

Spiry Dogfish Tagging on the Atlantic and Pacific Coasts

- A Review

by

John Hoberman
Volunteer Summer Assistant

Woods Hole Laboratory
Manuscript Report Number
59 - 1

Woods Hole, Massachusetts
August 20, 1959

INTRODUCTION

Past studies of the spiny dogfish (Squalus acanthias)^{1/} have concentrated on the liver, liver-oils or anatomical descriptions, with only one or two comprehensive life-history studies of this small shark. In all of the studies there is a noticeable lack of information about the movements and migrations of the spiny dogfish. However, scattered through the literature are references to programs in which dogfish were tagged, either as a major study or incidental to tagging of other species. It is the purpose of this present study to review the available literature on dogfish tagging in North American waters, with particular emphasis on the tag and tagging method.

^{1/} The spiny dogfish of the Atlantic has been named S. acanthias, whereas that of the Pacific has been named S. suckleyi. However, Bigelow and Schroeder (1948) consider both Atlantic and Pacific forms to be the same species, S. acanthias. We shall follow their recommendations in this paper.

Pacific Coast Tagging

The earliest and most extensive spiny dogfish tagging programs have been those carried out on the Pacific coast by United States and Canadian laboratories. The longest reported migrations of tagged dogfish have come from these programs; in one case the fish had crossed the Pacific Ocean and was recaptured in Japan.

In June and July of 1928, 21 dogfish were tagged in the Nanaimo area of British Columbia, (Clemens, 1932) but only one recovery was reported. This fish had been tagged off Gabriola Bluffs, Gabriola I., Vancouver I., B.C. and was recovered five months later, 44 miles away, at White Rock on the mainland at the opposite side of the strait. Later that year, in August and September, 45 dogfish were tagged in the Cracroft area but none were recaptured.

Clemens does not state what tag was used, but since the dogfish were tagged incidentally during a salmon tagging operation, it is probably safe to assume he used the salmon tag. This is described in an earlier publication as an aluminum strap tag attached to the caudal fin. The dogfish for tagging were caught with salmon trolling gear.

Manzer (1946) reports examples of long migrations for nine species of tagged fishes, one of which, a dogfish, traveled 1125 miles in 171 days. The fish was tagged by the Pacific Biological Station of the Fisheries Research Board of Canada in September 1945, 6 miles northeast of Fife Point, in the Queen Charlotte Islands, British Columbia, and was recaptured March 1946 one and one-half miles south of Santa Cruz, California. The report gives no details on the type of tag, method of capture or the number of dogfish tagged in the experiment.

The Fisheries Research Board of Canada, Pacific Biological Station, noted (Anon. 1952) the recapture of a female dogfish measuring $25\frac{1}{2}$ inches in length and weighing $2\frac{1}{2}$ pounds which had been tagged inside Comox Bar, Strait of Georgia, British Columbia, at the Denmar Island end in November, 1944 and was recovered in October, 1952 at Deep Bay, British Columbia, by a British Columbia fishing vessel. In nearly 8 years the fish had grown $5\text{-}5/8$ inches and had gained $1\frac{1}{2}$ pounds but was recovered only 15 miles from the tagging point. The note gives no details about type of tag, number of dogfish tagged or other recoveries.

In 1940, 1942, and 1943, an extensive dogfish tagging program was conducted in the vicinity of Vancouver I., British Columbia (Holland, 1957). The final phase of the project was carried out from September, 1944 to August, 1946. In all, 9705 dogfish were tagged and released.

Sixty-two percent of the fish for tagging were caught in an otter trawl, 35 percent were caught in a herring trap in Holmes Harbor, Puget Sound and 3 percent were caught on set lines.

The tag used in this program was a celluloid Peterson-type disc, one-half inch in diameter and 0.03 inches thick with a center hole 0.04 inches in diameter. The tag was fastened to the fish by a pin inserted through the base of the first dorsal fin a short distance posterior to the spine, and twisted in such a manner as to bind one disc on each side of the fin.

Of 9705 tagged fish, the number of recoveries up to 1957 was 655, 6.7 percent recovery (table 1). One dogfish, a male, measuring 94 cm. when tagged was released in October, 1944 near Cape Shoalwater at the entrance to Willapa Bay. In February, 1952, the fish was recaptured off the northern end of Honshu I., Japan, after traveling a direct distance of 4700

nautical miles. It is worth noting that two other fish were at liberty for eight years and another fish was at liberty for ten years. Most of the recoveries, however, were made three or four years after tagging. The majority of the recaptured fish were caught in otter trawls (table 2), the rest were caught in gill nets and other types of gear.

Atlantic Coast Tagging

Recent dogfish tagging on the Atlantic coast has shown that in general the fish travel in a north - south direction. The movements are largely restricted to the coastal waters with only one reported long-distance offshore migration. This one fish is reported by Templeman (1958) and is noted later in the present paper.

