Report on the Canadian Fishery for Albacore in 1979

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ABSTRACT

Ketchen, K. S. 1980. Report on the Canadian fishery for albacore in 1979. Can. Ind. Rep. Fish. Aquat. Sci. 116: 21 p.

Canadian catch of albacore in 1979 was estimated at 1,147,000 lb (520 tons), substantially more than in the preceding 4 years, despite a late start, inclement weather and imposition by the United States of an embargo on tuna products from Canada. The fishery was concentrated along a temperature front off the entrance to Queen Charlotte Sound. Most of the catch was made in the last two weeks of August during which period catch rates averaged 112 fish per boat day. Average weight of individual fish caught was 14.9 lb and 60% were in the 13-16 lb range.

RÉSUMÉ

Ketchen, K. S. 1980. Report on the Canadian fishery for albacore in 1979. Can. Ind. Rep. Fish. Aquat. Sci. 116: 21 p.

Les prises canadiennes de germon en 1979 sont évaluées à 1 147 000 lb (520 tonnes), soit un total substantiellement plus élevé que celui des quatre années précédentes, malgré le retard du début des activités, les mauvaises conditions météorologiques et l'imposition par les Etats-Unis d'un embargo sur les produits canadiens du thon. La pêche a été concentrée le long d'un système météorologique frontal au large de l'entrée du détroit Reine-Charlotte. La plupart des prises ont été faites pendant les deux dernières semaines d'août, les taux de prises atteignant en moyenne 112 poissons par jour-bateau. Le poids moyen des prises individuelles était de 14,9 lb et 60% d'entre elles variaient entre 13 et 16 lb.

INTRODUCTION

Since 1974, reports on the Canadian fishery for albacore tuna (Thunnus alalunga) have appeared in the Technical Report Series or Information Bulletins of what is now known as the Field Services Branch (FSB) of the Fisheries Service, Pacific Region. These reports (Bourque, 1975; Lockner, 1977a, 1977b; Anon. 1978) were written primarily for the interest of fishermen, particularly those who had assisted the Fisheries Service by supplying logbook information.

Beginning in 1979 responsibility for reports on the albacore fishery was assumed by the Resource Services Branch (RSB). Although fishermen remain the primary audience for the present report on the 1979 fishery, there have been some changes in content and commentary to serve the additional purpose of providing information in a format which will be useful to Fisheries Management and in coastwide (U.S.A.-Canada) coordination of results.

This report reviews highlights not only of the fishery itself but also of attendant political and economic problems, which, along with some unusual oceanographic conditions, made 1979 a rather exceptional fishing year.

As in the past, details of fishing patterns and fishing success could not have been documented without the interest and dedication of fishermen who voluntarily submitted logbook records or provided necessary information through interviews with RSB port representatives and fishery officers aboard patrol boats.

METHOD OF COLLECTING FISHING INFORMATION

In any one year it is not only uncertain whether albacore will appear off British Columbia, but also how many and which particular Canadian vessels will engage in the fishery. Most are salmon trollers, so if salmon fishing is good, or if the price offered for albacore is relatively unattractive, fishermen may not bother to go after the latter species. If they do, it is usually on very short notice. Thus, historically the albacore fishery has been a difficult one to monitor.

In advance of the 1979 season, the Field Services Branch (FSB) mailed 30 special logbooks to fishermen who had landed albacore in at least one of the two preceding years. Ten others were distributed by the port observer/representative of the Resource Services Branch (RSB).

While fishing was actually in progress the Fisheries Patrol vessel TANU monitored radio conversations among Canadian fishermen and reported the names of 41 vessels believed to be fishing specifically for albacore. Captains of 35 of these vessels were sent logbook forms by mail in the hope that these would be filled in upon return to port or at the end of the

season. Thus, 75 captains had an opportunity, one way or another, to report details of their fishing operations through use of logbooks.

For the first time, and, as a back-up to the logbook system, some captains of vessels who landed at Prince Rupert and Vancouver were interviewed by RSB port representatives. The writer conducted a few additional interviews at Victoria, Nanaimo, Tofino, and Ucluelet.

EXTENT OF COVERAGE

Of the 75 captains who received logbooks (or post-fishing log sheets) only 47 actually participated in the fishery, and of these only 8 or 17% responded. Twenty-six other captains were interviewed at time of landing, making a total of 34 landings covered.

At least 104 Canadian vessels participated in the 1979 fishery. This figure represents the number of vessels that (a) appeared on fishing company landing records or on Field Service saleslips as having landed albacore and (b) were covered by interviews and logbook records but did not appear in fishing company or saleslip records. The number of vessels that fitted in neither of these categories, i.e. those that sold directly to the general public is not known precisely. Thus 104 is a minimum estimate of the number of vessels that took part in the fishery and therefore coverage was no more than 34/104 or 32%.

Another indication of coverage is one expressed in terms of the amount of fish known to have been landed. About 407,400 lb (185 tons) were recorded in logbook/interview records out of an estimated total landing of 1,147,346 lb (520 tons)[1]--which suggests that about 35% of the landings were identifiable with information on area of catch and fishing effort. In this report it will be presumed that the coverage was representative of fleet activites as a whole, even though such may not have been the case.

