas	22	187 E	LL LL	Samuel Gruber		FL
Nurse shark <sup>a</sup>	Long Point Key, FL		Long Point Key, FL	12	0	LN LN	William Botten		FL
"	Key Colony, FL		Key Colony, FL	5	0	RR LN	William Botten		FL
"	Long Point Key, FL		Long Point Key, FL	12	0	LN LN	William Botten		FL
"	Fat Deer Key, FL		Fat Deer Key, FL	9	0	RR RR	William Botten		FL
"	West Palm Beach, FL		SE Lake Worth Inlet, FL	16	6 N	FS HL	Mark Fischer		FL
"	Fat Deer Key, FL		N Burnt Pt, FL	5	1 SW	RR LT	William Botten		FL
"	Crawl Key, FL		Grassy Key, FL	<1	1 NE	RR FS	William Botten		FL
"	Key Vaca, FL		Key Vaca, FL	5	1 E	RR LT	William Botten		FL
"	Key Vaca, FL		Key Vaca, FL	5	3 NE	RR HL	William Botten		FL
"	Key Colony Beach, FL		Key Colony Beach, FL	<1	0	HL GN	William Botten		FL
"	Grassy Key, FL		Grassy Key, FL	5	0	RR GN	William Botten		FL
Dusky shark	S Montauk Pt, NY		W Sarasota, FL	7	1451 SW	RR LL	Harry McAllister		NY
"	S Pascagoula, MS		NE Mujeres Is., Mexico	4	466 S	LL LL	Winston Denton		MS
"	E Jacksonville, FL		N St. Simons Is., GA	4	79 NW	LL TN	Stephen Connett		RI
"	SSE Rudee Inlet, VA		E Indian River Inlet, DE	24	145 NE	RR RR	John W. Thurston, Jr.		VA
"	S Moriches Inlet, NY		E Pt Jerez, Mexico	83	1958 SW	RR LL	Jesse York		NY
"	SE Fire Island Inlet, NY		E Cape May, NJ	12	51 S	RR SD	Larry Lund		NY
"	Bethany Beach, DE		E Hatteras Inlet, NC	1	204 S	RR BS	Logan Longstreet		DE
"	W Challenger Bank, Bermuda		SE Challenger Bank, Bermuda	21	32 SW	RR RR	A. J. Card		Bermuda
"	NR		S Fire Island Inlet, NY	NR	NR	NR RR	Danny Azzato		NY
Dusky/Sandbar	SE Fire Island Inlet, NY		NE Rudee Inlet, VA	27	224 SW	RR PS	Wolf Hager		NY
"	SSE Fire Island Inlet, NY		Atlantis Canyon	49	127 E	RR LL	Peter James		NY
"	SE Manasquan Inlet, NJ		S Destin, FL	30	1557 SW	RR LL	Richard Addeo		NY
"	SSE Shinnecock Inlet, NY		ENE Charleston, SC	93	560 SW	RR LL	Frank Iackio		NY
"	S Montauk, NY		NE Veracruz, Mexico	77	1986 SW	RR LL	Dave Willis		CT
"	Sapelo Sound, GA		Sapelo Sound, GA	<1	0	RR RR	G. J. Gevin		GA
"	SE Montauk Pt, NY		Fort Walton Beach, FL	29	962 SW	RR RR	Walter Kaprielian		NY
Blacktip shark	Landrail Pt, Bahamas		Landrail Pt, Bahamas	2	9 S	HL HL	Stephen Connett		RI
"	Morris Island, SC		Vero Beach, FL	54	304 S	RR GN	Rick Stringer		SC
"	E Atlantic Beach, FL		Fernandina Beach, FL	1	21 N	RR RR	Lonnie Nordin		FL
"	Bimini, Bahamas		Bimini, Bahamas	19	1 SE	LL RR	Samuel Gruber		FL
"	N Port Mansfield, TX		E Soto La Marina, Mexico	1	205 S	RR RR	Manuel Arispe, Jr.		TX
"	S Port Aransas, TX		Barra Cazones, Veracruz, Mexico	1	480 S	RR NR	David Hastings		TX
BE Thresher shark	SE Galveston, TX		S Pensacola, FL	75	291 NE	LL LL	Brad Walters, NMFS Obs.		MA
"	S Cape Verde Is.		SW Dakar, Senegal	68	111 W	LL LL	T. Sekudewicz		Poland
Porbeagle shark	S Oceanographer Canyon		SE Cape Sable, NS, Canada	2	274 NE	LL LL	Jay Taylor, NMFS Obs.		MA
"	S Powell Canyon		SE Cape Sable, NS, Canada	25	161 NE	LL LL	Martin Williamowsky, NMFS Obs.		MA
Swordfish	SE Virginia Beach, VA		S Miami, FL	11	782 SW	LL LL	Biologist (NMFS)		RI
"	S Newfoundland, Canada		SW Dry Tortugas	31	1930 SW	LL LL	Philip Ruhle, Sr.		RI
Bignose shark	E Cape Charles, VA		W Bradenton, FL	23	768 SW	LL LL	Biologist (NMFS)		RI
Blacknose shark	Melbourne Beach, FL		E New Smyrna Beach, FL	12	64 N	RR GN	Woody Woodrum		FL
Bonnethead shark	S Port Aransas, TX		North Padre Is., TX	NR	NR	RR RR	Charles Krause		TX
Bull shark	NR		E Mayport, FL	NR	NR	RR GN	Carl Jernigan		FL
Dogfish shark	W. Tobago, West Indies		NE Tobago, West Indies	13	7 NE	GN GN	Jose Castro		Trinidad
Night shark	SE Charleston, SC		N Cardenas, Cuba	49	789 SE	LL LL	Ron Schatman		FL
Sc. hammerhead	NE Cape Hatteras, NC		NE Hatteras Rockpile, NC	11	37 SW	LL RR	Biologist (NMFS)		RI
Gr. hammerhead	Conception Island, Bahamas		Conception Island, Bahamas	2	2 SW	LL RR	Stephen Connett		RI
Sm. hammerhead	NE Cape Hatteras, NC		NE Ponce Inlet, FL	6	496 SW	LL RR	Biologist (NMFS)		RI
Silky shark	SE Charleston, SC		E Savannah, GA	71	16 NE	LL LL	Stephen Connett		RI
Reef shark	N Salma Pt, Bahamas		N Salma Pt, Bahamas	4	2 SW	LL LL	Stephen Connett		RI
Greenland	Trondheimsfjord, Norway		Trondheimsfjord, Norway	11	0	RR NT	Kjell Hagen		Norway
Blackfin tuna	Argus Bank, Bermuda		Argus Bank, Bermuda	17	0	RR RR	Brian Luckhurst		Bermuda
"	NR		S Puerto Rico	NR	NR	LL LL	Biologist (P.R.)		P. Rico
"	NR		NE Veracruz, Mexico	NR	NR	NR NR	Joe Heilmann		NJ

