

TABLE 1

Total "Fish" Catch of Japan Proper, 1934 - 1940 ^{a/}
(1000 metric tons)

	1934	1935	1936	1937	1938	1939	1940
<u>Coastal Catch</u>							
Fish	2,227	1,929	2,143	1,854	1,685	1,745	1,511
Shellfish	180	205	152	141	117	113	176
Crustaceans and Molluscs	190	136	158	153	212	228	227
Total	2,597	2,270	2,453	2,148	2,014	2,086	1,914
<u>"Deep Sea" Catch</u> ^{b/}							
Home waters	727	815	975	862	788	785	793
Korean waters	65	110	48	36	24	18	n.a.
Formosan waters	-	-	-	1	-	2	n.a.
Kwantung waters	4	6	8	5	5	4	3
South Sea Mandated area	n.a.	n.a.	2	4	4	3	n.a.
Soviet waters ^{c/}	108	75	86	83	72	77	n.a.
Trawling	52	53	52	50	38	36	34
Total	956	1,059	1,171	1,041	931	925	n.a.
<u>Aquiculture</u> ^{d/}	100	122	121	137	116	n.a.	n.a.
Grand Total	3,653	3,451	3,745	3,326	3,061	n.a. ^{e/}	n.a. ^{e/}

n.a. - not available

^{a/} These figures represent the total production of fish, shellfish, crustaceans and molluscs, i.e. the total "fish" catch which could be used as food. Seaweed, whales and seals are excluded as is the production of Karafuto waters and floating canneries for which catch data are not available. The figures indicated as not available are insignificant except those for 1940. The totals are made from all available official figures. Not only do the total figures represent production, but are thought to almost approximate domestic consumption. Although Japan had sizable fishing exports in prewar years these are thought to be offset here by the omission of the production of floating canneries, the crab production of Soviet waters and the fish imports from colonial areas (chiefly Korea). Although exports loom large in Japan's trade by value the actual volume is small as compared to the total catch. Domestic consumption during the immediate prewar years appears to have been about 3 million metric tons.

^{b/} Includes only the catch in these waters from operations based on Japan proper. In the fisheries of the Russian waters there are land bases on Soviet territory, but the boats sail each season from Japan. The fisheries listed here are often called the "pelagic" or "deep sea" fisheries of Japan although many of the operations are not deep sea fishing.

^{c/} Does not include crab production.

^{d/} Excluding amanori (seaweed), goldfish, pearl oyster, pearl shell and "other".

^{e/} Estimated at 3,130 for 1939 and 2,950 for 1940.

any other nation. These fishermen used more than 360,000 boats, or 45 percent of the world's total number of fishing boats.

The annual per capita consumption of fish for food in prewar years was more than 60 pounds, higher than in any other country. Lacking a significant livestock rearing industry Japan's population depended upon the fisheries to furnish almost all of their animal protein. Rice and fish with some green vegetables and fruit formed the staple diet of the population. Marine plants were also an important food item.

As the statistics cited above indicate, aquatic industries occupied a position of far greater importance in Japan than in most countries where fishing is looked upon as the poor relation of other much more important industries and is overshadowed by them.

Japanese fishing was largely concentrated in the coastal waters of Japan proper and the Pacific waters east of Japan, but operations were also carried on in the Yellow Sea, the China Sea, along the coasts of Korea (Chosen) and Karafuto (Japanese Sakhalin) and around the margins of the Okhotsk Sea. Of lesser importance were fisheries of tropical waters, Bering Sea and the Antarctic whaling region.

Much of the fishing industry, particularly that of the "deep sea", was modern large-scale business in which control was centralized in a relatively few corporations. The coastal fisheries, however, were largely operated by very small units; four-fifths of the fleet in 1938 was still composed of small craft less than 5 tons propelled by oars, sails or small motors and operating close to shore.

Some of the processing was likewise in the hands of large companies and closely coordinated with the fishing activities. This was especially true of the companies producing chiefly for the export markets such as those operating in the northern fisheries. The drying and salting of fish for home markets although done partly by the large-scale operators was also carried on in many small units.

The Japanese government has been active in the fishing industry -- in research, in training and in regulating the operations as well as in furthering the rapid and vigorous expansion of fishing into more distant seas. Government control permeates all parts of the industry and has been tightened during the war period.

Japan's widespread fishing operations have encountered controversies with other nations -- with the Soviet Union in its Northern fisheries, with the United States in its expansion of salmon fishing and with several nations regarding fur seal and whaling operations.

Although this guide deals with all aspects of the fisheries, either in or based upon Japan proper, emphasis is pointed toward the role of the industry in supplying food for domestic consumption. This was the primary importance of the industry in prewar years, although often overlooked by Westerners who were concerned with the Japanese export trade. Likewise the core of the fishery problems confronting military government authorities will be supplying food for the Japanese population.

II WARTIME CONDITIONS OF THE INDUSTRY

Decline in Production and Supply

During the war period the fishing industry has suffered seriously and this has, in turn, affected the food supply of the Japanese people. It has been estimated that the 1943-44 fish production was 2,360,000 metric tons and that of 1944-45 about 1,650,000 tons. In recent months the production has been drastically curtailed by naval operations close to the home islands.

The reduction in supply available for domestic consumption from about 3,000,000 tons in prewar years to 1,650,000 tons in 1944-45 can be expected to have seriously affected the Japanese diet, reducing annual per capita consumption from more than 60 pounds to about 40 pounds. This loss in a major protein food is important although it has been partly mitigated by increased soybean imports.

The decline in production has been due largely to developing shortages of boats, manpower and equipment, but has also been related to the government pricing of food fish. Many fishing vessels were commandeered by the armed forces, others were taken for transport purposes in the coastal trade and the inter-Empire trade, and some of the smaller boats were used for landing operations in China. The conscription of large numbers of fishermen, the removal of others from the industry for the operation of commercial boats and the transfer of some to more lucrative war industries resulted in a manpower shortage. Boats using Diesel oil or gasoline have had their operations restricted because of fuel shortages; rationing of

fuel for fishing boats began as early as August 1941. Shortages of nets, boat repair parts and other equipment were reported in 1941 and became widespread after 1943.

At first the outlying fisheries -- Northern waters, trawling and deep sea in "home waters" -- were most affected by these shortages, but the production of coastal fishermen also declined despite attempts to keep their production as high as possible. Output of the coastal fisheries was noticeably reduced in many areas by late 1943 because of these wartime shortages. In addition to these shortages there has been dissatisfaction among coastal fishermen with the prices established by the government and in recent months fear of destruction by Allied naval operations further curtailed fishing. Aquaculture production, although encouraged throughout the war period, is thought to have increased little, if at all, due to manpower shortages.

Wartime Distribution

In late 1941 fish was first rationed locally in those areas of Japan where supplies were short and irregular and in early 1942 the Food Control Bill provided partial control of marine foods. This bill, designed to strengthen government control of food, established a control structure national in scope and under the general supervision of the Bureau of Food Control of the Ministry of Agriculture and Commerce. 3/

3/ In the Cabinet reorganization of November 1943 the Ministry of Agriculture and Forestry and the Ministry of Commerce and Industry were combined to form the Ministry of Agriculture and Commerce. The new name is used in this section.

The actual control of the distribution of marine products was by control associations designated by prefectural governments. Under the controls established at this time emphasis was placed on seven consumption regions -- the six large cities -- Tokyo, Osaka, Yokohama, Kyoto, Kobe and Nagoya -- and Northern Kyushu. Elsewhere counties (guns) were designated as consuming areas. At this time salted and dried fish were mentioned as the most important items under control. Later eleven "designated consuming cities" for fresh fish and vegetables were named -- Tokyo, Yokohama, Nagoya, Kyoto, Osaka, Kobe, Hiroshima, Kure, Shimonoseki, Northern Kyushu and Sasebo. For these areas the Central Agricultural Association (Chuo Nogyo Kai) made shipping plans and monthly quotas and these, approved by the Ministry of Agriculture and Commerce, were sent to local associations. After August 1944, however, the Ministry of Agriculture and Commerce directly notified local governments of amounts needed and its shipping plans, making the local government authorities responsible for shipping the needed quantities of fresh fish.

Since much of the rationing control of fish during the war period has been local rather than nationwide, the per capita allowance is thought to have varied considerably within Japan and since transportation and distribution have been impaired some areas can be expected to have sufficient supplies whereas other areas, particularly the large cities, have suffered severe shortages. In Tokyo, for example, shortages were common in late 1943 and at times distribution is known to have been limited to two days or even one day per week.

Despite the control of food distribution illegal operations are widespread and many people who have the means supplement their rations through black market purchases. Fish is known to enter into the black market in considerable amounts.

Wartime Price Controls

A cabinet ordinance in August 1940 provided for price control for perishable foods, including fish and shellfish. Wholesale prices are fixed by prefectural governments with the advice of a price fixing committee, the whole system being administered by the Ministry of Agriculture and Commerce. Details of fish prices during the war are not available, but when prices were first set they were reduced below the free market price prevailing at the time. Up to April 1943 only minor upward revisions had been made. Fishermen's complaints that the government prices were too low prevailed and were one factor in both the reduced supply and in the large black market sales. In August 1944 the prices of fresh and salted fish were reported to have been revised upwards by more than 20 percent.