INTERNATIONAL AND ECONOMIC HIGHLIGHTS OF THE 1979 SEASON

A number of non-fishery events made 1979 a unique fishing year, and, because of their "domino" effect they are best reviewed not only in the order in which they occurred, but also as a necessary preface to discussion of the fishery itself.

Conflicting U.S.A. and Canadian positions on highly migratory species

For several years it has been apparent from new legislation respecting extension of fisheries jurisdiction that the United States and

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[1]The method of estimating total landing is described later.

Canada had differing views regarding the special status of highly migratory species such as the tunas. Canada, on the one hand, claims jurisdiction over all marine species including tuna occurring within the 200-mile zone, while the United States claims that a coastal state has no jurisdiction over highly migratory species beyond its own territorial sea. In anticipation of action by Canada in 1979, the National Marine Fisheries Service in the United States announced on August 17 that it would provide vessel seizure insurance to United States fishermen intending to catch albacore in Canadian waters (Anon. 1979a).

Arrest of United States vessels

United States albacore vessels began fishing in Canada's zone of extended jurisdiction in the third week of August. First arrests by Canadian patrol vessels began about August 26, and before the end of the season nineteen vessels had been apprehended.

U.S. embargo on tuna products

After a brief exchange of views between the two countries, the United States enacted domestic legislation which in effect places a ban on the importation of tuna products from any country that seizes United States tuna vessels in waters (beyond the 12-mile territorial sea) which that other country considers to be under national jurisdiction.

Impact on the Canadian fishery

The foregoing actions and reactions had two immediate effects on the conduct of the Canadian fishery:

a) It is well known that, because albacore occur over a relatively wide area of the ocean and travel in small, often fast-moving schools, a substantial fleet of vessels is required first to find the fish and then to maintain contact with them. It is likewise well known that the presence of a United States fishing fleet off the Canadian coast helps Canadian fishermen (whose main preoccupation is salmon) to determine the progress of the seasonal migration of albacore and where the best fishing areas are likely to be. In 1979, Canadian vessels had to find and maintain contact with the albacore without the help of U.S. fishermen. This undoubtedly affected the extent of the area fished, catch rates and duration of the fishing season.

b) At the beginning of the 1979 season, it appeared that the prices offered for albacore would be sufficient to attract a Canadian fishing operation. However, upon announcement of the United States embargo, the price dropped by at least half and indeed some Canadian companies refused to take any albacore at all. This reaction stemmed from the fact that almost all albacore caught by Canadian fishermen are usually shipped in the round to United States canneries specially equipped to handle that species.

The embargo, perhaps more than any other factor, foreshortened the season for Canadian fishermen. Furthermore because of their unwillingness or inability to market their catches through commercial outlets, a considerable number of fishermen sold their catches piece-by-piece to the general public. As saleslips are not mandatory[2], some of these transactions were unreported. Thus arose the unusual situation where total Canadian catch for the year could only be roughly estimated.

FISHING AND BIOLOGICAL HIGHLIGHTS OF THE 1979 SEASON

Total Canadian catch

In 1979 part of the albacore catch was sold directly to the general public and hence did not appear in fishing company records or on Fisheries Service saleslips. The ony way to make up for this deficiency is to determine from interview and logbook records the proportion of the total landings that were actually reported. The arithmetic is as follows:

Interview/log records accounted for 407,400 lb of albacore, of which 217,500 lb could be matched with company/saleslip records. In other words only 53.4% of the "sampled" landings were reported. Knowning the total amount of albacore reported on company/saleslip records, namely, 612,683 lb, we may estimate the grand total landing as 612,683 ÷ .534 = 1,147,346 lb, or, 520 t. This means that probably 1,147,346 lb minus 612,683 lb or 534,663 lb were sold directly to the general public, or for other reasons did not appear on company or Field Service official records.

The foregoing calculations are based on the assumption that logbook/interview coverage was representative of the operations of the fleet as a whole. As this is probably not entirely true, the calculated total landing must be regarded only as an approximation. If it is reasonably accurate, we can say that production in 1979 was substantially better than in the preceding four years (despite market problems), but well below the 1,966,000 lb (892 t) average for all of the 1970's (Table 1).

At the present time there is no information on how much fish was caught by United States vessels in, or to seaward of the Canadian zone. After the arrests began, some vessels were reported working along the outer boundary of the 200-mile zone between the Cobb and Warwick seamounts.

Length of season and distribution of fishing effort

As early as June 13, 1979, the National Marine Fisheries Service (Southwest Fisheries Center) had predicted that albacore of the northern sub-stock, because of their late departure from the western Pacific, would not arrive off the northwestern U.S. coast until about mid-August (Anon.

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[2]Saleslips are required upon demand by the Minister or his representative (eg. Fishery Officer), although the power is seldom used.

1979b). Activity off Oregon and Washington indeed remained slow and intermittent through the first two weeks of that month, with reports of spotty fishing, rough seas and an absence of well established oceanic "fronts" (sharp boundaries between warm oceanic water and upwelled cold water near the coast).