NOTE: BS=Beach Seine; BT=Bottom Trawl; CJ=Cod Jigger; FS=Free Swimming; GN=Gill Net; HP=Harpoon; HL=Hand Line; LL=Longline; LN=Landing Net; LT=Lobster Trap; NT=Net; PS=Purse Seine; RR=Rod & Reel; SD=Scallop Dredge; TOF=Tag Only Found; TN=Trawl Net; Obs.=Foreign Fisheries Observer; and NR=Not Reported.

<sup>a</sup>Not included are local returns for 5 lemon sharks, 3 nurse sharks, and 1 tiger shark from a concentrated study off Bimini, Bahamas by Dr. S. Gruber, Univ. of Miami.

fishermen from several different countries, 3) makos occur over a wide geographical range but they are vulnerable when they concentrate seasonally on known fishing grounds and 4) makos are increasing in value and will be among the first species impacted by directed fisheries (sport and commercial, U.S. and foreign). How serious the impact might be is difficult to predict with the information now available. Moreover, additional information is no guarantee against the overexploitation of any species. History has many examples where knowledge gained through biological research was not translated into the wisdom necessary to effectively manage fishery resources. But without biological knowledge and public concern there is no other alternative but the overexploitation of sharks, especially the mako. We hope you will consider this notion when you have opportunities to release small makos or to establish size and catch limits in your tournaments.