III ADMINISTRATION, CONTROL AND ORGANIZATION OF THE INDUSTRY ^{4/}

Pre-War Period

Government Administration and Control. The Imperial government administered the fishing industries of the coastal waters, the high seas and the interior waters through the Fisheries Bureau (Suisan Kyoku), one of six bureaus of the Ministry of Agriculture and Forestry (Norinsho). This bureau regulated and licensed certain fisheries such as trawling, whaling, factory ship operations and fur sealing. It supervised and aided the fishery associations and societies; it was active in fishery research, in conservation measures and in education. The compilation and publication of national fishery statistics was also carried on by this central bureau.

Even prior to the war there was hardly any phase of the fishing industry which was not subject to control, either direct or indirect by the Imperial government. In addition to the direct regulation of certain fisheries as mentioned above, the government exercised control through the central associations of the various fishery organizations. These central associations included associations to which companies dealing with certain phases of the industry were forced to belong as well as the central associations of fishing societies and cooperatives. In order to further centralize its control the government also sponsored, in the immediate prewar period, the amalgamation of many small fishing companies to form large corporations.

^{4/} See pages 166-184 for further details, for prewar period and pages 198-209 for war period.

The prefectural governments, most of which maintained separate fisheries sections, regulated the local licensing and supervised the local organizations. Thus, they had direct control over those village fishermen who fished the coastal waters. In many cases, the prefectural governments also engaged in research and educational activities.

Organization. All aspects of the Japanese fishing and related industries were highly organized. In general the organizations may be divided into three types: (1) societies, of which there were several kinds; (2) companies; and (3) associations.

Societies. Fishery societies (suisan-kai), aquatic products societies (suisan-kumiai) and fishermen's societies (gyogyo-kumiai) were three types of societies for fishermen and those interested in the industry. These were all set up under law and the central government which gave them aid also had considerable control over them. Some of these societies were principally aimed at promoting the common interests of those engaged in production, manufacture and sale of aquatic products whereas others were mainly concerned with economic aspects of individual members. In the coastal fisheries the fishermen's societies (gyogyo kumiai) were perhaps the most important type of organization; these originally formed to handle the "fishing rights" of the villages, in many cases also undertook cooperative marketing, purchasing and credit arrangements.

Companies. Although there were several hundred fishing companies in 1939, two large fishing companies, both of which were the

result of government sponsored mergers, dominated the large scale commercial deep sea fisheries in the immediate prewar years: the Nippon Suisan Kabushiki Kaisha (Japan Marine Products Company) and the Nichiro Gyogyo Kabushiki Kaisha (Nichiro Fishing Company).

The Nippon Suisan was capitalized at 93 million yen. It not only operated all the floating crab canneries in the northern seas but controlled three-fourths of the steam trawler industry, most of the Antarctic and local whaling and 20 percent of the exports of marine products.

The Nichiro Company, capitalized at 87 million yen, controlled virtually all the salmon fishing in Soviet waters and through its various subsidiaries controlled most of the rest of the salmon fishing industry as well as cod fishing and the shore-based crab fishing.

Not only fishing but a large part of the processing, particularly the canning of marine products, was carried on by these two companies or their subsidiaries.

The Mitsubishi Shoji K. K. (Mitsubishi Trading Company) was the leading firm in exports.

At the top of the fishery companies one can distinguish among others the well-known family firms of Mitsui and Mitsubishi. The Manchurian Heavy Industries Development Corporation is the principal shareholder of Nippon Suisan K. K.

Associations. All aspects of the industry -- fishing, processing and marketing -- were coordinated into associations. The fishery organizations were coordinated through the Dai Nippon Suisankai (the Fisheries Societies of Japan), the Teikoku Suisankai (Imperial Fishery

Society or the National Association of Fisheries) and the Central Association for Fishermen's Cooperative Societies. The companies engaged in manufacturing, particularly those producing for the export market, were united into such associations as the Canned Food Association of Japan, Canned Crab Packers and Manufacturers' Association, the Fish Meal Producers and Exporters Association, etc.

These associations, government-sponsored and operating under a Fisheries Association Law promulgated in 1921, provided one more point where the government exercised control.

Wartime Reorganization of the Industry

All phases of the fishing industry were subject to government control prior to the war but since 1942 several reorganizations have brought much closer control.

In late 1942 and early 1943 the deep sea fishing industry was reorganized so that there is only one big enterprise operating in these fisheries -- the Imperial Fishing Control Company (Teikoku Suisan Tosei Kaisha). This company, formed with a capital raised by the leading fishing companies, lets out boats and gear to the four branch companies, operates cold storage plants and grants necessary credits to the branch companies -- the Northern Pacific Fishing Control Company, the Japan-Soviet Fishing Control Company, the Japanese Pelagic Fishing Company and the Western Pacific Control Company. The present relation of these branch companies, which were formed by the merger and realignment of the large existing companies, to such parent companies as Mitsui and Mitsubishi is not clear. (For earlier relationships of the prewar companies see pages 10-11.)

Although coastal fishing, drag net fishing by small boats, and tuna and bonito fishing did not come under this reorganization, in 1943 these were all to be reorganized with coastal fishing to be placed under "a central fishing federation".^{5/} Thus, by these reorganizations fish production was brought under centralized control. Distribution and prices, as already indicated, were also controlled.

During the war changes in the administrative organization of the government affecting fisheries or the distribution of marine products in one way or another were numerous but full details are not available. In October and November 1943 the Ministry of Agriculture and Forestry merged with the Ministry of Commerce and Industry to form a Ministry of Agriculture and Commerce (Noshosho). In this reshuffle the Fisheries Bureau seems to have been taken over intact by the new Ministry. New wartime bureaus, established under the Ministry of Agriculture and Commerce, however, have simultaneously or successively dealt with some phase of fish production, distribution and pricing. Included in these are the Bureau of Food Control, the Commodity Price Bureau (Bukka Kyoku), the Livelihood Commodity Bureau, and the Resources Bureau (Shizai Kyoku).

^{5/} Although no further definite statement concerning this reorganization is available there are indications that it took place.

IV SUGGESTIONS FOR MILITARY GOVERNMENT ADMINISTRATION

Overall Recommendations

Policy principles for the Japanese fisheries during the period of military government are: 6/

1. Japan should produce such fishery products as are required for domestic consumption.
2. The military government should assist in reestablishing production facilities to the fishing and processing industries and facilities for the distribution of fishery products in order to meet domestic consumption requirements.
3. Fishery production for export should be undertaken only if facilities, equipment, gear and manpower available are needed less urgently to meet domestic consumption requirements than for products to (a) supply United Nations with animal proteins and oil or (b) secure foreign exchange for essential imports.
4. The affiliations of the Japanese fishing, fish-processing and fish-exporting industries with large combines should be severed. In general, there should be wide distribution of ownership, management and control within the fishing industry and allied industries.
5. Japanese fishing near the American continents, island possessions of the United States and in strategic areas should be prohibited. The prohibited zones should be sufficiently wide to assure effective enforcement.

6/ These policy principles which conform to those submitted to SWNCC by the State Department are basic for the entire period of military occupation. Operations which are started under these principles by military government authorities should be continued, with modifications as the conditions warrant, by any subsequent allied control authority.

6. Japanese fishing operations should conform strictly to provisions of international agreements of which the Allied countries are parties.

The first principle above, in the production of sufficient fishery products for domestic consumption ^{7/}, is developed with consideration, on the one hand, of relieving the United Nations in feeding the Japanese population during a period of critical food shortages in the United Nations and liberated areas, and, on the other hand, of providing useful and customary occupation for a large number of Japanese workers. The level of domestic food consumption is yet to be determined by military authorities. Total caloric consumption levels for the period of occupation of 1600 and 2000 are still being discussed. As soon as a decision is reached concerning the level of total food consumption and the part fish will play in this, quotas necessary for domestic fish supplies should be established. Because of the importance of fish as protein food in the Japanese diet, these quotas can be expected to be above present production.

The second principle follows from the first, since the extent to which the Japanese fisheries can produce following the cessation of hostilities will be dependent primarily upon the reconditioning and replacement of fishing boats and gear and the provision of fuel and supplies. In the rehabilitation of the fisheries the coastal fisheries and aquiculture should be given primary attention and insofar as practicable these

^{7/} Domestic consumption as used here means consumption by the occupying forces as well as the Japanese population.

should provide all the necessary marine products. Although it might be advantageous to reestablish and develop the larger scale deep sea fishing, trawling, the Northern waters fisheries and fishing in colonial waters, it appears practicable to give first attention and emphasis throughout the period of military government to the coastal fisheries and aquiculture because: (1) in the past these fisheries have provided the great bulk of Japanese requirements; (2) the fishing and processing operations are simple and require equipment and facilities the major portion of which might be produced domestically; (3) problems of rights to the fisheries will be largely avoided since the majority of vessels engaged in the coastal fisheries stay within thirty miles of shore; (4) the coastal fisheries are largely communal in character and not dominated by large companies; (5) it can be expected that a large percentage of the small boats will be available whereas a considerable number of the larger ones will have been destroyed.

