Shark Tagging News

A Newsletter of the CDFG Shark Tagging Program

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Another banner year has passed for the Pelagic Shark Tagging Program. A record seventy-five new taggers signed up for the program this year. As the program continues to grow, we can expect to see an increase in tagging and recoveries. The information collected will be very useful for learning more about our local shark populations.

This newsletter is dedicated to all of our volunteer taggers, without whose help the tagging program could not continue. Thank you all for your efforts, and keep up the good work!

-John Ugoretz, Marine Biologist

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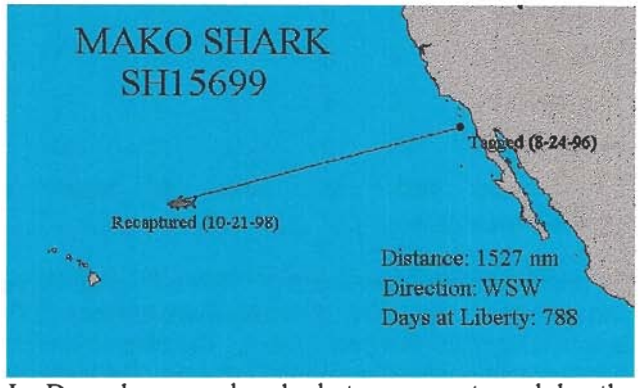
LONG DISTANCE MAKO RETURN!



In December a mako shark tag was returned by the National Research Institute of Far Seas Fisheries of Japan. The shark was captured by the Japanese fisheries training vessel ***Kagawa Maru***. The female mako traveled over 1,500 nautical miles in just over two years. It is the second mako to be returned from the central Pacific, and the fourth shark returned by a Japanese fishing vessel. The shark measured 122 cm (4 ft) when tagged. While at liberty it grew to 188 cm (6 ft).

1998 TAGGING OVERVIEW

This year 41 active volunteers tagged 960 sharks, bringing the program total to more than 10,000 sharks (Table 1). Fewer sharks were tagged than last year, reflecting the late start of the fishing season. Six species of shark were tagged: blue sharks (*Prionace glauca*), leopard sharks (*Triakis semifasciata*), an oceanic whitetip shark (*Carcharhinus longimanus*), sevengill sharks (*Notorynchus maculatus*), shortfin mako sharks (*Isurus oxyrinchus*), and thresher sharks (*Alopias vulpinus*). Nineteen tagged sharks were recaptured in 1998, bringing the recapture total to 172 (Table 1). The recaptures consisted of fourteen mako sharks, four blue sharks, and one thresher shark.

Table 1. Summary of tagged (T) and recaptured (R) sharks, 1983-1998 (includes sharks tagged by CDFG and NMFS biologists).

	1983-97		1998*		Total	
	T	R	T	R	T	R
Blue Shark	6523	45	435	4	6958	49
Shortfin Mako	2151	94	523	14	2674	108
Angel Shark	107	6	0	0	107	6
Thresher	80	1	63	1	143	2
Basking Shark	57	0	0	0	57	0
Sevengill	58	6	7	0	65	6
Leopard Shark	33	1	18	0	51	1
White Shark	16	0	0	0	16	0
Soupfin Shark	5	0	0	0	5	0
Spiny Dogfish	4	0	0	0	4	0
Smoothhounds	3	0	0	0	3	0
Other Species	20	0	2	0	22	0
Total:	**9057**	**153**	**1048**	**19**	**10,105**	**172**

*1998 preliminary data

The preliminary recapture rate for 1998 is 1.8%, slightly higher than last year's rate (1.5%). The mako recapture rate (2.7%) is down slightly from last year (3.0%). The blue recapture rate (0.9%) is double what it was in 1997 (0.4%). The higher mako shark recapture rate may indicate that makos remain in the Southern California Bight longer than blue sharks.

SHARK MIGRATIONS

MAKO SHARKS

Of the fourteen mako sharks recaptured this year all but four were caught in the Southern California Bight, within 100 nautical miles (nm) of where they were tagged. Two of these sharks were at liberty for nearly two years, two for more than one year, and the rest for less than a year. It is interesting to note that all of the sharks recaptured within the Southern California Bight were less than 5 feet long. These fish were definitely juveniles.

The most impressive mako shark return this year was the female shark returned by the Japanese fisheries training vessel ***Kagawa Maru***. It was at liberty for just over two years and traveled more than 1,500 nm (see page 1 for details).

One mako traveled north from the waters off Ensenada, Mexico to the northern Channel Islands. This fish traveled at least 180 nm in just over one year. Another mako went west from Palos Verdes, traveling more than 100 nm in about a year and a half. The fourth far-ranging mako traveled south from San Clemente Island to the waters off central Baja California, Mexico. It traveled nearly 250 nm in just under two years (Figure 1).