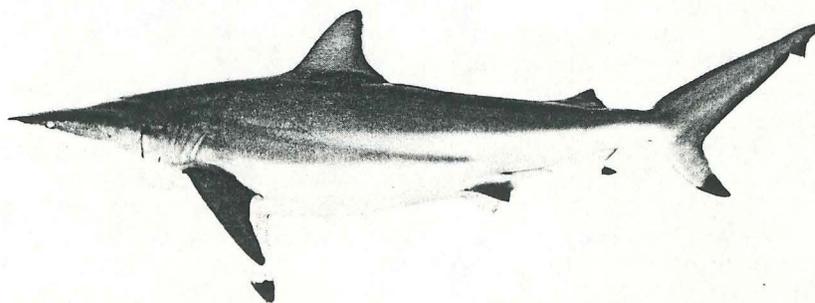
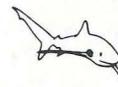
**TIGER SHARKS** (12 returns) were at liberty for up to four years and over a maximum distance of 805 miles. One of the most interesting returns came from a small tiger shark (54" TL) tagged in July 1986 off Ponce Inlet, Florida and recaptured 2.5 months later off Yucatan, Mexico (777 miles). This is the most recent of several tagged tiger sharks to show movements between the Atlantic and Gulf of Mexico. Were it not a tiger shark, it would seem a bit unusual for a shark to move southward during the summer and against the prevailing current systems. Past tag returns, however, have shown that tiger sharks do not fit a predictable pattern except to say they are widely distributed (Page 9) and that some segments of the population move north during the summer and return south during the winter. Others are found year round wherever water temperatures are suitable (e.g. off Florida, the Bahamas, West Indies, the Caribbean and the Gulf of Mexico). We have tagged tiger sharks in the Sargasso Sea several hundred miles from land, but tiger sharks are also commonly caught close to shore. The 1986 returns included: a tiger shark tagged off Montauk, NY that

was recaptured four years later off Florida, one tagged in the Bahamas and recaptured by a Taiwanese longliner 187 miles east of the release location and another tagged near Bimini that moved 100 miles west to the coast of Florida.

**LEMON SHARKS** (23 returns) were recaptured after four years at liberty and a maximum distance of 78 miles. Most of the lemon sharks were young individuals tagged by William Botten in shallow nursery grounds near Marathon, FL. Mr. Botten has tagged several hundred lemon sharks over the past several years and he knows most of them in his area on a first name basis. Five additional lemon sharks were tagged and recaptured by Dr. Samuel Gruber in the Bahamas.

**OTHER SPECIES** included a **GREENLAND SHARK** tagged in a fjord in Norway and recaptured there a year later. This is the first return from a Greenland shark, a species that grows to over 20 feet and is only occasionally caught in deep water off the U.S. Atlantic coast. It is common enough in Norway to be fished with rod and reel and we are providing tags to Swedish biologist Dr. Hans Hallbaech for his studies. Two **BIGEYE THRESHER** sharks were recaptured. One tagged by Polish scientists 600 miles south of the Cape Verde Islands was recaptured five years later by a Korean longliner near the release location (111 miles). The other, tagged off Texas

and recaptured off Florida after six years, is the first tag return from a bigeye thresher from the Gulf of Mexico. Of the five **BLACKTIP** sharks recaptured, one was the second longest time at liberty (4.5 years) for this species. A **NIGHT** shark tagged off South Carolina and recaptured off Cuba four years later, supports previous tagging evidence that this species crosses the Florida Straits. A **SILKY SHARK**, tagged and recaptured in the same area 60 miles southeast of Charleston, SC after six years was a near record time at liberty for this species. Our first return from a **GREAT HAMMERHEAD** (est. 400-500 lbs.) came from a shark tagged and recaptured in the Bahamas after two months. A **SMOOTH HAMMERHEAD** tagged off North Carolina and recaptured six months later off Florida was only the fifth tag returned from this species. The **SWORDFISH** returns show movements from off Virginia to Miami, FL (11 months) and from 140 miles south of Newfoundland to 20 miles south of the Dry Tortugas (1,930 miles after 32 months). These and other recaptures are summarized in Table 2. From our standpoint 1986 was indeed a successful year and we are grateful to all of you who helped make it so.