The deep sea fisheries in home waters, trawling, fishing in Soviet waters and in colonial waters should be exploited to provide products to the extent that the coastal fisheries and aquiculture are unable to meet domestic requirements. Shortages of small boats and the necessary equipment for the immediate full exploitation of the coastal fisheries may make it desirable to operate some of the larger vessels which may be available and for which the necessary equipment is also at hand. Also, since the demarcation between "coastal fishing" and "deep-sea fishing in home waters" is merely an arbitrary one, it may well be practicable to

permit some of the latter operations. For example, the off-shore sardine fisheries which are efficient producers and not carried on in distant waters might be permitted to resume operations. In general, however, emphasis should be on the coastal fisheries and aquiculture. These should be worked as fully as the available equipment permits and as is consistent with conservation regulations. 8/

In the reestablishment of processing facilities for marine products, attention should be given to the drying and salting of fish and the preparation of seaweed. Fish canneries should not receive undue emphasis for canned fish is normally consumed only in small quantities by the Japanese population.

A workable system of distribution of fish and other marine products during the period of military occupation is of utmost importance. The system of distribution and rationing during the war period has not worked particularly well and with final defeat and surrender this may be in a stage of collapse. A plan for regulated and equitable distribution of food fish is as essential as the restoration of production.

The severing of fishery companies from large parent organizations (such as the Mitsui and Mitsubishi Combines) is recommended as a step in the breakdown of the large Japanese combines which control much of the non-coastal industry. The fishing corporations affiliated with such

8/ Japanese regulations (both national and local) designed for conservation of marine resources should be observed by the military government authorities. Coastal fisheries of some areas are known to have been depleted and this has often been given as one reason why the Japanese fishermen have gone far afield into foreign waters.

combines, are primarily in the large scale modern operations such as the northern fisheries, trawling and deep sea operations and in the marine product export business. If the prewar corporate relations are existing at the time of occupation the fishing companies should be severed from these parent combines; this does not necessarily mean that the fishing companies themselves should be broken down, although in view of the recent organization into large government controlled companies this may also be desirable.

The curtailment of Japanese fishing operations near the American continents, island possessions of the United States and in strategic areas is designed both as a security measure and as a step in checking Japanese fishery interests, which had reached far afield in distant waters just previous to the war. Until further international understandings are reached regarding nations' use of fish resources in foreign or "open" waters, Japanese fishing in such foreign areas should be stopped; certainly such operations should not be permitted prior to a peace settlement.

The last principle affects the Japanese Antarctic whaling and the north Pacific sealing operations. Although Japan has never been a party to the international control of Antarctic whaling if Japan is allowed to resume these operations because of shortages in fats and oils, its activities should strictly conform to the provisions laid down by

the international conventions to which the United States is a party. 9/ Since the International Fur Seal Treaty is one designed for the conservation of this resource until the facts as to the condition of the Japanese seal herd is established, any sealing which may be authorized by the military government should be undertaken in conformity with sound conservation principles.

Program for Early Period of Occupation

The major problems of the early period of occupation, that is the period of military government control, will be to restore the production of the coastal fisheries, to maintain and perhaps increase the production from agriculture, and to establish a system of distribution of marine foods.

The restoration of the coastal fisheries will require:

1. inventory of boats and gear
2. the return of requisitioned vessels to their former owners
3. the working out, in cooperation with naval authorities, of a system of permits and security regulations to take the place of Japanese wartime restrictions
4. aid in repairing and replacing boats, gear and other equipment
5. allocation of fuel necessary for the operation of the powered fishing boats.

9/ The whaling agreements in effect with respect to the United States at the present time are: (1) the Convention for the Regulation of Whaling signed at Geneva September 24, 1931, Treaty Series 880; (2) Agreement for the Regulation of Whaling, and Final Act, signed at London June 8, 1937, Treaty Series 933; (3) Protocol Amending the Agreement for the Regulation of Whaling, signed at London June 1937 and Final Act of the Conference, signed at London June 24, 1938, Treaty Series 944.

The seizure of records should yield essential data concerning the first item although the large amount of destruction of boats likely to occur immediately preceding military occupation can be expected to necessitate an inventory of current conditions. General rules for registration of boats for all of Japan should be worked out, but the actual inventory should be carried out on a prefectural, or even more local, basis.

Strict war emergency fishing restrictions are expected to be in force in the period immediately preceding military occupation; during this period it is likely that fishing, even in the near coastal waters will be greatly curtailed if not brought to a virtual halt. The relaxation of these emergency restrictions and the establishment of new ones will be basic to the revival of the industry. A set of regulations shaped so as to permit sound naval security should be drawn up as soon after military occupation as possible. If the territory is occupied in sections, emergency restrictions in those areas occupied may need to be relaxed before the general regulations are promulgated. In working out these regulations and the permits to be used military government authorities should review the experiences of occupation authorities in Italy and Sicily in order to take advantage of their experience for those aspects which are applicable to Japan. 10/

10/ Regulations regarding night fishing, for example, should be reviewed. It has been reported that night fishing has been prohibited in Japan. Releasing or modifying this restriction may add to the coastal production.

It is expected that a large number of the small fishing boats will be available but that motors and parts will require repairs and replacements; priorities should be granted for these, for fish nets and other gear, for paint, net preservatives and for fuel oil required for the operation of powered boats. In order to get the coastal fisheries into quick production it is suggested that the possibility of providing occupying forces with a minimum basic supply of gear (particularly netting) be seriously considered.

In maintaining and expanding aquiculture production, the distribution of young fish should be arranged, preferably through the prefectural experiment stations and fishery societies which normally carry on this function. In order to encourage this production quotas might be established. 11/

For processing by drying and salting, the common methods for domestic markets, salt will be the major article in critical supply. 12/ Fish processing should be afforded a high priority in the demand upon the available supplies of this commodity.

It is expected that the distribution of fish for food will be handled in conjunction with the distribution of other foodstuffs. The main problems involved will be the seizure and inventory of food stocks and the control and distribution of emergency rations and, later, with the development of a food policy, the establishment of fish transport, distribution and pricing systems.

11/ These quotas should be reasonable ones. Some of the wartime quotas for aquiculture are thought to be unrealistically high.

12/ See Appendix D.

Employment of Japanese Administrative Machinery and Personnel

It will be desirable to utilize existing Japanese administrative machinery and personnel wherever their use will not interfere with the objectives of occupation authorities. This is recommended with a view to greater efficiency because (1) the local administrative structure and personnel have experience in dealing with the problems peculiar to Japanese fisheries and the processing and distribution of marine foods, and (2) the number of Allied personnel required will be reduced, desirable since there are few Allied experts in the field of Japanese fisheries.

Recent political appointees (which can be assumed to be upholders of totalitarian views) should, of course, be removed from key positions in the government agencies dealing with fisheries and food production. But many of the permanent Civil Service employees and many of the real fishery experts whose political views may not be hostile to the peaceful and efficient carrying out of military government control measures may prove of invaluable assistance. Some of this personnel may be found in the Fisheries Bureau in Tokyo while others may be located in the prefectural bureaus dealing with marine products at the fisheries experiment stations in the various fishery organizations and at the fisheries schools. Local advisors will be essential in the actual administration of the fishery program at the local level. The various Japanese fishery societies which touch upon every phase of the work and life of Japanese coastal fishermen might, with proper safeguards, be used in promulgating and carrying out the fishery program. For this purpose the *gyogyo kumiai* formed by the small-scale village fishermen and the cooperatives which have grown from these organizations might be particularly helpful.