In the Canadian zone, U.S. vessels (on charter) and the Canadian Fisheries patrol vessel TANU reported catches in the second week of August. A build-up in activity of Canadian commercial vessels began in the third week and reached a peak during the last week of the month. All the while, poor oceanographic conditions and lack of concentrations of food organisms contributed significantly to the rapid, presumably northward, movement of albacore and spotty catches from waters off the northwestern states (Anon. 1979c).

Fishing effort (as indicated by interview/logbook records) off the Canadian coast was not only concentrated closer to the coast than usual, but also restricted primarily to waters between Cape Cook and Cape St. James (exact locations are described later).

Most of the Canadian catch was made during the last week of August and probably would have been substantially greater had not a strong gale forced suspension of fishing for several days starting September 1st. When the gale abated and contact with albacore schools was re-established, fishing was much less successful and effort declined sharply, probably in response to the embargo announcement. In any event the albacore appeared to be on the move again and Canadian fishing activity (as indicated by interview/logbook data) came to an end around the middle of September.

Although most of the Canadian albacore catch was made in late August, 69% was landed in the month of September (Table 2). Reports of activity by United States vessels outside the Canadian zone, in the general vicinity of Cobb Seamount continued through mid-October (Anon. 1979e).

Areas of catch in relation to surface temperature conditions

Albacore, when present off the Canadian coast are usually to be found where surface water temperature is between 14.4°C (58°F) and 16.1°C (61°F). Staff of the Albacore Fisheries Program at La Jolla, California, consider that the 15.5°C (60°F) isotherm generally coincides with the migration route of albacore along ocean fronts of the Transition Zone[3] across the North Pacific (Anon. 1979c).

To simplify the description, we shall here refer to the general migration route as coinciding with 15-16°C. By late August 1979, it was apparent to the La Jolla staff that the 15-16°C isotherms were lying at about 45°N latitude from west of the date line to about 140-142°W longitude, but from there they angled northeastward to the Canadian coast lying north of Vancouver Island. This northward shift is quite apparent when one compares the position of the 15-16°C band of surface water in August 1979 with the long-term average position (Fig. 1).

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[3]This is a zone described by oceanographers as transitional between the Subarctic and Subtropic domains.

Events as we know them from logbook and interview records bear out the La Jolla staff's prediction. During the first two weeks of August the 15-16°C isotherms intersected the coast at the latitude of the Queen Charlotte Islands (Fig. 2). Surface temperatures were favourable for albacore and catches (such as they were during that period) were further to the north than usual, i.e. there was little activity directly off Vancouver Island. Whether this signified that albacore were moving directly into the Queen Charlotte Sound area from the open sea or had migrated north from the Oregon-Washington area is unknown. The lack of activity off Washington and southern Vancouver Island, as mentioned previously, may have been due to poor oceanographic conditions and the unwillingness of the fish to bite. In any event catch rates in the first two weeks of the month were relatively low (15 fish per day), suggesting that the albacore had not arrived in full force.

During the last two weeks of August (Fig. 3), the 15-16°C isotherms had shifted slightly southward and were closely bunched adjacent to Queen Charlotte Sound. This created a "front" against the colder water within the Sound itself and probably brought about a concentration of food organisms. In any event, it was along this "front" (actually along a line roughly following the 1000 fm or 1800 m contour) that heavy fishing developed. Catch rates averaged 112 fish per day, but in the most heavily fished 1° × 1° block the average was 126 per day and at least one vessel scored more than 330 fish for a single day in that two-week period.

By the first two weeks of September the 15-16°C isotherms had shifted southward slightly, but more important, they were now more widely separated (Fig. 4). In other words, the gale of early September probably had much to do with breaking down the "front". Nevertheless, albacore were still being taken off the Queen Charlotte Sound area, but catch rates had dropped substantially (averaging 47 fish per day) and this appeared to signal their departure. Whether they moved southward into the U.S. zone or to seaward of the British Columbia coast is not known.

While temperature conditions may have played an important role in determining the distribution of albacore during the relatively short 1979 season, the possibility cannot be overlooked that the true distribution (as opposed to the distribution indicated by Canadian catches) would have been more widespread had United States vessels been present.

Size composition of albacore

A total of 662 length measurements were taken of albacore landed by five vessels at Vancouver, Prince Rupert, Victoria and Ucluelet. The average fork length was 27.1 inches (68.8 cm) with a corresponding round weight of 14.9 lb (6.75 kg). Over 60% were in the 13-16 lb (5.9-7.3 kg) range.

The length composition in 1979 is compared in Figure 5 with that of United States vessels fishing off the Canadian coast (actually north of 48°00'N) from 1972 to 1977, inclusive. In none of the U.S. samples for this 6-yr period was there ever a mode around 68 cm. Distributions were either uni-modal or bi-modal, with modal sizes being in the 63-65 cm range for

small fish and 71-75 cm for the larger fish. The 1979 fish were of an in-between size, and the reason for this is not clear. It may reflect a difference in growth rate of the particular age group involved (possibly age 3+ years) or a difference in the manner in which albacore of various sizes distribute themselves once they arrive off the North American coast.