A 7 ft. TL, 120 lb. spinner shark (large blacktip) caught 30 miles east of Ocean City, MD on the R/V WIECZNO. Photo by G. Skomal.

# SHARK SURVEY CRUISE

A 49-day longline cruise aboard the Polish RV *Wieczno* was the major field expedition for staff biologists in 1986. This cruise (Jul. 31-Sept. 18) represents the first systematic survey of sharks covering most of the U.S. Atlantic coast. The cruise was designed to obtain baseline information on large pelagic fishes, primarily sharks, using standard longline gear. This gear (Yankee type) is similar to that currently used by the Japanese for tunas and has in the past been used by U.S. swordfishermen. The survey procedure was to fish 100 hooks baited with whole mackerel for one hour, excluding the time required to set and retrieve the gear. The mainline, buoyed at ten-hook intervals, fished over a distance of approximately three miles and through a depth range of approximately 20 to 60 fathoms. Normally the gear was set at night, hauled at dawn, then reset at different fishing stations throughout the day. A maximum of four and a minimum of two sets were made each day depending on steaming time and weather conditions. At each fishing station surface to bottom temperatures were measured and plankton nets were towed as part of an ancillary survey of fish eggs and larvae for the Sandy Hook Laboratory. The survey area extended from southern New England to mid-Florida (Page 9). An attempt was made to fish in the three major water masses (shelf, slope and Gulf Stream) but because of time constraints most of the stations were in shelf and slope water between 10 and 300 fathoms.

A total of 120 longline sets yielded an overall catch of 679 fish representing 32 species. Catch rates ranged from 0 to 20 fish per 100 hooks with an average catch of 4.9 fish per 100 hooks. The average catch of 4.3 sharks per 100 hooks was higher than we expected in a random survey of this kind. Sharks were caught at 75% of the stations fished with the lowest catch rates at stations beyond the continental shelf (i.e. over 200 fathoms) and in the Gulf Stream. The overall catch included 17 species of sharks and 15 species of bony fishes. The most commonly caught sharks were: sandbar (325), Atlantic sharpnose (78), dusky (37), scalloped hammerhead (35), tiger (34) and blue sharks

(32). The larger bony fishes included swordfish (9), white marlin (5), sailfish (2) and yellowfin tuna (9). Bluefish, barracuda, sting rays and amberjack made up the bulk of the smaller species. Sandbar, Atlantic sharpnose, scalloped hammerhead and tiger sharks were the most widely distributed, although mako sharks were taken between Georgia and the southern part of Georges Bank. Sixty-two percent (424) of all sharks were tagged and released. Prior to their release many of the sharks were brought aboard, measured, tagged and injected with tetracycline for age studies. Injected specimens included full-term embryos that were removed from pregnant females. Fish that were not tagged were brought aboard to: examine their stomach contents and reproductive organs; collect vertebrae, parasites and tissue samples; and obtain entire specimens for museum collections. About 50% of the shark stomachs were empty and of those containing food, squid was the principal prey. Five of 15 species of sharks examined for reproductive studies contained embryos. These were sandbar, night, bigeye thresher, blue and Atlantic sharpnose sharks.

