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Review of Canadian Fishery and Research on Large Pelagic Fish in the ICNAF Area in 1963

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Swordfish

The study of swordfish and the swordfish fishery that was started in 1958 was continued on a small scale during 1963. Landing statistics and log-book records were examined to follow variations in the distribution of catches and the effort involved in fishing for swordfish. Studies of the size and weight composition of catches by months and by areas were included in the program. Activities during 1963 included two trips on a commercial fishing vessel, the M. V. Beinir, for direct observation of fishing techniques and for biological studies of the catch.

The new method of fishing (longlining) that was introduced into the swordfish fishery towards the end of the 1962 fishing season was continued and expanded in 1963. Of 122 fishing vessels known to have fished for swordfish in 1963, only 4 used harpoons exclusively. Forty-eight vessels fished with both harpoons and longlines and 70 vessels used only longlines. This is remarkable for a fishery that has been virtually unchanged since its beginning at the start of the present century. Equally remarkable, of course, has been the increase in landings of swordfish. Preliminary tabulations indicate a catch of 5620. 5 metric tons in 1963 as compared with 1584. 4 metric tons the previous year.

Under ideal fishing conditions longlining appears to be considerably more effective than harpooning for catching swordfish. In addition, longlines can be used at night and when the weather is unsuitable for harpooning. Longlines can be used successfully for, at least, 8 months of the year, whereas harpooning rarely lasts more than 4 months. Still another advantage is that both male and female swordfish are taken with longlines, whereas only females are taken with harpoons.

The accompanying table summarizes the information obtained from log records in 1963 and compares results with similar data for 1961 and 1962. For this table, only the log records from vessels fully occupied with swordfish fishing were used. Many vessels are engaged in mixed fishing and some make only one or two short swordfish trips each season. The records from such vessels are not included in the table.

The table shows that the results of fishing were considerably better in 1963 than in the two previous years. With less days at sea and less fishing days per trip, the number of fish caught per trip was increased about threefold. Less spectacular was the increase in dollar earnings which did not parallel the increase in catch. The average landed value per pound (0. 454 kg) for swordfish in 1963 was only 20. 9 cents as compared to 38. 8 cents in 1961 and 45. 4 cents in 1962.

Biological studies were concerned chiefly with length and weight measurements of swordfish from commercial catches landed in southwest Nova Scotia during the summer months. In addition, two trips on a commercial fishing vessel provided information on various aspects of the biology of swordfish but these data have not been fully examined as yet.

Summary of swordfish log records, 1961-63

	1961	1962	1963
Total no. of trip records	175	158	205
Total no. of days at sea	2323	2226	2151
Total no. of fishing days	1847	1725	1526
Total no. of fish caught	6117	6261	24903
Total weight of fish caught (metric tons)	561.5	560.0	1936.6
Av. no. days at sea per trip	13	14	10
Av. no. fishing days per trip	11	11	7
Av. no. fish caught per day at sea	2.6	2.8	11.6
Av. no fish caught per day fishing	3.3	3.6	16.3
Av. no fish caught per trip	35	40	121
Av. landing per trip (metric tons)	3.2	3.5	9.4
Av. Gross stock per trip ($)	2745	3544	4290
*Av. annual landing per vessel (metric tons)	16.0	18.1	69.0
*Av. annual gross stock per vessel ($)	13723	18061	31316

*Based on 4 or more trips per vessel

The dressed weight of 5216 swordfish examined at Yarmouth during 1963 varied from 25 to 660 pounds (11 to 300 kg). The mean weight was 166.5 pounds (75.6 kg). Compared with similar data obtained in 1962 (190.5 pounds (86.5 kg) average weight for 532 fish) the swordfish caught in 1963 were considerably smaller. The size composition, however, varies with the season and with the area fished, and there are completely different size distributions for fish caught on the Nova Scotia Banks in October and those caught on Georges Bank in November. These observations tend to discredit an earlier view that there is a migration of swordfish northeastward in the spring and early summer and a retreat to the south and west in the autumn. Certainly the stock that was fished in October on the Nova Scotia Banks was not the same stock fished on Georges Bank in November. These results are not in agreement with earlier work which showed little or no size differences for the various fishing areas and only minor variations seasonally. It is obvious that much work needs to be done along these lines to show what resources we are exploiting.