Part II

BASIC BACKGROUND MATERIAL

I FISHING AREAS, RESOURCES AND SEASONS

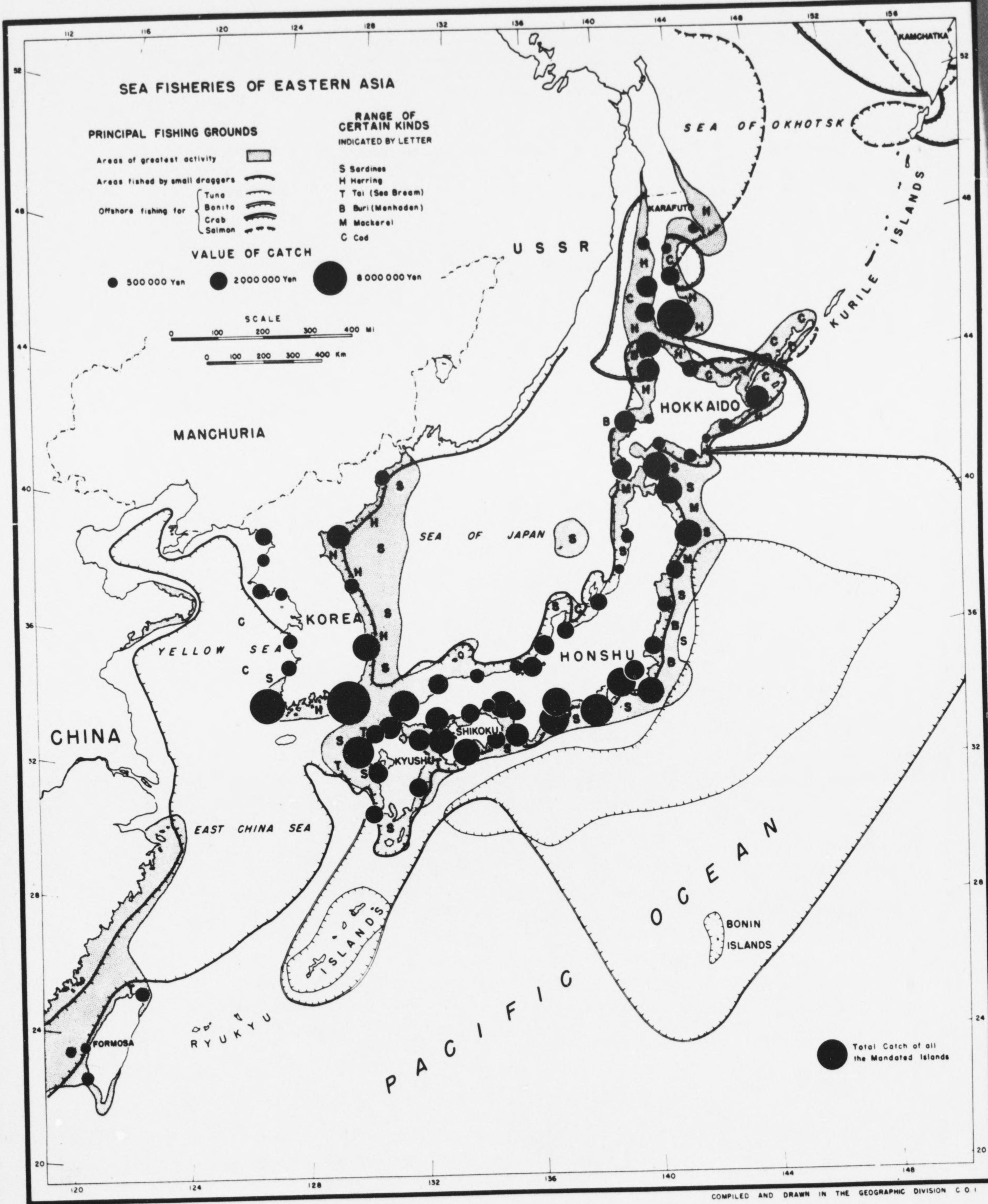
Fishing Areas

Along the eastern coast of Asia from Bering Sea on the north almost to Australia on the south is one of the world's richest fishing regions. In this vast area of the Pacific extending through 65° of latitude and east as far as the 180th meridian the Japanese carry on their fishing operations. Other people bordering these waters fish their local grounds but none have spread their operations far afield as have the Japanese.

Within this western Pacific fishing area, the Japanese operations are most intensively developed in the coastal waters of Japan proper, in the Pacific immediately east of the main islands, in the Yellow Sea and the East China Sea, along the Japan Sea coasts of Korea and Karafuto, and around the margins of the Sea of Okhotsk (Figure 1). Of secondary importance are the tropical waters of the Pacific Mandated Islands and Indonesia and the cold waters of Bering Sea. Outside the western Pacific area Japanese carry on Antarctic whaling and have also operated fishing vessels off the coasts of Alaska, British Columbia, Mexico, Central America and South America of the Western Hemisphere and also in Indian waters of the Far East.

In the areas described above as those in which Japanese fisheries are most intensively developed the natural conditions of water depths and ocean currents are favorable to marine life. Except for the Japan

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Sea which is relatively deep, most of the waters bordering Asia from Kamchatka to Formosa (Taiwan) are shallow, a condition conducive to prolific marine life. Although the continental shelf around Japan proper is not large, within the area of intensive and secondary Japanese operations the continental shelf is estimated at approximately 2,000,000 square miles. 13/

It is also of significance that in the waters around Japan ocean currents from tropical and polar latitudes converge, for this too creates a favorable environment for fish. The warm current, the Kuroshio or Japanese Current, coming from the South Seas washes the eastern coast of Kyushu, Shikoku and southern Honshu then flows northeastward to central Honshu where it changes its direction to the east. A branch stream of the warm Kuroshio enters the Japan Sea by way of Tsushima Strait, washes the Japan Sea coast and partly reaches eastern Karafuto and Sakhalin by way of the west coast of Hokkaido, entering the Okhotsk Sea through Soya Strait. The cold Oyashio Current flows south from Bering Sea along the Kurile Islands and washing the east coast of Hokkaido, approaches the northeastern coast of the mainland of Japan to meet the warm Kuroshio. In the Japan Sea a cold current (Liman Current) which flows westward along the coast of Soviet Russia continues southward along the Korean coast to meet warm currents in Tsushima Strait.

The areas of marked convergence, and therefore of the mixing of unlike waters, have the most abundant plankton and marine life. The

13/ Japan's Fisheries Industry 1939 (Special issue of the Japan Times and Mail, 1939)

greatest zone of convergence and mixture of waters in the western Pacific extends from about 36° N. latitude off the east coast of Honshu northeastward toward Hokkaido and the Kurile Islands; this area is one of the most important of all Japanese fishing grounds. Likewise currents converge in the Japan Sea, also an area of sizable fisheries.

The power of the ocean currents varies with the seasons. The warm current, strong in summer, flows farther north in that season; the cold current which is more powerful in winter comes farther south in that season. Thus fish of the warm waters may be seen in summer at the same places as fish of the cold waters are seen in winter.

Fish Resources

In view of the extensive latitudinal range of Japan, the confluence of warm and cold currents, and the vast areas of continental shelf, it is not surprising that the Japanese catch has great variety. The kinds of fish living in Japanese waters, even with closely related species grouped together, number 8,000; according to strict scientific distinctions the number of species is reported to be about 20,000. More than 400 kinds are used for food or are otherwise commercially important. Table 2 lists the species having large economic value according to scientific families; Table 3 lists the twenty-four most important kinds of fish landed in Japan in 1936 by order of weight giving the Japanese and English names.

Certain varieties are most abundant in the cold northerly waters whereas others are most abundant in the warm subtropical waters. In the mixed waters between, both cold-water and warm-water species are caught.

TABLE 2

The Important Japanese Fish by Family Groups

I Clupeoid Fish

Herring -- Clupea pallasii
 Sardine (pilchard) -- Sardina melanosticta
 Anchovy -- Engraulis japonicus
 Round herring -- Etrumeus micropus

II Scombroid Fish

Bonito (oceanic skipjack) -- Katsuwonus pelamis
 Tuna (several kinds)
 Albacore -- Germo alalunga
 Blue-fin tuna -- Thunnus orientalis
 Yellow-fin tuna -- Neothunnus macropterus
 Mebachi (mebati) -- Parathunnus mebachi
 Mackerel -- Scomber japonicus
 Frigate mackerels -- Auxis spp.
 Seer-fish -- Cybium spp.

III Salmonoid Fish

Salmon

King or chinook salmon -- Oncorhynchus tshawytscha
 Red salmon -- Oncorhynchus nerka
 Silver salmon -- Oncorhynchus kisutch
 Humpback or pink salmon -- Oncorhynchus gorbuscha
 Chum or dog salmon -- Oncorhynchus keta
 Salmon or Salmon trout -- Salmo spp.
 Smelt -- Osmerus dentex
 Surf smelt -- Hypomesus olidus
 Chars or Dolly Varden trouts -- Salvelinus spp.

IV Gadoid Fish

Cod -- Gadus macrocephalus
 Alaskan pollack -- Theragra chalcogramma (Gadus chalcogramma)

V Carangidae

Yellowtail -- Seriola quinqueradiata
 Horse mackerel -- Trachurus japonicus
 Jacks -- Caranx spp.

VI Sparidae (Sea breams)

Sea bream or porgy -- Pagrus major
Pagrus cardinalis (Evynnis cardinalis)
Pagrus tumifrons (Taus tumifrons, Dentex tumifrons)

TABLE 2 (Continued)

The Important Japanese Fish by Family Groups

VII Swordfish and Spearfish

Swordfish -- Xiphias gladiusSpearfish or marlin -- Makaira spp.Spearfish -- Tetrapturus angustirostrisSailfish -- Istiophorus orientalis

Note: Numerous other species of fish as well as shellfish and crustaceans are taken in large quantities.

TABLE 3

Important Fish Landed in Japan

1. iwashi -- sardine, pilchard, anchovy
2. nishin -- herring
3. tara -- cod
4. saba -- mackerel
5. sake -- salmon
6. masu -- trout
7. buri -- yellowtail (amberfish)
8. maguro -- tuna
9. aji -- yellow mackerel
10. karei and hirame -- flounders
11. katsue -- bonito
12. tai -- porgy, sea bream, red snapper
13. fuka -- shark
14. samma -- mackerel -- pike
15. bora -- mullet
16. tobi-uo -- flying fish
17. * konoshiro
18. sawara -- Spanish mackerel
19. * kurodai
20. wagasagi -- surf smelt
21. * ayu
22. unagi -- eel
23. koi -- carp
24. kajiki -- spearfish and swordfish

Source: Japan's Fisheries Industry 1939 (Special issue of the Japan Times and Mail, 1939).

* No English equivalent. Kurodai is one of the sea breams. Ayu is a small fish resembling trout very popular in Japan.

Although lines of demarcation are not distinct and vary according to seasons and currents the Japanese waters may be divided into four regions: (1) the cold region; (2) the temperate region; (3) the warm region and (4) the true oceanic region. In the cold region which includes the Okhotsk Sea, waters surrounding the Kurile Islands, Karafuto and Hokkaido, and the northern portion of the Japan Sea bordering the Asiatic mainland are great quantities of the salmonoid fish, the gadoid fish and herring. The Japanese king crab is also caught in this region. The waters of the temperate region, which includes those bordering the southern coast of Hokkaido and the three main islands of Honshu, Shikoku and Kyushu, abound in sardines, mackerel, horse mackerel, yellowtail and sea breams. In the summer bonito and tuna are found in coastal waters and in the southern part of the region oysters are cultivated. South of Japan proper in the waters of Loochoo Islands (Ryukyu Islands), the Bonin Islands and Formosa bonito, tuna, swordfish, spearfish and frigate mackerel and horse mackerel predominate. From the oceanic region in the Pacific east of Japan come bonito, tuna, spearfish and swordfish.