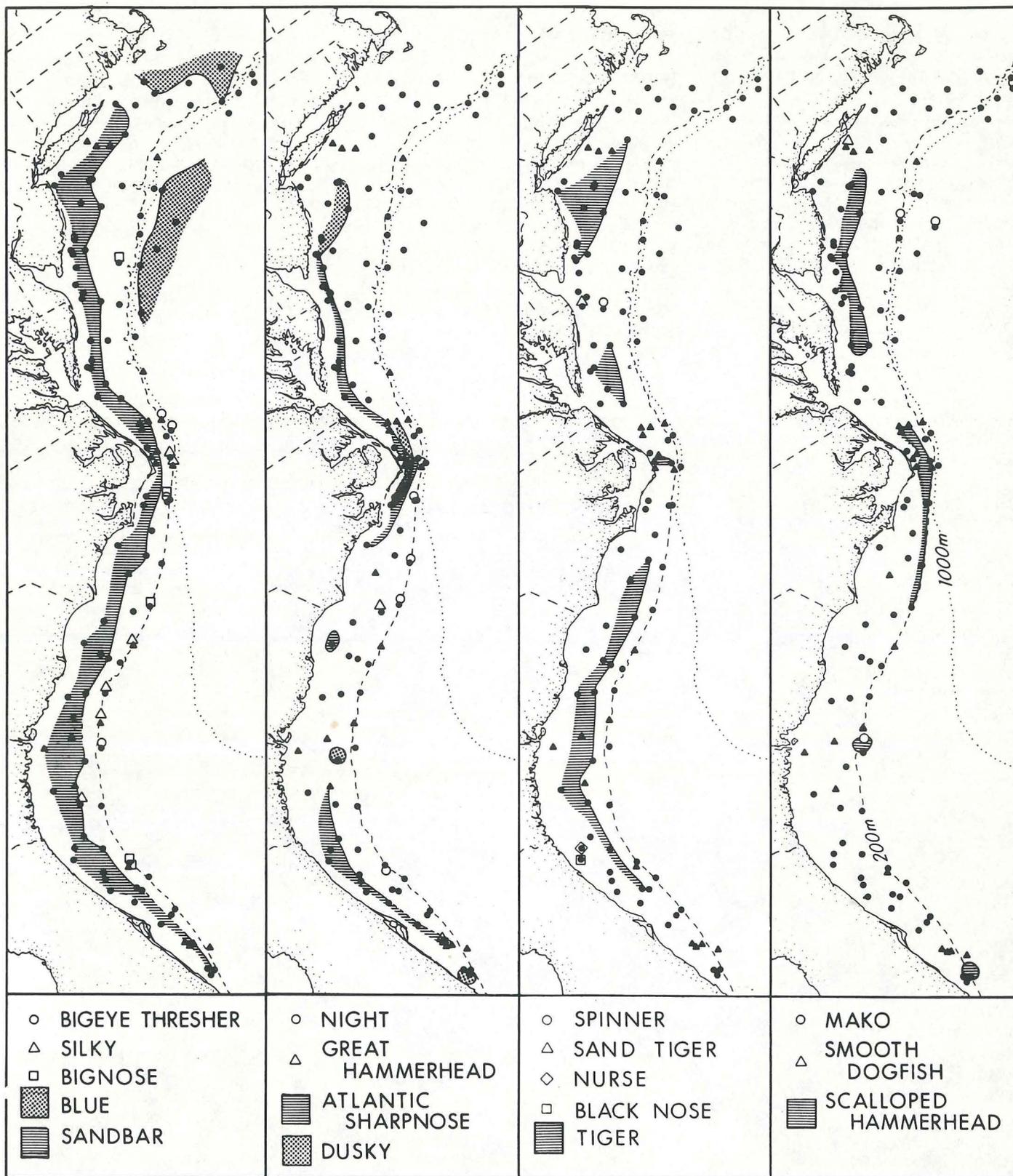
During the cruise we engaged in joint vessel operations off Hudson Canyon with Dr. Frank Carey, who was conducting sonic tracking experiments on blue sharks from the R/V *Cape Henlopen*. He was able to follow blue sharks for several days after they had been tagged with sonic tags placed on the fish aboard the R/V *Wieczno*. His experiments were designed to monitor heartbeat and swimming behavior of free swimming blue sharks which, in this case, swam through a depth range from the surface to nearly 960 fathoms.