Tuna

Landings of tuna in 1963 amounted to 452 metric tons, a fourfold increase over the landings in the previous year. Most of the increase in landings occurred in the West Isles district of Charlotte County, New Brunswick, where two new tuna purse seiners, operating during the last half of the year, made substantial catches of bluefin and skipjack. Altogether these vessels caught 287 metric tons of bluefin and 45 metric tons of skipjack. Fishing was carried on in the Cape Cod region of Massachusetts (Subarea 5) and southward to Long Island, New York. The balance (120 metric tons) of the 1963 tuna catch was made mainly in the inshore areas of Nova Scotia (Subarea 4).

Tunas and bonitos are among the greatest but least developed of the world's fishery resources. In recent years, however, tuna fishing has expanded rapidly and landings have been doubling about every 10 years since the turn of the century. This expansion may continue for some time because the fishery is now invading both the North and South Atlantic Oceans, which are still relatively unexploited. In 1956 landings of tunas and bonitos from the Atlantic amounted to 77,111 metric tons or 10% of the world catch of these species. By 1960 the Atlantic catch had risen to 185,068 metric tons or 20% of the world catch.

Tunas and bonitos are widely distributed in the Northwest Atlantic but their seasonal distribution patterns, abundance, behaviour, growth, spawning, and feeding habits are not well known. Such knowledge, however, is important for the development and management of a commercial fishery and a start was made in 1963 toward its accumulation.

There are five species of tuna (bluefin, bigeye, yellowfin, albacore, and blackfin) in the western North Atlantic, all of which would appear to be available in commercial quantities to Canadian fishermen. In addition, there are several bonitos of which the skipjack probably has most commercial significance.

Three of the tuna species (yellowfin, bigeye, and albacore) are generally distributed in the warm waters of the North Atlantic. Seasonally they move northwestward into the waters of the continental slopes and occasionally into the continental shelf area. The northernmost western Atlantic record for yellowfin and bigeye is Browns Bank and for the albacore, Banquereau. The blackfin is found mainly near land or in relatively shallow water (less than 15 fathoms (27 m)) and only rarely occurs north of Cape Hatteras. The bluefin occurs throughout a large part of the western Atlantic. It has the most dramatic and complicated migratory pattern of all the tunas and changes its habitat both seasonally and at various stages in its life-history.

During the period July through October, bluefins come in close to the continental shelf between Cape Hatteras and Newfoundland. The areas of concentration may change from year to year and sometimes after periods of 2 or 3 years and longer. Most landings of small bluefin are taken from Cape Cod southwestward and on the outer shoals or banks. Medium-sized and larger bluefin are generally taken from eastern Long Island and northeastward. The smaller fish favour warmer water while the larger ones frequent both warm and cold.

The distribution of yellowfin is controlled by temperature. There are no records of its capture in waters less than 18.3°C (64.9°F) and it is usually found in much warmer waters. The albacore is a deep-swimming resident of oceanic waters and is taken almost exclusively by longline. It is tolerant of low temperatures and sometimes taken in waters whose surface temperature is below 15.5°C (60°F). The blackfin is a warm-water species that is restricted to the western Atlantic and extends its range very little northward in the summer. The bigeye is a deep-swimming inhabitant of the waters beyond the continental shelves. It is generally taken on oceanic longlines although a few are caught by surface trolling off the coast of Maryland.

During 1963 detailed records of the purse-seine fishing operations by the Blue Waters and Green Waters were obtained and samples of the catches of bluefin were examined for size distribution and body proportions.

The length composition of 161 bluefin tuna landed at Campobello, New Brunswick, during September and October was calculated. No ageing was done on these fish but it would appear from the length distribution that several age-classes were involved in the samples. The predominant size was 100-115 cm (fork length), weighing 50 to 60 pounds (23 to 27 kg). The size composition is substantially smaller than for bluefin taken in the coastal waters of Nova Scotia where 400-600 pound (182 to 273 kg) "giants" and 100-150 pound (45 to 68 kg) "jumpers" are the most commonly reported sizes.

An additional effort during 1963 was a small-scale tagging experiment which was conducted in St. Margaret's Bay, Nova Scotia, using trap-caught tuna. On August 29, 1963, 18 "giant" bluefin weighing 400 to 600 pounds (182 to 273 kg) each were tagged and released from a tuna trap at Croucher's Island. This is the first time that we have been able to tag tuna successfully in Canadian waters. As yet there have been no returns. Five of the tags used were an all-plastic type and the other 13 were plastic streamers with metal darts. Both types of tags have been used successfully by the Woods Hole Oceanographic Institution for tuna taggings.