



Shark Tagging News



A Newsletter of the CDFG Shark Tagging Program

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Welcome to the fifth annual California Department of Fish and Game Shark Tagging Program Newsletter. As some of you may know, John has left the shark tagging program and is now working with abalone. Currently, John's position is vacant, but we hope to fill his shoes by early spring. As for the program, it continues to grow with thirty new taggers signed up this year. With an increase in volunteers, 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!

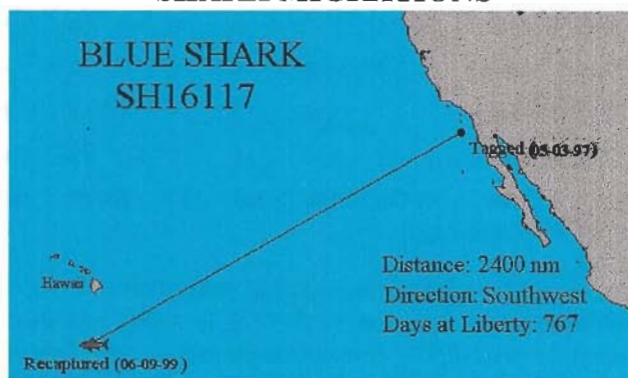
-Valerie Taylor, F/W Scientific Aide



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SHARK MIGRATIONS



Two tags were returned from Japanese fishermen in 1999. The Fisheries Training ship *Fukushima Maru* caught a blue on longline south of the Hawaiian Islands. The fish had been at liberty for over two years and had traveled at least 2400 nautical miles (nm). Shortly after this return another tag was sent from Japan. This tag was found in the Tokyo Fish Market on a mako shark carcass. Though no other information on the capture was available, it was likely that this fish was caught in the central Pacific as well.

1999 TAGGING OVERVIEW

This year 44 active volunteers tagged 292 sharks, bringing the program total to more than 10,400 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*), sevengill sharks (*Notorynchus maculatus*), shortfin mako sharks (*Isurus oxyrinchus*), white sharks (*Carcharodon carcharias*), and thresher sharks (*Alopias vulpinus*). Seventeen tagged sharks were recaptured in 1999, bringing the recapture total to 193 (Table 1). The recaptures consisted of eleven mako sharks and six blue sharks.

Table 1. Summary of tagged (T) and recaptured (R) sharks, 1983-1999 (includes sharks tagged by CDFG and NMFS biologists).

	1983-98		1999*		Total	
	T	R	T	R	T	R
Blue Shark	6960	50	202	6	7162	56
Shortfin Mako	2683	111	57	11	2740	122
Angel Shark	107	6	0	0	107	6
Thresher	143	2	3	0	146	2
Basking Shark	57	0	0	0	57	0
Sevengill	67	6	3	0	70	6
Leopard Shark	53	1	24	0	77	1
White Shark	22	0	13	0	35	0
Soupin Shark	5	0	0	0	5	0
Spiny Dogfish	4	0	0	0	4	0
Smoothhounds	3	0	0	0	3	0
Other Species	22	0	1	0	23	0
Total:	10126	176	303	17	10429	193

*1999 preliminary data

The preliminary recapture rate for 1983-1999 is 1.9%. The mako recapture rate for 1983-1999 is 4.5%, and the blue recapture rate is 0.8%. Annual recapture rates were determined to be biased because fewer sharks were tagged in 1999 in comparison to previous years. Therefore, the recapture rates for 1999 were not calculated.

SHARK MIGRATIONS

MAKO SHARKS

Of the eleven mako sharks recaptured this year all but four were caught in the Southern California Bight, within 100 nm of where they were tagged. One shark was at liberty for a little over one year and the rest for less than a year.