United States vessels encountered predominantly 13-14 pounders 95.9-6.4 kg) in the last two weeks of August 530-650 miles offshore between Cape Flattery and Willapa Bay (Anon. 1979c) and these corresponded fairly closely with fish taken at about the same time in Canadian waters off Queen Charlotte Sound. At the end of the month, albacore caught by U.S. vessels in the off-shore area were replaced by 7-8 pounders (3.2-3.6 kg) and by predominantly 10-11 pounders (4.5-5.0 kg) in the first two weeks of October (Anon. 1979d).

Incidentally, during the latter part of October a single albacore --the first ever--was caught at weather station PAPA (50°N; 145°W). This observation adds a modicum of support to the view that albacore migration routes in 1979 were farther north than usual.

Summary of coastwide production in 1979

Preliminary reports from the Southwest Fisheries Center at La Jolla indicate that United States albacore fishery in 1979 was one of the poorest on record (Anon. 1979e). By November 1st the catch was about 5,500 tons, to which may be added the Canadian catch of 521 tons for a total of 6,021 tons, the lowest catch since 1941 (Bartoo and Kikawa 1979). This may be compared with an average of 23,900 tons for the 1969-78 period.

Although North American landings of albacore have been following a general decline since 1975, U.S. biologists have voiced no alarm about a possible general decline in abundance of juvenile albacore reaching the North American coast. Instead, the poor fishery in 1979 was attributed to a variety of other factors: (1) late arrival of albacore off the North American coast, (2) weak or non-existent temperature fronts along much of the U.S. west coast, (3) difficult fishing conditions produced by high winds and rough seas, (4) fish not biting, especially off central California, (5) low availability of 12-15 pounders (5.5-6.8 kg) which normally make up a significant part of the catch off California, and, of course, (6) closure of the Canadian 200-mile zone to United States fishermen (Anon. 1979e).

SUMMARY

1. The Canadian catch of albacore in 1979 was estimated to be 1,147,650 lb (521 tons), substantially more than in the preceding four years, despite a late start, inclement weather and imposition by the United States of an embargo on tuna products from Canada.

2. At least 104 vessels were involved in the fishery, which took place mainly between Cape Cook and Cape St. James where a "front" between warm oceanic water and cold inshore water became established during the last two weeks of August. It was during this period that most of the Canadian catch was made.

3. The migration route of albacore across the eastern North Pacific in 1979 appeared to be farther to the north than usual. This and other factors, particularly the absence of favourable oceanographic conditions resulted in relatively poor fishing off the United States coast from northern California to Washington. Prospects of good fishing conditions off Canada had been predicted by the staff of the Albacore Research Program (NMFS) at La Jolla.

4. Average catch rate off Canada during late August was 112 fish per day, but ran to 125 per day in the area between Cape Scott and Cape St. James. Average weight of fish was 14.9 lb. Over 60% were in the 13-16 lb range.

5. Preliminary information indicates that the total North American catch in 1979 was little more than 6,000 tons, the lowest since 1941. During the 1969-78 decade the average was 22,900 tons.

ACKNOWLEDGMENTS

Special thanks are extended to fishermen who submitted logbook records of their 1979 fishing operation or provided equally valuable information through interviews. Without their help this report would not have been possible.

I am indebted to Anthony P. Majors of the NMFS Southwest Fisheries Center at La Jolla, California, for provision of data on the sizes of albacore caught in past fisheries off the Canadian coast by U.S. vessels. Thanks are also extended to R. M. Wowchuk of the Offshore Division of the Field Services Branch for his advice and assistance throughout the course of the 1979 fishery and during the preparation of this report.

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Table 1. Canadian albacore landings in thousands of pounds, 1960-69.

Year	Weight landed	Year	Weight landed
1960	468	1970	779
61	10	71	3,492
62	2	72	7,842
63	11	73	2,799
64	7	74	2,661
1965	33	1975	222
66	97	76	556
67	354	77	116
68	2,262	78	51
69	3,003	79	1,147(Est.)

Table 2. British Columbia landings of albacore by month in 1972-79 (figures in thousands of pounds with percentage in parenthesis)[a].

Year	July	August	September	October	November	Total
1972	98(1)	3,801(49)	3,261(42)	629(8)	2(0.02)	7,842
1973	2(1)	737(26)	1,806(64)	251(9)	3(0.1)	2,799
1974	72(3)	1,484(56)	997(37)	108(4)	-	2,661
1975	17(8)	158(71)	33(15)	3(1)	11(5)	222
1976	-	322(58)	228(41)	6(1)	-	556
1977	-	52(45)	40(34)	24(21)	-	116
1978	-	7(14)	40(78)	4(8)	-	51
1979	-	327(29)	795(69)	25(2)[b]	-	1,147

[a]Data for 1972-77 from Lockner (1977b) and Anon. (1978).

[b]Probably caught in August or September but stored in shore or boat freezers until October.