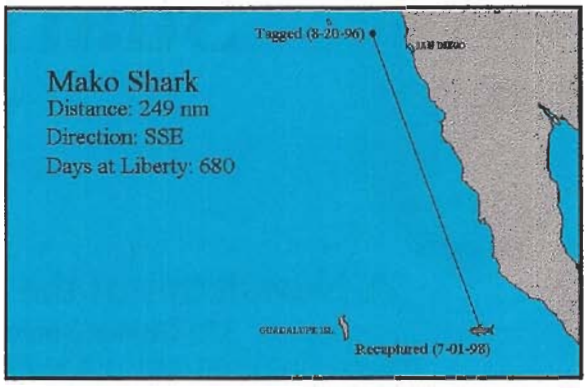


Figure 1

BLUE SHARKS

Four blue sharks were recaptured in 1998. Two were caught within 50 nm of their tagging locations. One of these was caught after just over one year within one mile of its tagging location. The second was caught after 12 days and less than 50 nm from its point of release.

A third blue shark was both tagged and recaptured off central Baja California, Mexico. It moved at least 113 nm, after almost eight months at liberty.

The fourth blue shark traveled south from local waters to the area off Cabo San Lucas, Mexico. This shark was one of many that have been returned by Mexican commercial fishermen. It moved more than 750 nm in about a year and a half (Figure 2).

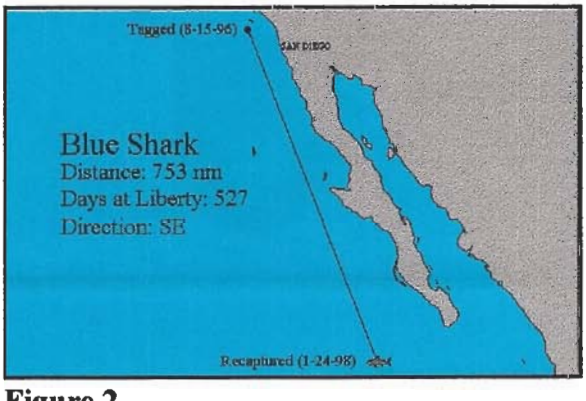


Figure 2

THRESHER SHARKS

One thresher shark was returned in December. The male shark had been at liberty for five months and had moved 53 nm. This return is special because the shark had been injected with tetracycline at the time of tagging as part of an ageing study. Scientists count rings on shark vertebrae to estimate age. Tetracycline injection creates a visible mark on the shark's vertebrae. When recaptured, any rings beyond the visible mark can be counted and compared to the known time at liberty. The return of this tag, along with the shark's vertebrae, will allow scientists to verify assumptions on shark ageing.

1998 TOP SHARK TAGGERS

All of our taggers deserve credit for the sharks they tagged this year. Everyone's efforts are greatly appreciated. This year twelve volunteers tagged nine or more sharks, Good going!

Tagger	No. Sharks Tagged
Joseph Singer	482
Keith Poe	197
Deana Poe	37
Steve Prime	37
Guy Irwin	33
Mark Wagner	32
Jerry Barber	16
Dave Casper	16
Paul Hayley	13
Randall Holman	13
Michael Toorop	11
Matt Potter	9

TOP TAG RETURNS

Three taggers deserve special recognition for having the highest number and percentage of tags returned. Five sharks tagged by Keith and Deana Poe were returned this year. Guy Irwin had three tags returned making his recapture rate 9.0%, well above the rate for the entire program. Overall, ten of Guy's tags and eight of Keith and Deana's have been returned since they started tagging.

PROGRAM ACTIVITIES

The National Marine Fisheries Service (NMFS) conducted its annual shark tagging cruise on the ***R/V David Starr Jordan*** in June and July. This year differed because NMFS specifically targeted thresher sharks to determine the effectiveness of placing sonic tracking devices on this species. The cruise was highly successful with the capture, tag, and release of 33 thresher, 26 mako, and 12 blue sharks. Five threshers were tracked with sonic tags. Three of them were followed for more than 24 hours each. This preliminary test showed that it is possible to tag threshers with tracking devices. Next year NMFS plans to place satellite "pop-up" tags on threshers to determine their migratory patterns.

Tagging Program volunteer Frank Nielsen participated on the cruise. He was a valuable source of local knowledge of thresher shark fishing.

CDFG conducted its own tagging cruise in July aboard the ***R/V Mako***. Department biologists and volunteers tagged a total of 19 sharks (12 mako sharks and 7 blue sharks). The number of sharks caught was drastically lower than previous years. Several reasons can account for this, including an earlier than normal cruise date, a slightly shorter cruise, and displacement of sharks due to El Niño. Program Volunteers reported better success later in the fishing season.

Both cruises used longline gear equivalent to the commercial gear used in the 1980's to fish for sharks. The cruises are part of an ongoing assessment of shark populations in the Southern California Bight. By using a standardized gear, Catch Per Unit Effort data can be collected and compared over time.