We attempted to compare catch rates of different gears by fishing near a Japanese tuna longliner south of Cape Cod, and near some U.S. shark longliners off Florida. The results were inconclusive however because of time constraints and poor catches in those particular areas. The Japanese vessel was fishing approximately 80 miles of gear (2,800 hooks) and caught only 15 sharks and 39 other fish. On that same day we fished 200 hooks along one section of his

line and did not catch any fish. Off Cape Canaveral when we encountered U.S. commercial shark fishermen, both gears also had low catches and our survey schedule did not permit exploring other areas with them. The Florida commercial fishermen were cooperative and interested in our operations and informed us that commercial shark fishing is expanding in Florida.

Although the gear comparisons did not work out, the survey exceeded our expectations in several respects. The cruise was successful in providing data on catch per effort, species composition, distribution and abundance of sharks over a broad geographic area. In addition, the biological samples and the large number of sharks tagged will continue to yield information in the future. Under cooperative arrangements with other agencies, collections of shark heart and brain tissues are currently being studied by scientists at the National Institutes of Health. Shark parasites that were collected for scientists at the University of British Columbia, and whole sharks and anatomical parts collected for the Florida State Museum are available to many scientists. We should point out that our catch results are for a single season in an area where these apex predators are highly migratory. Had this survey been conducted in early spring for example, the catch of blue and mako sharks north of Cape Hatteras would have been much higher. Moreover, the distribution of sandbar, sand tiger, Atlantic sharpnose and other coastal species extends further inshore than we were able to cover in this first survey. Additional inshore stations should have a high priority in future surveys. Despite these shortcomings we waited 20 years for an opportunity to conduct a cruise of this kind—and it was worth it!

**OTHER FIELD STUDIES**—Life history information from 386 sharks was collected at 13 shark fishing tournaments held between New Jersey and New England and off the west coast of Florida. Staff biologists attended eight tournaments and examined 271 sharks (eight species) for ongoing studies of reproduction, age and growth and food habits. Volunteer cooper-

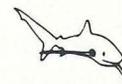


ators from Long Island, NY and Florida provided data on lengths, weights and species composition from an additional 115 sharks. Tiger, nurse, bull, lemon and black-tip sharks dominated the Florida landings. In the New Jersey-southern New England area, the

most prevalent species were mako, blue, sandbar, scalloped hammerhead and thresher sharks in order of decreasing catch.

Tournaments are important sources of tag returns for our migration studies. If you are active in this type of competitive fishing and you

or your comrades catch a tagged shark, we would appreciate your assistance in obtaining a fork length measurement and a six inch section of the vertebral column from over the gill slits for our age studies.



## THE WHITE SHARKS OF 1986

This past August, three very large white sharks were caught in close succession near a dead whale off Montauk, NY. The first, a 17 ft., 3,427 lb. individual was landed by Capts. Frank Mundus and Donnie Braddick and is a contender for the title of "largest fish ever caught on rod and reel". We appreciate the cooperation of these captains in allowing us to dissect their shark. The other two whites, weighing 2,500 and 2,602 lbs. were harpooned fish. Unfortunately we were denied the opportunity to examine them.

During the past 25 years we have

examined only eight white sharks exceeding 1,500 lbs. Since almost nothing is known about the white shark's life history (e.g. reproductive biology, age, growth rates, food requirements...), we believe that every specimen can provide invaluable clues to understanding this species. At the same time we are on record as discouraging the useless killing of these uncommon giants. Certainly we are against, as in two cases this summer, harpooning white sharks solely for their teeth and then discarding the carcass. We view this as a sad commentary on

man's disregard for one of the world's most unique animals. White sharks are often fearless of boats and are quite vulnerable to harpooning or shooting (see photo). Admittedly white sharks can be dangerous but we ask that you keep them in perspective as an exciting and rare species.



*Wes Pratt observes a 14 ft. white shark tagged off Montauk, NY. Photo by J. Casey.*