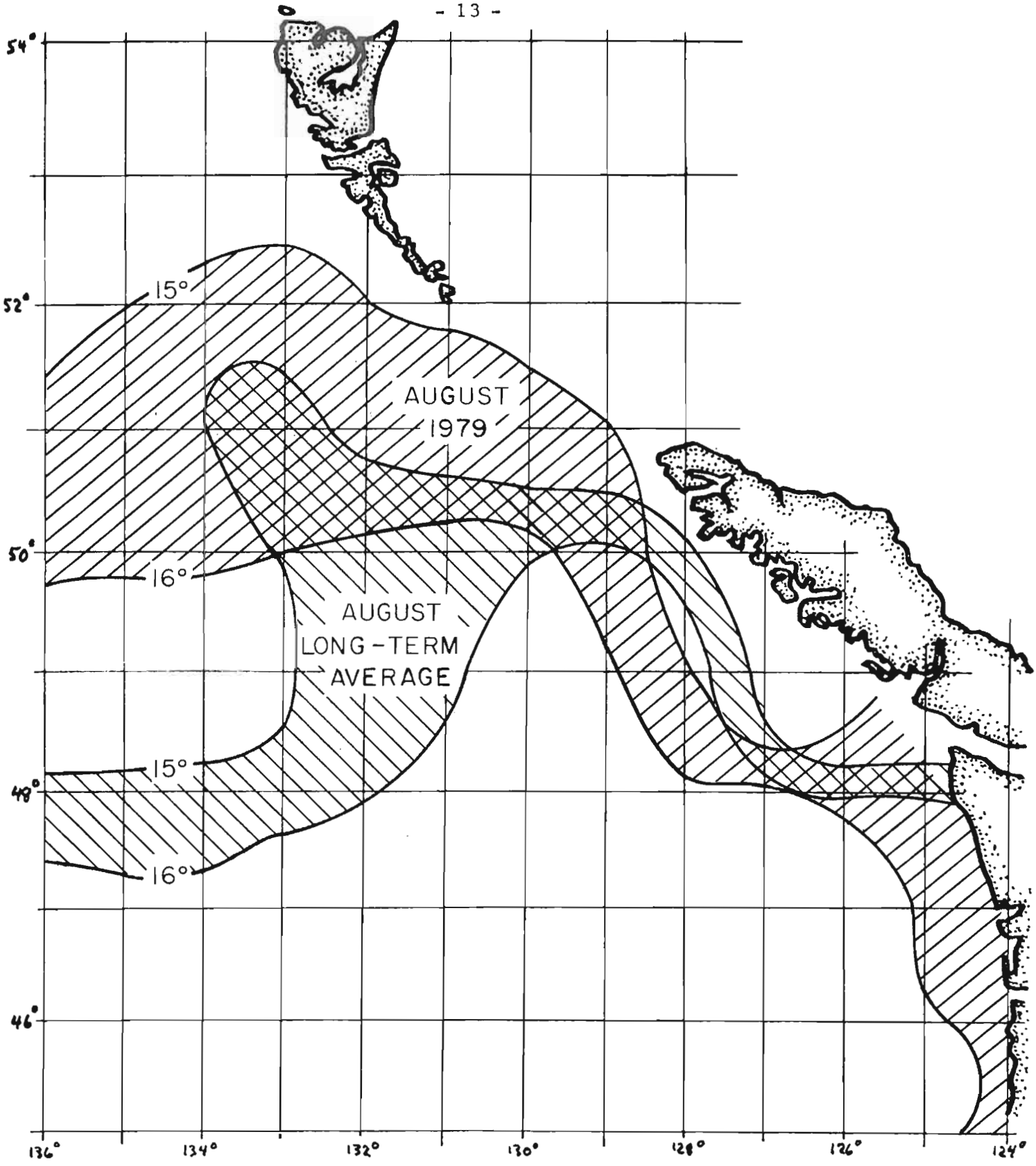

Fig. 1. Approximate position of the 15° and 16°C surface isotherms in August, 1979 (data from Anon. 1979f); long-term average position of these isotherms for the same month (data from Robinson and Bauer 1971).