A Japanese source, considering only Japan proper, groups the more important commercial fish according to the area of catch as follows: 14/

14/ Japan's Fisheries Industry 1939 (Special issue of the Japan Times and Mail, 1939).

<u>Fish generally caught throughout Japan</u>	<u>Fish caught in North Japan</u>	<u>Fish caught in South Japan</u>
iwashi (sardine (anchovy (round herring)	nishin -- herring	buri -- yellowtail
karei (flatfish hirame (sake -- salmon	tai -- porgy or sea bream
maguro -- tuna	tara -- cod	aji -- yellow mackerel
samma -- mackerel - pike	masu -- trout	bora -- mullet
kajiki (spearfish (swordfish)	wakasagi -- surf smelt	sawara -- Spanish mackerel
fuka -- shark		katsuo -- bonito
		* kurodai
		* konoshiro
		* ayu
		unagi -- eel
		koi -- carp
		tobi-uo -- flying fish

* No English equivalent.

Fishing Seasons


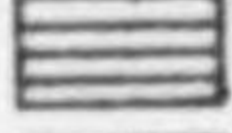

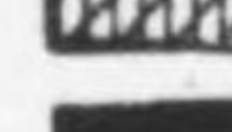
Japanese fishing is carried on throughout the year although in some areas certain seasons are relatively unimportant, many species have peak seasons, and certain fisheries have closed seasons. Figure 2 shows the seasonal pattern of the Japanese fisheries and in the following sections the peak seasons are indicated for the more important species. For several of the special "deep sea" fisheries the seasons may be summarized as follows:

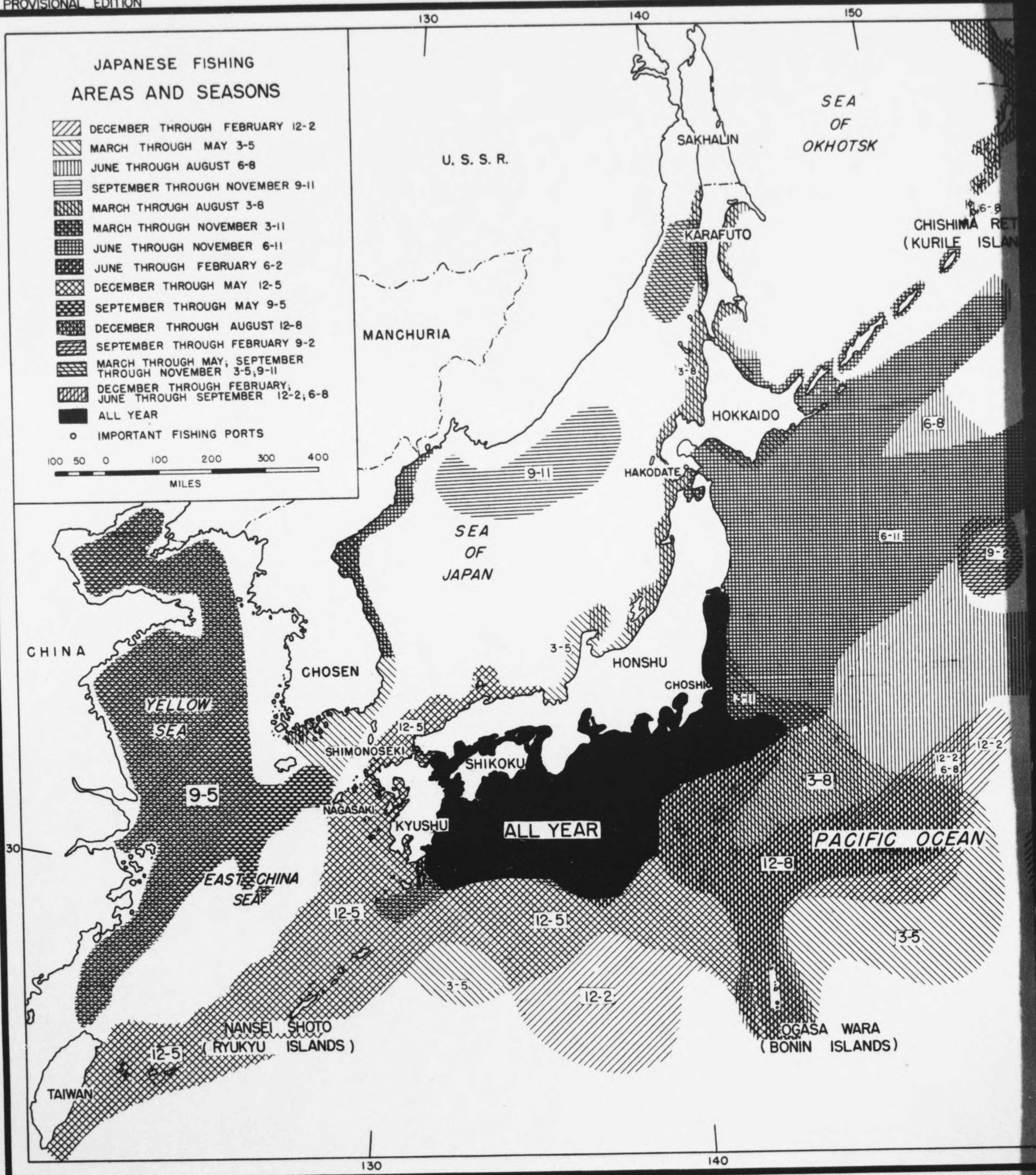
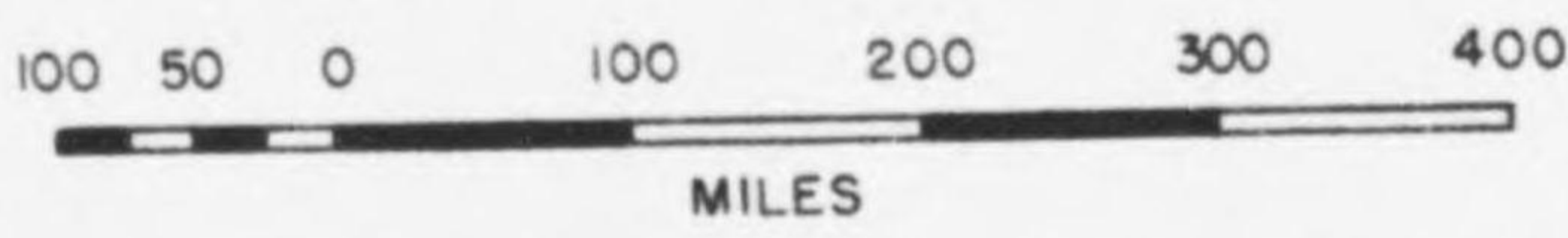
Northern Fisheries (Russian waters, Karafuto, Kuriles and northern Hokkaido). April to October is the most important season in which the commercial operations are concentrated.

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JAPANESE FISHING AREAS AND SEASONS

-  DECEMBER THROUGH FEBRUARY 12-2
-  MARCH THROUGH MAY 3-5
-  JUNE THROUGH AUGUST 6-8
-  SEPTEMBER THROUGH NOVEMBER 9-11
-  MARCH THROUGH AUGUST 3-8
-  MARCH THROUGH NOVEMBER 3-11
-  JUNE THROUGH NOVEMBER 6-11
-  JUNE THROUGH FEBRUARY 6-2
-  DECEMBER THROUGH MAY 12-5
-  SEPTEMBER THROUGH MAY 9-5
-  DECEMBER THROUGH AUGUST 12-8
-  SEPTEMBER THROUGH FEBRUARY 9-2
-  MARCH THROUGH MAY; SEPTEMBER THROUGH NOVEMBER 3-5, 9-11
-  DECEMBER THROUGH FEBRUARY; JUNE THROUGH SEPTEMBER 12-2, 6-8
-  ALL YEAR
-  IMPORTANT FISHING PORTS



MAP NO. 627, JUNE 22, 1942

DRAWN IN THE GEOGRAPHY DIVISION, O

Deep-Sea Fishing Off the East Coast of Japan. In the summer months the operations are largest. These follow the northward migrations of Scombroids, sardines and other species. As Figure 2 shows, however, there are many seasonal variations within this vast area.

Trawling in the China Sea. This is limited to October 1 -- June 1 north of 25° N. and to May 1 -- November 1 south of 25° N.

Antarctic whaling. In 1937-1938 this was limited to November 1 -- March 16 by Japan. The season for other nations was December 8 -- March 15. (See page 113)

Areas and Seasons of the Northern Region by Species

In the northern cold waters, roughly north of 40°, herring, cod, salmon and crab are the mainstays of the Japanese fisheries. The southern part of this area -- northern Honshu, Hokkaido, the Kurile Islands and Karafuto -- are Japanese territories whereas the northern part of the area -- Sakhalin, Kamchatka and the Siberian Coast are Soviet areas.