Of the four sharks that were not recaptured within the Southern California Bight, one was found in the Tokyo Fish Market (see page 1 for details) and the other three were recaptured in the waters off Baja California, Mexico. The first was at liberty for less than four months and traveled over 530 nm southwest from the waters off Laguna Beach. The second shark traveled from Santa Catalina Island to the waters off Cape San Lazaro, Mexico. This fish moved at least 565 nm in just over a year and a half. The third mako traveled south from northern Santa Catalina Island to the waters off southern Baja California, Mexico. It traveled over 850 nm and was at liberty for just over two years (Figure 1).

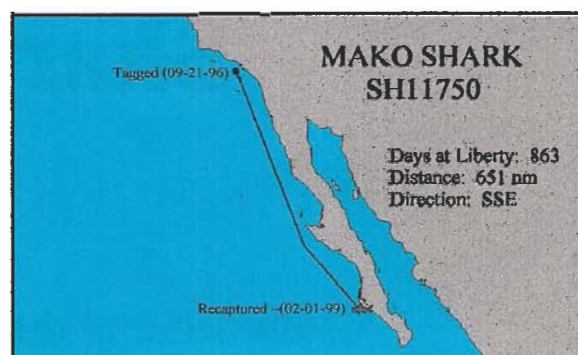


Figure 1

BLUE SHARKS

Six blue sharks were recaptured in 1999. Of these six, two were caught in the Southern California Bight. One was recaptured in just over two years within 200 nm of its tagging location. The second shark was caught after just one day and less than 10 nm from its point of release.

The third blue shark traveled south from Monterey to Point Conception. This fish was at liberty for less than one year and traveled at least 150 nm.

The most impressive blue shark return was a female returned by the Japanese fisheries training vessel *Fukushima Maru* (see page 1 for details).

The last two recaptured sharks traveled south from local waters down to Baja California, Mexico. One blue traveled nearly 430 nm and the other blue moved more than 710 nm (Figure 2). Both were at liberty for less than one year.

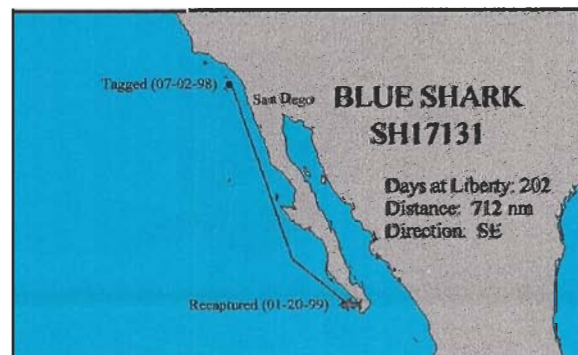


Figure 2

LEOPARD SHARKS

On July 10 Howard Arnold, one of our Tagging Program Volunteers, caught what he thought was just another leopard shark. When he examined it more closely he realized it was tagged with an unusual marker. The plastic tag in the shark's dorsal fin had lettering, most of which had been rubbed off. After some investigation we located Susan Smith with the National Marine Fisheries Service in La Jolla. Susan identified the tag as one that she had used in San Francisco Bay between July and September 1979, almost 20 years ago! At tagging, the fish was injected with tetracycline, an antibiotic that deposits in

mineralized tissue and makes a permanent mark. Preliminary examination has shown that the 20-year old mark is still on this shark's vertebrae. The shark did not grow much while at liberty, but this is not surprising as most sharks, especially leopards, grow very slowly. The return of this tag is very exciting to Susan and other shark biologists. She said "This may be the longest any tagged shark has been at liberty...it certainly is for leopard sharks...and is definitely the longest a fish with the tetracycline time mark has ever been at liberty!"

1999 SHARK TAGGERS

The following permittees volunteered their time, effort, and expenses to tag sharks for the Department of Fish and Game this year. All of their efforts are greatly appreciated.