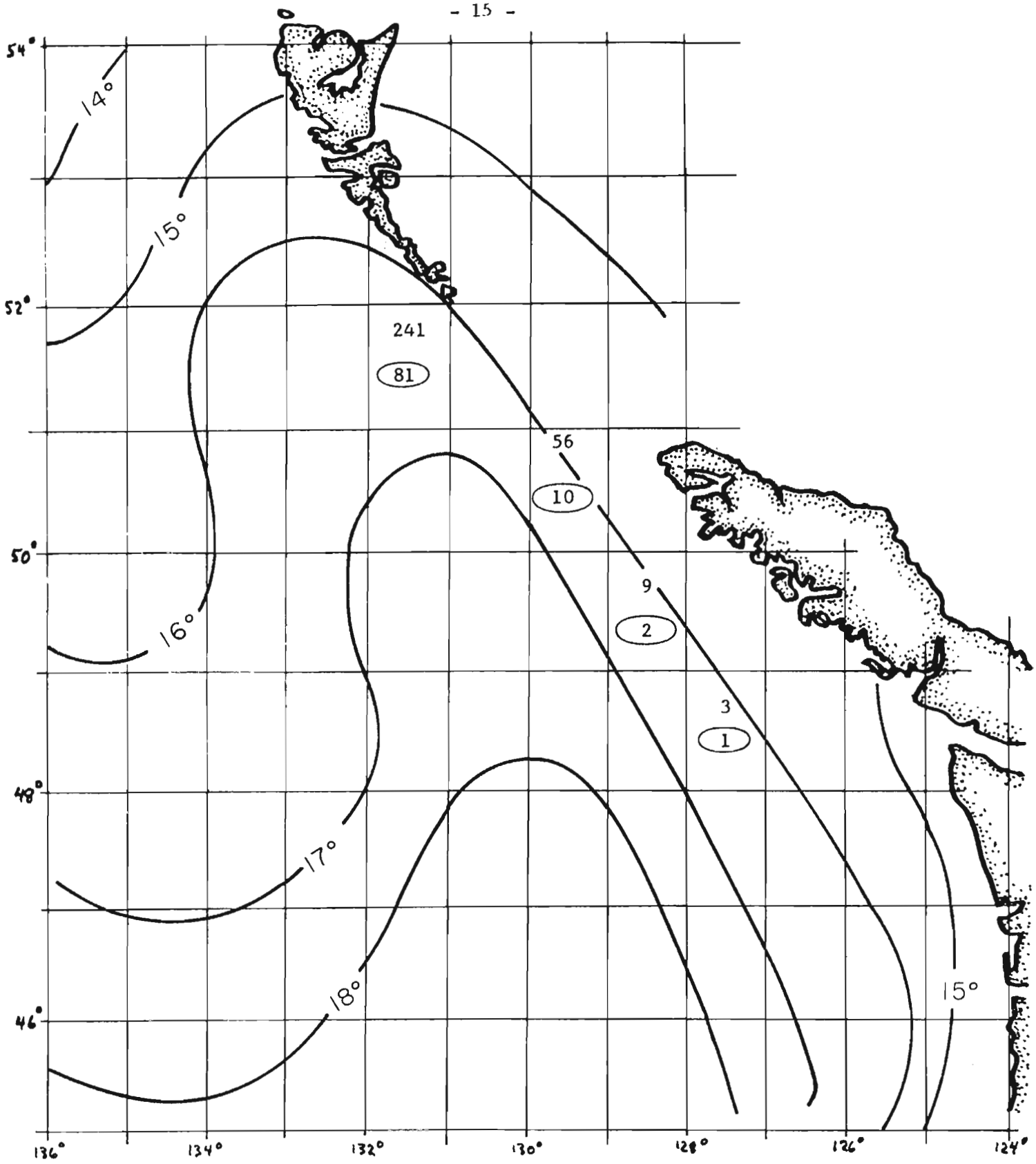

Fig. 2. August 1-15, 1979: Location of Canadian albacore catches (projected total numbers caught per 1° × 1° block) and catch rates (average number per boat day - figures enclosed in ovals) compared with approximate position of sea surface isotherms (°C) (data from METOC Centre, Esquimalt, B.C.).