Herring (nishin) is the leading product of the cold waters and next to sardines the largest Japanese fish catch. Herring are most abundant from northern Sakhalin to Aomori Prefecture, particularly on the western side of the former island, but occur in lesser numbers much farther south along the coasts of Japan proper and Korea. The southern limit on the Pacific coast is about 37° (Fukushima Prefecture) and in the Sea of Japan on the east about the latitude of Sado Island and on the west about 35° (Fusan City in Korea).

There are two spawning groups: the spring spawners and the fall spawners. The spring herring, the catch of which is larger, appear in the Sea of Japan from about mid-March to mid-April in the waters of Akita and Aomori Prefectures and those of southwestern Hokkaido, then proceed northward as the waters warm. In May spring herring are caught off the east coast of Hokkaido and in Karafuto and Sakhalin waters. After three waves of spawning, spring herring come in less developed schools on feeding migrations. Winter herring are taken mainly in Pacific waters. As Table 12 shows the herring catch declined markedly from 1934 through 1938, the 1938 catch being about one-sixth of the 1934 catch. However, this was a temporary decline reflecting the cycle of abundance typical of herring; the larger catches of 1939 and 1940 indicate this.

Cod (tara), including the Alaskan pollack which is fished in the same waters, in most years is caught in quantities about as large as herring although the catch is less valuable than that of salmon. Cod fisheries have their southern limit on the Pacific coast at 38° and in the Japan Sea, where waters are colder farther south than along the Kuroshio-warmed Pacific coast, at about 35°. Cod are important in the northern prefectures of Honshu, all around Hokkaido, in waters of the Kuriles and Karafuto. The west coast of Karafuto has more extensive cod fisheries than the east coast. In the Russian waters cod fishing and salmon fishing grounds coincide in general, i.e. along both the east and west side of Kamchatka, along the Siberian coast in the vicinity of the town of

Okhotsk and also in the Gulf of Penzhinskaya. Japanese fishermen have also caught cod in Bering Sea. The chief season is from March to October.

Salmon and salmon-trout, anadromous fish which are taken in large numbers from April to December the time of their spawning migration, are characteristic of the northern waters. Of the species of this group the most important in the Japanese fisheries is the dog or chum salmon, (sake), (Oncorhynchus keta) which is found in the waters stretching from the northeastern part of Japan proper to Kamchatka. Of all the varieties of salmon it is the one most abundant in waters of Japan proper (north of 35°), but occurs in larger numbers in waters of Hokkaido, Karafuto and Sakhalin, the Kuriles and Siberia. These salmon ascend the rivers in September to December, later than other salmon. The red salmon (beni sake or beni masu), (Oncorhynchus nerka) is found in the waters north of Honshu with the largest schools occurring off the coast of Kamchatka and smaller amounts taken in the seas off the Kuriles. The king or chinook salmon (masunosuke), (Oncorhynchus tshawytscha), the largest, is less far-ranging than the dog and red salmon, occurring no farther south than Hokkaido. It spawns earliest in spring, appearing in the latter part of April in vast numbers off the river mouths, especially in Kamchatka and the coasts of the Okhotsk Sea. The largest numbers are taken off the east coast of Kamchatka. The run is earlier in the south than the north as it begins with the first spring freshet. Pink salmon (masu), (Oncorhynchus gorbuscha) is taken in great abundance being the species canned in largest quantities. While it is caught in practically every locality within the

Kamchatka and Okhotsk Sea areas, the largest amounts are taken off the east coast of Kamchatka. The silver salmon (gin sake), (Oncorhynchus kisutch) is caught in relatively small quantities, chiefly in the seas off Kamchatka. Salmon-trout (Salmo sp.) is a smaller fish taken chiefly in waters of Hokkaido and Karafuto; it is rare in Kamchatka and is absent in northern Honshu waters. Figure 3 shows the main areas of the composite salmon catch.

Crab, especially the king crab (Taraba-gani), (Paralithodes Camtschatica), provides an important export product of the northern fisheries. The fishing grounds (shown in Figure 4) occur in the cold waters from Bering Sea to the northern end of the Japan Sea. Floating factories operating off the Kamchatka coast accounted for about half the 1938 catch; shore based operations in eastern Hokkaido, in Karafuto, the northern Kuriles and Kamchatka accounted for the rest. The most lucrative of all Japanese crab fishing areas is off the west coast of Kamchatka south of 58°.

The crab fishing season varies according to the area. In Hokkaido it starts the early part of April and ends in late June, reaching the peak between mid-April and early May. Along the east and west coasts of Karafuto operations are possible generally from the earlier part of March to the beginning of September; the fishing season in this region reaches its height between the latter part of March and April. The operating season for the floating canneries extends from the earlier

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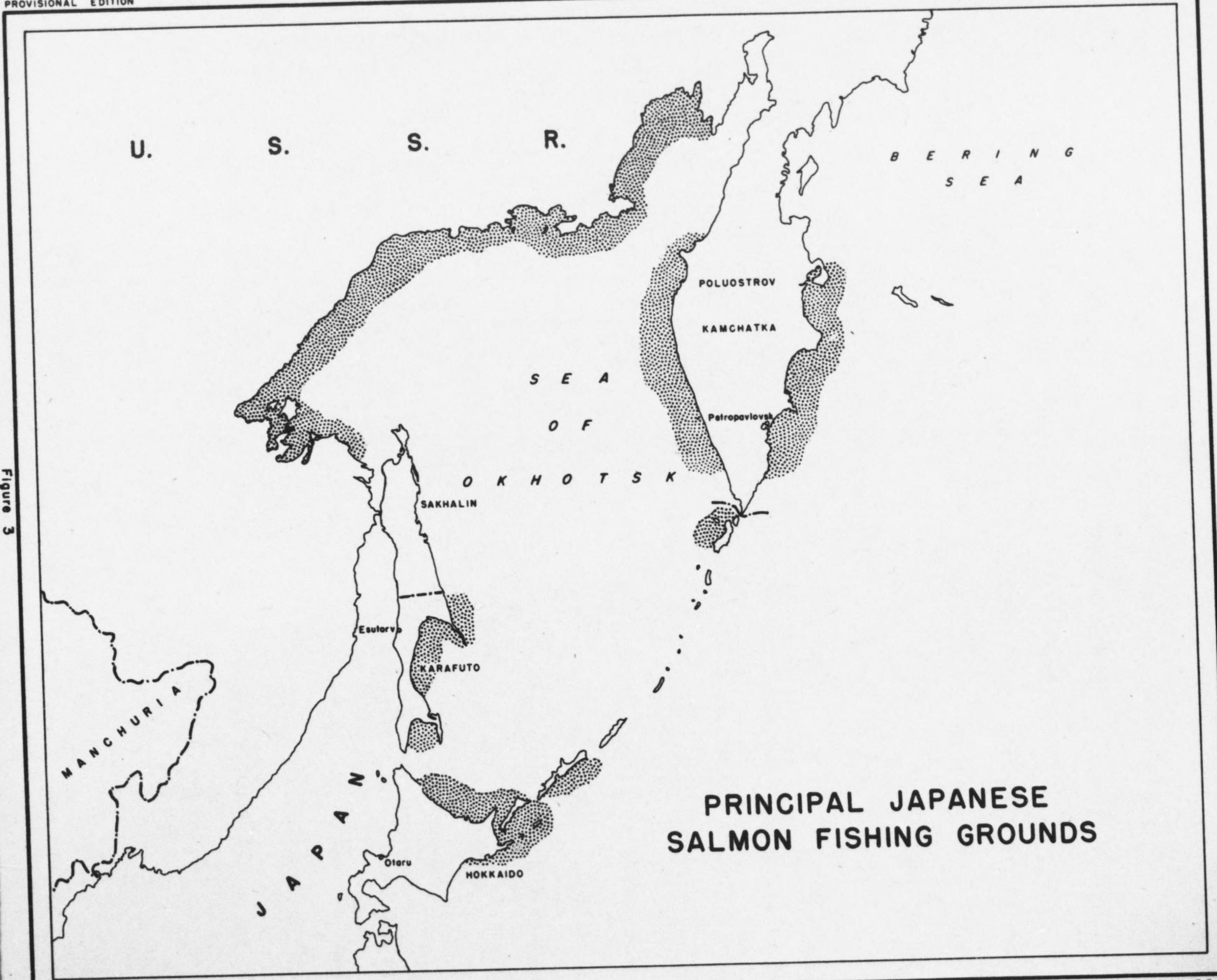