Barry Andersen	Donald Nelson
Doug Armfield	Frank Nielson
Howard Arnold	John O'Cain
Jerry Barber	Skip Odell
Dave Barnett	Keith Poe
Jason Blower	Deana Poe
Andy Bodjanac	Matt Potter
Randy Bosworth	Kevin Price
Dave Brackman	Steve Prime
Dave Casper	Vincent Randino
Mike Chin	Don Rowland
Andy Dolich	Mark Rein
David Duner	Mike Schmidt
Manny Ecurra	Joe Singer
Steve Fisk	Christina Slager
Ken Goldman	Mark Smith
Dave Grevel	Scott Smith
Walter Heim	Brad Stiles
Brian Henkle	Michael Toorop
Guy Irwin	Sean Van Sommeran
Wayne Kelly	Mark Wagner
Paul Miller	Charles Williams

In addition to Department of Fish and Game biologists the following agencies and institutions cooperated with the Tagging Program donating personnel and time:

Long Beach Aquarium of the Pacific, Monterey Bay Aquarium, San Francisco's Underwater World, and the National Marine Fisheries Service.

PROGRAM ACTIVITIES

CDFG conducted its shark tagging cruise in August aboard the *R/V Mako*. Unfortunately, due to crew vacancies on the

boat, the cruise was drastically reduced from a planned 12 days to only four. This severely limited our abilities to fish a variety of spots. As luck would have it, the locations we chose were the wrong ones.

Department biologists and volunteers tagged a total of five sharks (3 mako sharks and 2 blue sharks). The only bycatch was a single pelagic stingray (*Dasyatis violacea*). Biologists and volunteers alike were disappointed with the results and hope that next year will be better.

Five volunteers assisted on the cruise. Diego Bernal (Scripps Institution of Oceanography) is a doctoral candidate studying mako shark physiology. He has participated on previous cruises, to assist our efforts and collect his own data. Steve and Debbie Prime are volunteers in the Shark Tagging Program. Steve and Debbie offered assistance and advice for all cruise operations. Dave and Hunter Lodarski won a trip on the *R/V Mako* in a drawing at a hunter education function. Dave and Hunter were a big help, and Dave also volunteered his services as ship's cook for the cruise.

Tagging Program staff attended two shark fishing tournaments this summer. In August we attended the skippers' meeting for the Marina Del Rey Mako for Dollars tournament. Tournament organizers and participants were very receptive to tag and release fishing information. Tags were provided for tournament participants, and new taggers enrolled in the Program.

In September we attended the skippers' meeting for the Redondo Beach Mako My Night tournament. Questions were answered regarding what to do with large shark specimens to make them useful to scientists. The cooperation of the tournaments' organizers is a valuable asset, and we look forward to future participation.

In July talks were given at two sessions of Shark Camp. This camp is a new educational program run by the Long Beach Maritime Center of Excellence. Students at the camp received information about the Shark Tagging Program, and current shark research. In addition, a question and answer period allowed students to learn about a variety of marine fisheries issues and potential careers.

BIG MAKOS CAUGHT OFF CALIFORNIA

The summer's fishing season started slowly off Southern California. At the beginning of August catches were low and anglers were wondering if any mako sharks would be found this year. By the beginning of September, however, things really started to take off. Total numbers of fish were still low, but the number and size of big makos, ones rarely captured off California, increased dramatically.

Some of the biggest fish were encountered by tournament



Photo Courtesy Tom Brooks Jr.

fishermen. In some years these tournaments are won by fish in the 100 to 200 pound range. This year many saw fish well above 300 pounds. An angler in the Marina Del Rey Mako for Dollars tournament had a reported 11-footer to the boat three times before losing it.

Even more exciting (at least for the fisherman) was the 9' 6", 426 pounder caught by spear fisherman Stewart Graham of San Diego. Graham was free diving off Los Coronados islands when he spotted the big mako. Having seen sharks before, he stayed in the water, not worried about the possibility of attack. Shortly after sighting the shark, however, he turned to see it rushing at him. Graham did what came naturally and took a shot. The spear entered the shark's mouth, hit a gill, and continued into its stomach. The lucky shot subdued the shark enough for Graham to land it.