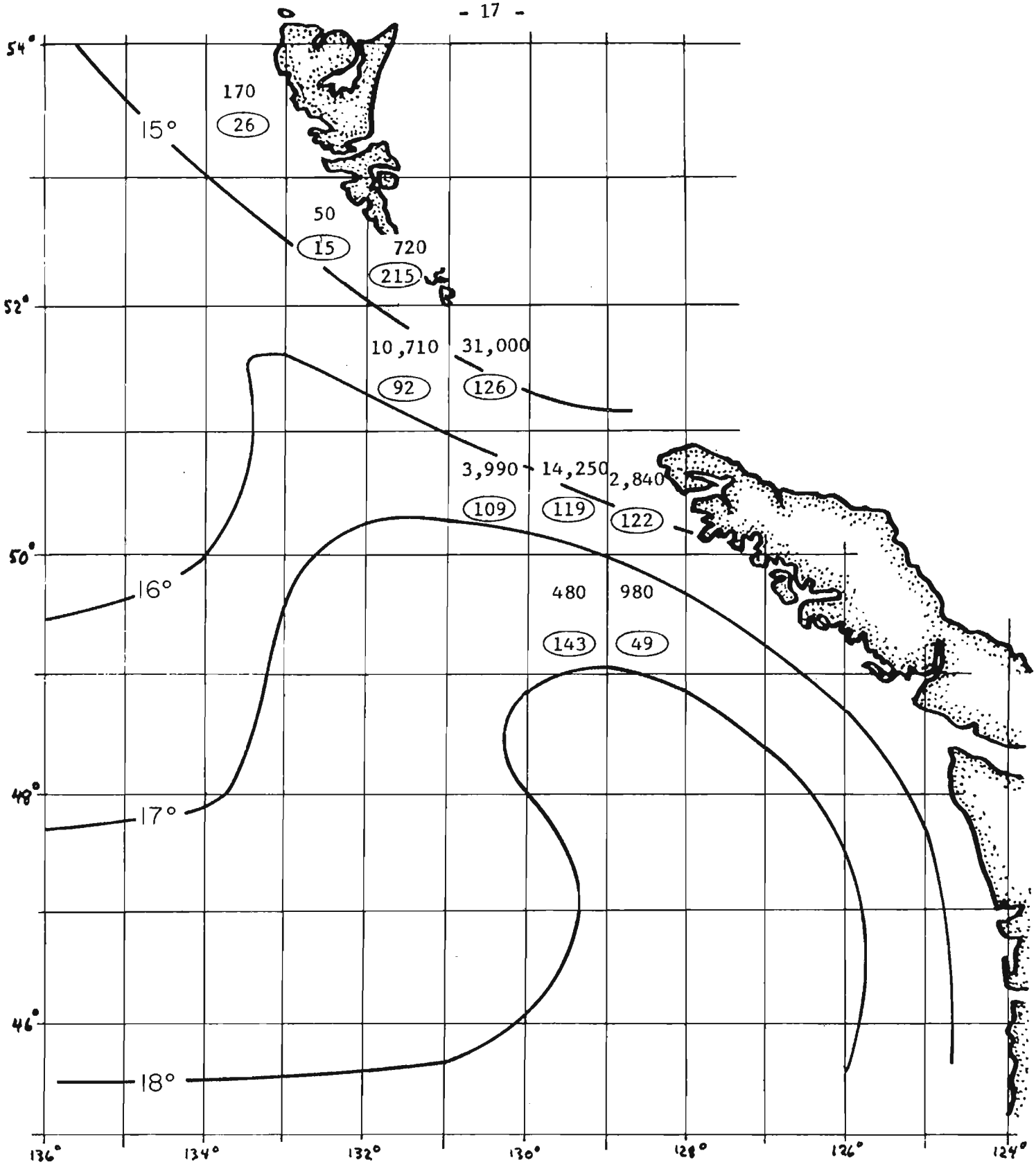

Fig. 3. August 16-31, 1979: Location of Canadian albacore catches (projected total numbers caught per 1° × 1° block) and catch rates (average number per boat day - figures enclosed in ovals) compared with approximate position of sea surface isotherms (°C) (data from METOC Centre, Esquimalt, B.C.).