Figure 3

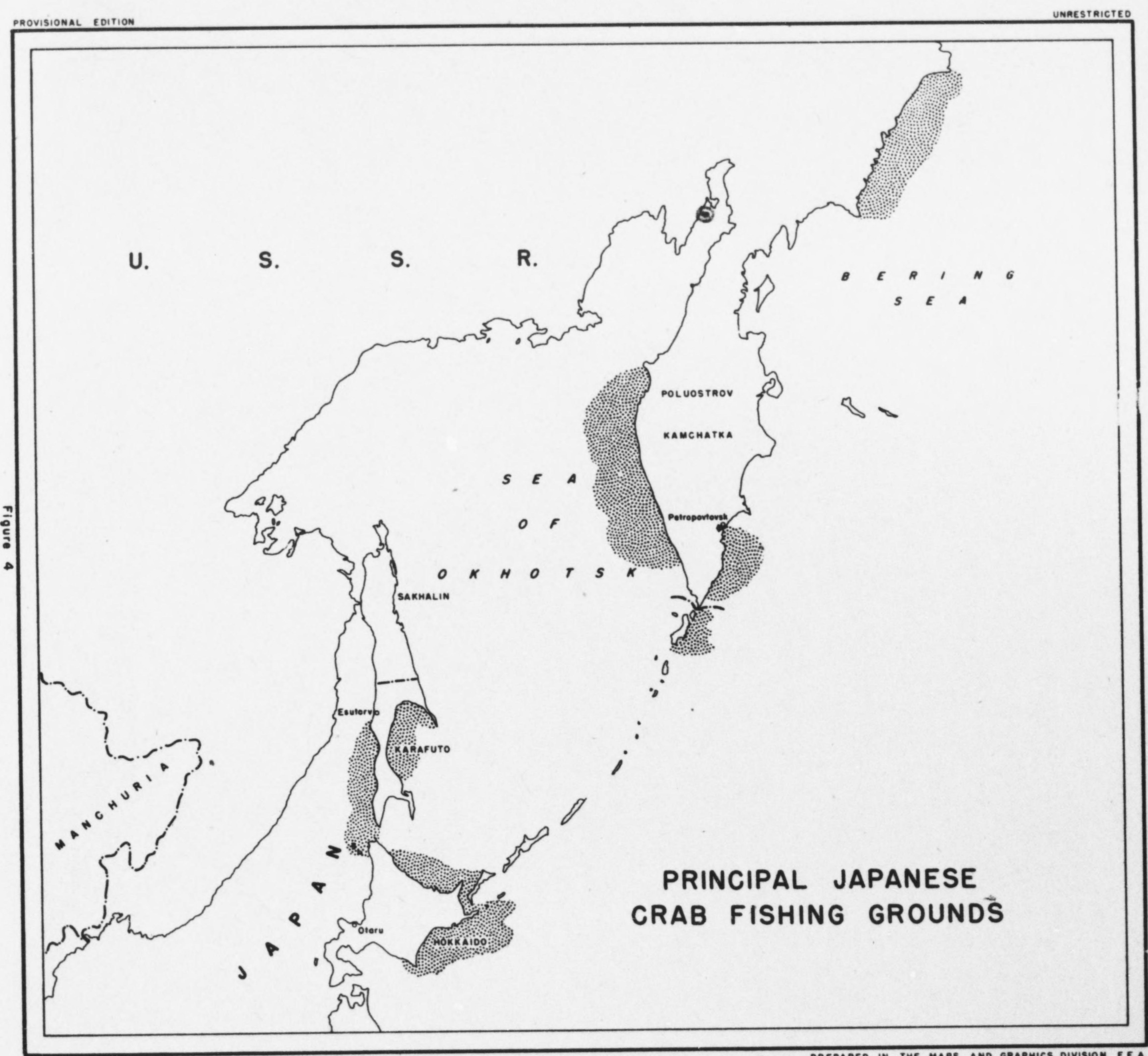


Figure 4

PROVISIONAL EDITION

UNRESTRICTED

part of April to the beginning of September, May and June being regarded as the best part of the season.

Also important in the northern waters is the scallop (hotate-gai) which next to the abalone, is the most important edible mollusk in Japanese fisheries by weight of catch. The scallops are most abundant on the east and northeast coast of Hokkaido, north from Nemuro, and in Atei Bay, Karafuto. Aomori Prefecture supplies some.

Other marine products of lesser importance in the northern waters are cuttlefish which are taken in Hokkaido and Aomori Prefecture; smelt; the flatfish (especially flounder); whales; sea-otters and fur seals.

Areas and Seasons of Central and Southern Japan by Species

South of 40° N. sardines, the Scembroids, sea bream, yellowtail, flatfish, horse mackerel, the Spanish mackerel and swordfish are taken in large quantities.

Sardines (iwashi) occupy first place both in quantity of production and the value of the catch among all the marine products of Japan. Of the annual fish catch of Japan proper of slightly more than 3 million metric tons, sardines account for more than 50 percent in quantity and about 20 percent in value. ^{15/} It is the leading species caught in both the coastal fisheries and the so-called "deep-sea fisheries".

Japanese sardines which include the anchovy and the round herring as well as the true sardine, are widely distributed in the waters

^{15/} In addition the sardine catch of Korea is approximately 30 percent of its fish production. Korea production of sardines in recent years has averaged approximately 1 million metric tons.

extending from Karafuto and Hokkaido in the north to Formosa in the south -- in the Pacific, the Japan Sea and the China Sea. The coasts of Nagasaki, Hyogo, Shizuoka, Chiba, Fukushima, Miyagi, Ibaraki, Iwate and Aomori prefectures and Hokkaido are noted for large catches (Figure 5). The fishing grounds are in general within thirty miles of shore. Much of the catch is taken by the coastal fishermen, but part is taken by large-scale operations and is classed with the deep sea fisheries.

Sardine fishing is carried on all year round with, however, different seasonal peaks in various localities. Figure 6 summarizes the seasons for the chief producing areas in the coastal waters of Japan proper.

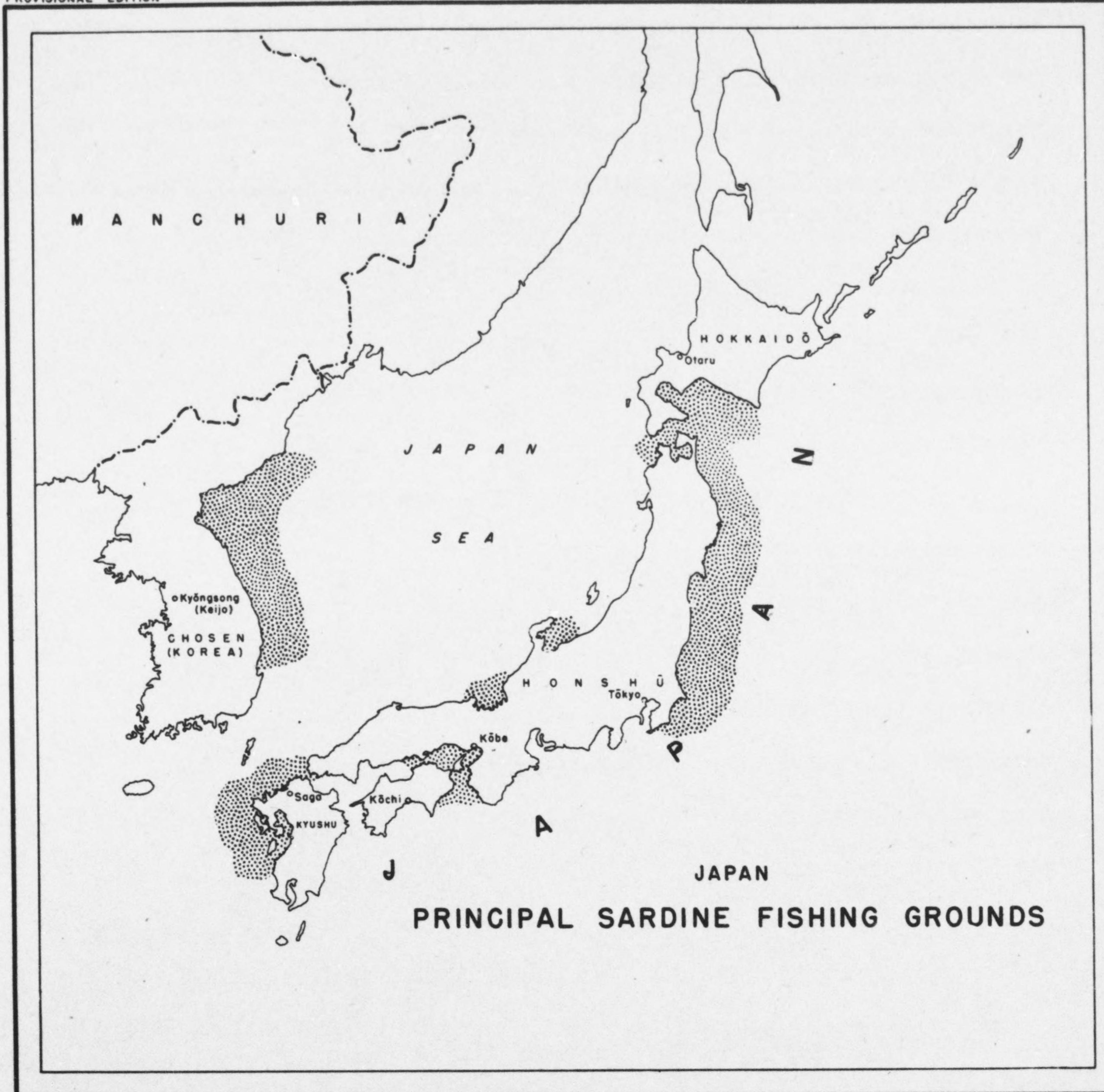
In the waters farther offshore large schools of sardines migrate with considerable regularity: in the spring the migration is northward with the warming waters; later, they reverse their migrations. The swimming layer is deeper in the southern waters, varying from south to north with the thickness of surface warm layers. The large schools are recognized by the dark brown color effect on the water surface; where they swim at great depths, their wake is indicated by tiny bubbles of air. Their predators -- mackerel, tuna and other Scombroids -- are also signs of their presence.