Tagging Program staff attended three shark fishing tournaments this summer. A tagging demonstration was given at the skippers meeting of the first annual All Tag and Release Tournament held in July. Tags were provided for tournament participants.

Also in July, we attended the Oceanside Invitational Mako Shark Tournament. In October we attended the skippers' meeting for the Marina Del Rey Mako for Dollars tournament. Both of these tournaments require the release of sharks less than four feet in length, and encourage tagging. The winning shark in Marina Del Rey was a new state record weighing in at 582 lbs. The cooperation of the tournaments' organizers is a valuable asset, and we look forward to future participation.

In July and August talks were given at the Long Beach Rotary Club and the Glendora Reef Dive Club. These talks focused on the Shark Tagging Program, the status of California's shark populations, and how the public can help with tagging efforts.

GOBLIN OF THE DEEP

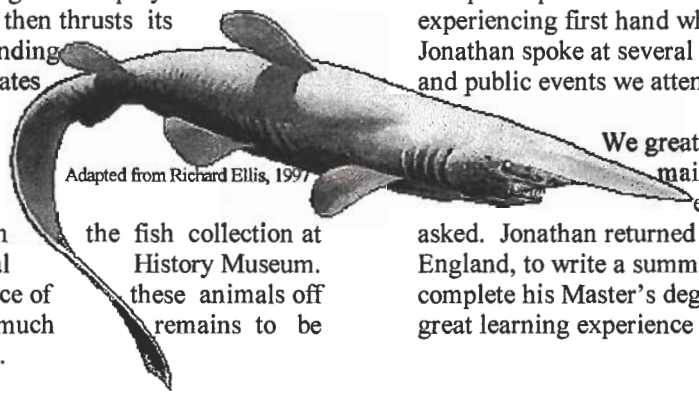
CDFG, 1998

Don Krebs and his crew on the ***F/V Gold Coast*** didn't know what they had in their net, but they knew it was strange. The nine-foot long shark had slimy skin, a long, shovel-like snout, and very jagged teeth. Fish and Game Warden Dan Sforza photographed the shark's head when it was landed. We were at first puzzled by this shark, which was different from anything we had seen before. With the help of fellow scientists we determined it was a goblin shark, *Mitsukurina owstoni*.

Goblin sharks have only been seen on a few rare occasions. What makes this capture even more exciting is that a goblin shark has never before been caught in the eastern Pacific Ocean! Previous captures have been reported from the western Pacific around Japan, Australia, and New Zealand, and the eastern Atlantic and Indian Oceans.

Goblin sharks probably live in the midwater column of the deep ocean. Stomach content analyses of

previous specimens show they eat fish and squid found at great depths. The shark's small eyes and soft body suggest that it hangs in the water column, waiting to sense prey with electrical receptors on its broad snout. It then thrusts its jaw forward,opening and expanding it greatly. This expansion creates a rapid suction, forcing the prey into the shark's mouth.



The ***Gold Coast*** specimen has been preserved, and is now in the fish collection at the Los Angeles County Natural History Museum. The previously unnoticed presence of these animals off California demonstrates how much remains to be discovered in the world's oceans.

If you catch an unusual or unidentifiable fish:
Save the entire specimen, including gut contents; get good pictures while it is fresh; and contact your local Fish and Game Office. These specimens are very important to scientists.

INTERN FROM ENGLAND

The Shark Tagging Program was assisted this summer by a volunteer intern from England. Mr. Jonathan Solomon expressed an interest in learning more about sharks and fisheries management through an Internet group of shark scientists. We offered him a chance to work with the Tagging Program, which he accepted.

Jonathan was completing his Masters of Research degree at the University of York. As a part of his degree he needed to complete an external placement in field science. By working for us he fulfilled this requirement and helped a great deal with the Shark Tagging Program.

Jonathan entered new information into the Tagging database and checked the entire database for errors and omissions. He also participated on the NMFS and CDFG tagging cruises, experiencing first hand what science at sea is really like. Jonathan spoke at several of the shark fishing tournaments and public events we attended this summer.

We greatly appreciated Jonathan's help. He maintained a positive attitude and was eager to assist with anything we asked. Jonathan returned to his home in Nottingham, England, to write a summary of what he learned and complete his Master's degree. Jonathan's time with us was a great learning experience for him, and a great help to us.

WHITE SHARKS

White sharks (*Carcharodon carcharias*) are now fully protected under California law. **You may not fish for, or tag, white sharks without a special permit.**

COMMERCIAL TAG RETURNS

Commercial tag returns are very important to the success of the program. Commercial fishermen are on the water year round, increasing their opportunity to encounter sharks when they fish.
This year nine tag recoveries came from the local and foreign commercial fishing industry. The cooperation of commercial fishermen is very valuable. We look forward to future tag returns.

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