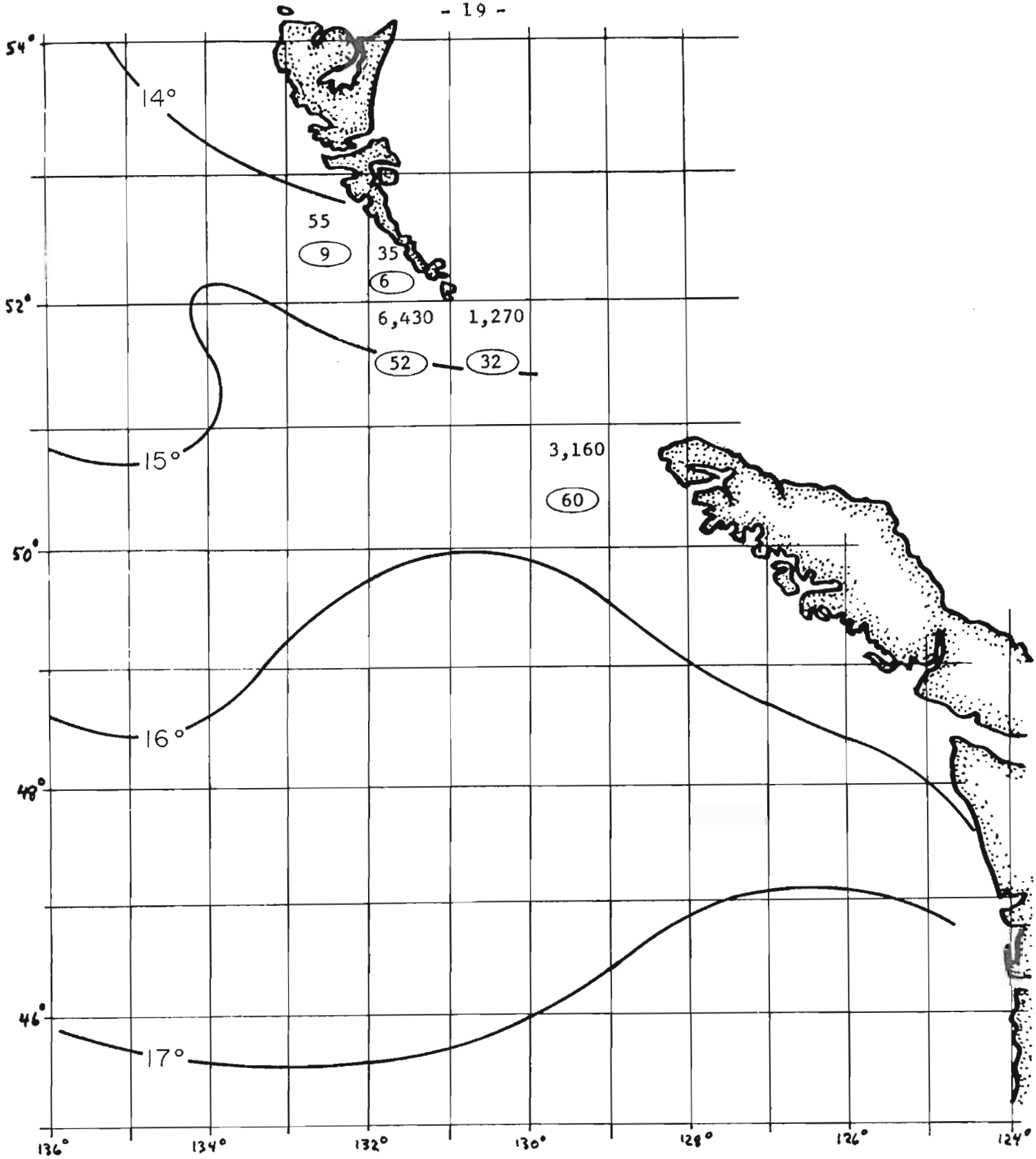

Fig. 4. September 1-15, 1979: Location of Canadian albacore catches (projected total numbers caught per 1° × 1° block) and catch rates (average number per boat day - figures enclosed in ovals) compared with approximate position of sea surface isotherms (°C) (data from METOC Centre, Esquimalt, B.C.).

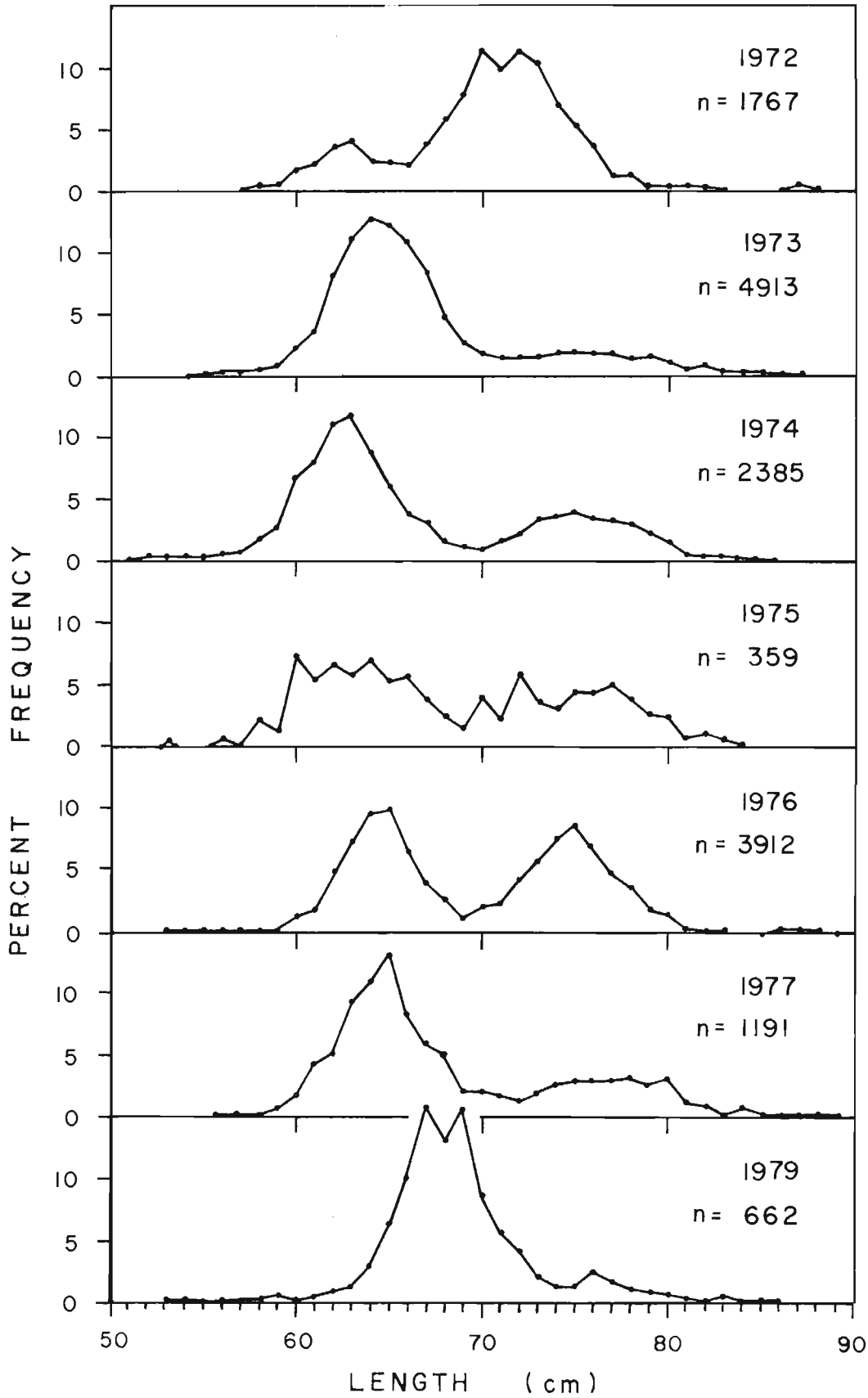

Fig. 5. Length frequency distribution in the United States jig-boat fishery for albacore north of 48°N (1972-1977) compared with Canadian data for the 1979 season.