A total of 279 dogfish were tagged $3\frac{1}{2}$ miles north of St. John's, Newfoundland in July, 1942 (Templeman, 1944). The fish used were taken in a salmon gill net and one dollar reward was offered for the return of each tag. Up to 1944, only 9 tags (3.2%) had been returned. The recaptures to 1944 are shown in table 3. The most notable recapture was one fish which traveled nearly 1000 miles in 132 days and was recovered off Gloucester, Massachusetts.

In a later paper, Templeman (1954) reported the 1942 experiment in greater detail, brought the recaptures up to date (table 4), and described the tag used in 1942. One fish which moved from Newfoundland to Cape Henry, Virginia, a distance of over 1300 miles from the tagging point and was at liberty for 5 years and 5 months.

The tags were of bright red cellulose nitrate, 32 mm. long and 8 mm. wide, with the printing below a superficial layer of celluloid (see fig. 1). Each tag was attached by one end to an 0.81 mm. diameter nickel wire which was inserted through the flesh and the base of the spine anterior to the dorsal fin. A large hypodermic needle was used in the tagging operation, presumedly to make a hole for insertion of the tag wire.

The longest offshore migration of a tagged dogfish is reported by Templeman (1958). The fish, tagged by researchers aboard the Investigator II of the Biological Station, St. John's, Newfoundland, June 13, 1947, on the southwest slope of the Grand Bank, was recaptured August 31, 1957, after over 10 years of freedom in Faxa Bay, near Reykjavik, Iceland, after traveling a straight line distance of over 1300 nautical miles. The dogfish was caught by an Icelandic motorboat in a common haddock net and was

said to be one of a very great shoal of dogfish migrating into Faxe Bay. The length when tagged was 73 cm. and the length when recaptured was 81.1 cm.

The laminated tag was of bright red cellulose (cellulose nitrate) $1\frac{1}{4}$ inches long, $\frac{5}{16}$ of an inch broad, and 0.03 of an inch thick, rounded at the ends and was attached through a hole at one end to an 0.032 of an inch diameter nickel wire. The wire was inserted through the flesh at the base of the spine in front of the dorsal fin. Presumably this is the same tag used in Templeman's previous experiments.

The tag was in excellent condition. However, the nickel wire was somewhat corroded and reduced in size in the area where it was twisted tightly to attach the tag to the wire and probably would not have lasted more than a year or two longer. Wherever the wire had not been twisted it was relatively uninjured. Bending alone did not lead to erosion. The wire, however, was much more brittle than it was originally and broke at the eroded parts on handling. On recapture there was only a very small wound around the wire and the tag was quite firmly attached.

In July, 1956, a total of 155 spiny dogfish were tagged with Petersen discs by Fish & Wildlife Service biologists aboard the research vessel T-79^{2/}.

The tags were fastened with stainless steel pins and were attached to the dorsal fin of the first 20 fish and through the snout of the rest of the fish. Each tag consisted of a numbered disc and a message disc.

The dogfish used were caught on a line-trawl and were released about 20 miles northeast of Cape Ann, Massachusetts. There have been six recaptures of these fish (see table 5 and figure 2).

In October of 1957, 50 spiny dogfish were tagged through the dorsal fin with Petersen tags.^{2/} The fish were caught on central Browns Bank in an otter trawl and tagged by Fish & Wildlife Service biologists aboard the research vessel Albatross III. To date, only one fish has been recovered. This fish was recaptured in the Bay of Fundy after 9 months at liberty and moved a straight line distance of 140 miles.

^{2/} Fish and Wildlife Service unpublished data.

LITERATURE CITED

Anonymous.

1952. Contrast in dogfish migrations. Fish. Res. Bd. Can., Pac. Prog. Rep. No. 92, p. 20.

Bigelow, Henry B. and William C. Schroeder.

1948. Fishes of the western North Atlantic, Pt. 1, Mem. Sears Found. Mar. Res., No. 1, pp. 450-499.

Clemens, W.A.

1932. Pacific salmon migration. The tagging of the spring salmon on the east coast of Vancouver I. in 1927 and 1928 with notes on incidental tagging of other fish. Bull. Biol. Bd. Can., 27(9): 1-10.

Holland, G.A.

1957. Migration and growth of the dogfish shark, Squalus acanthias (L.) of the eastern North Pacific ocean. Wash. Dept. Fish., Fish. Res. Paper, 2(1): 43-59.

Manzev, J.I.

1946. Interesting movements as shown by the recoveries of certain species of tagged fish. Fish. Res. Bd. Can., Pac. Prog. Rep., No. 67, p. 31.

Templeman, Wilfred.

1954. Migrations of spiny dogfish tagged in Newfoundland waters. Jour. Fish. Res. Bd. Can., 11(4): 351-354.

Templeman, Wilfred.

1958. Grand Bank tagged dogfish moves to Iceland. Fish. Res. Bd. Can., Atl. Prog. Rep., No. 70, pp. 28-30.