In the same month a group of anglers, including shark taggers Barry Anderson and Jerry Barber, landed a 10 ½ footer at the Isthmus on Catalina Island. The mako was hooked three miles Southwest of Cat Harbor, on the back side of Catalina. It took a group effort and more than three hours for the anglers to get the fish to the boat.

None of these catches, however, compared to what came next. On September 5th Tom Brooks Jr. brought an 11' 6" foot mako to the docks in Redondo Beach. Brooks is a long-time shark fisherman who has waited for years to catch a fish this big. The mako weighed in at 986 pounds, breaking the old state record by just over 400 pounds. In addition to submitting the fish for the record, Brooks saved the shark's internal organs and donated them to researchers at the National Marine Fisheries Service.

Just two weeks later, however, the record was again broken. Chris Badsey brought an 11' 5" mako into Dana Point Harbor. It took Chris almost three hours to get the fish to the boat, and a grueling 7 hours to bring it in to port. The long trip was well worth it for Badsey, as the fish weighed in at 1,109 pounds. This became both the new state record and a possible new world record in the 80 lb. line class (the old record was 1,075 lbs.). Badsey also saved the shark's organs for scientific study. While it is unusual to see this many big makos in the sport catch, they do occur off California. It seems this year they were more abundant than usual. Colder-than-normal water temperatures might have brought the big fish closer to shore. The rare landings provided scientists with great opportunities to collect samples from larger fish.

NMFS PELAGIC SHARK STUDIES

The CDFG shark tagging program has participated in the juvenile shark abundance survey conducted annually by the National Marine Fisheries Service. The survey is designed to determine trends in local abundance of shortfin mako and

blue sharks in the Southern California Bight. Juvenile sharks are routinely tagged and released during this survey with CDFG shark tags. During 1998 and 1999 nearly 200 mako, blue and thresher sharks were also injected with oxytetracycline (OTC) for age and growth studies. The OTC creates a fluorescent line in the growth ring of the vertebrae, which can give information on the growth of the fish when it is recaptured. These OTC injected fish carry two tags: a yellow spaghetti tag and a white dorsal fin tag. There is a \$25 reward for the return of the tag and a section of the vertebra.

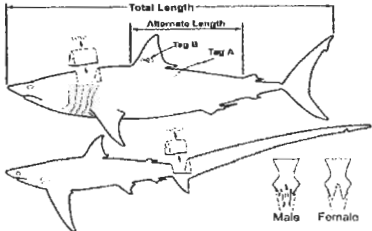
In a separate study, eight common thresher sharks were tagged with satellite pop-off tags to help determine migration and habitat patterns. These tags are black and 13 inches long (including the antenna). If these fish are recaptured, they should be released without harming them. Just note the white dorsal fin tag number.

If you are lucky enough to capture any of these sharks, please contact NMFS or CDFG biologists at NMFS-La Jolla (858) 546-7186 or CDFG-Long Beach (562) 590-5136.

WANTED

TAGGED MAKO AND THRESHER SHARKS

The National Marine Fisheries Service (NMFS) is cooperating with the California Department of Fish and Game and el Centro de Investigación Científica y Educación Superior de Ensenada (CICESE) in a shark tagging program. The purpose is to determine age and growth (determined by examining a section of backbone), migratory patterns and stock structure of mako and thresher sharks. The two types of tags being used are pictured below.



Fin Tag Legend: "Reward-Mess. Fish. Save Neck Spine. Call (588) 546-7186"

If you land a tagged shark, please provide the following:

1. Date of Capture
2. Location (including date, time, length, and gear)
3. Type of fishing gear
4. Total Length (head snout tip to dorsal fin) or Alternate Length (from front of dorsal fin to base of dorsal fin)
5. Sex (if dorsal fin tag present)
6. Please cut a piece of the backbone from in front of the dorsal fin or from the base of the fin (if tag is present). Provide a piece of the fin in 70% alcohol and call (588) 546-7186. On receipt of the information and backbone, you will receive a

\$\$\$ REWARD \$\$\$

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 four 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.