The Scombroids. These are predatory pelagic species having vast oceanic distribution and gathering into relatively small schools to feed. In general the Japan Sea is poor in Scombroids and they are virtually unknown in the Inland Sea. In waters off the east coast, however, they

PROVISIONAL EDITION

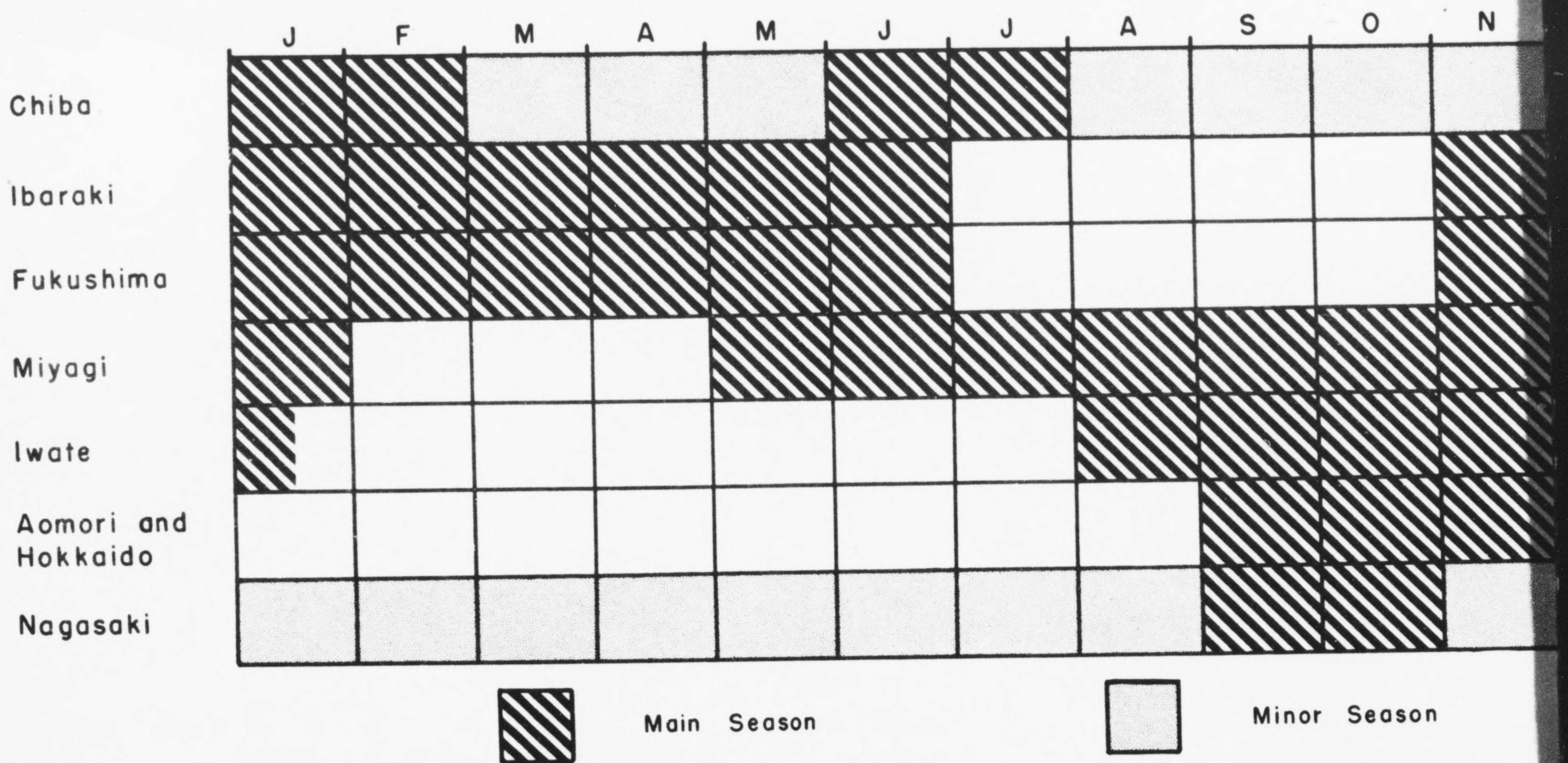
Figure 5.

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JAPAN
PRINCIPAL SARDINE FISHING GROUNDS

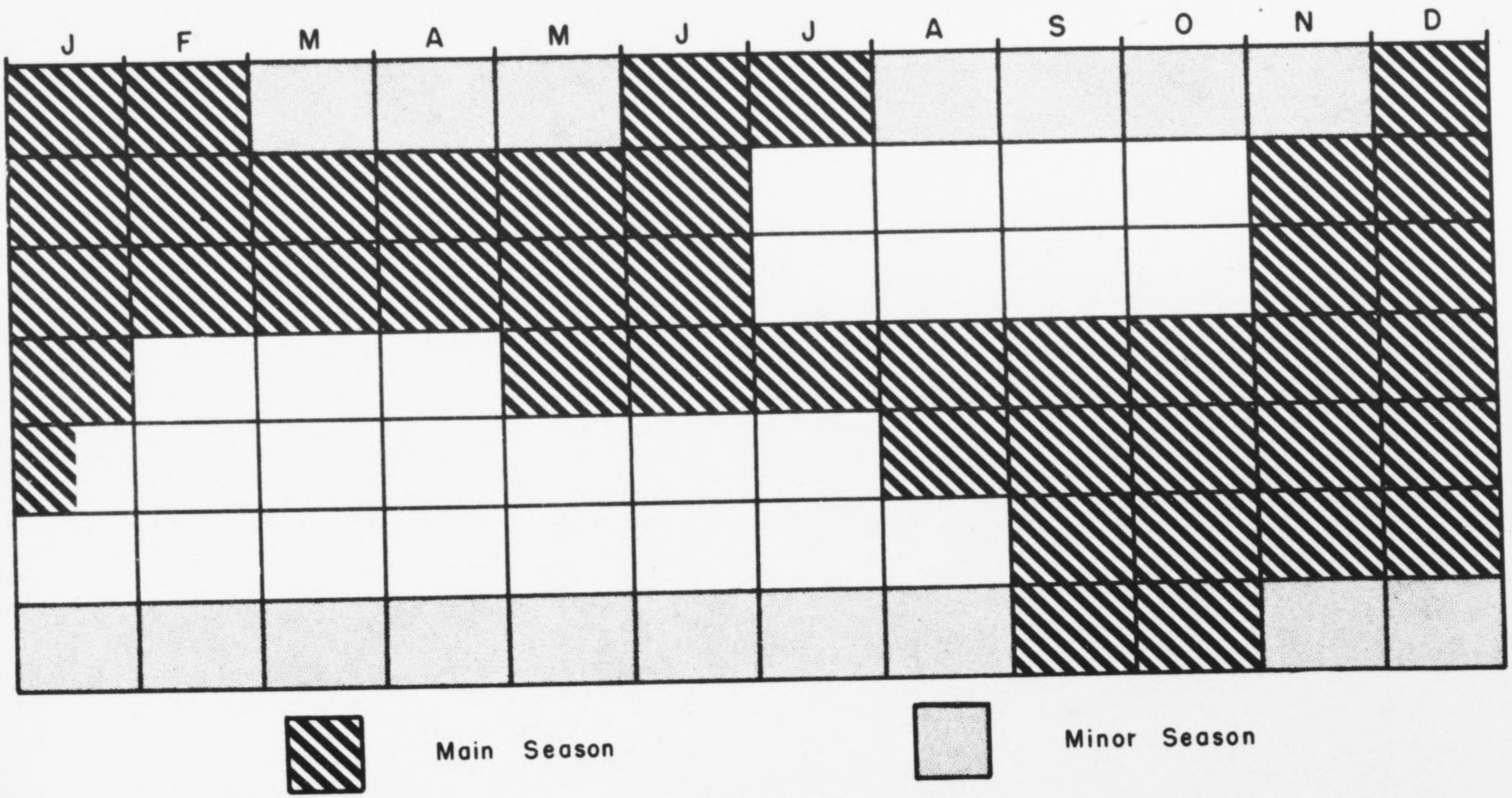
Figure 6



SARDINE FISHING SEASONS IN JAPAN

PREPARED IN THE MAPS AND GRAPHICS DIVISION
NO. 2587-C

Figure 6



SARDINE FISHING SEASONS IN JAPAN

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NO. 2587-C

are taken in large quantities.

The true mackerel or saba (Scomber japonicus) is the most important in tonnage and value; in 1940 the catch amounted to more than 92 million pounds and was valued at ¥ 10.6 million. Mackerel are numerous in the coastal waters of Japan as far north as Hokkaido but are taken only in small quantities north of this. They are taken only in small numbers in the Japan Sea, north of 40° on the Honshu coast. Ishikawa, Toyama and Niigata prefectures are the chief areas of the west coast.

Mackerel are caught at almost all seasons, but during the summer when they approach the coasts the coastal fishing season reaches its peak. In this season they prefer bays with depths up to 20 meters, returning in winter to depths of 40 to 100 meters.

In quantity of production tuna and bonito rank after only sardines, herring, cod and mackerel. They are caught in both the coastal waters and the high seas, slightly more being taken in the latter; in 1936 about 93 million pounds of tuna were taken in the deep sea fisheries and 74 million pounds in the coastal waters.

The range of these species is immense; hardly any marine district from Etorofu in the Kurile Islands to Formosa is without tuna fishing and to the east of Honshu the operations extend as far as 2,000 miles out into the Pacific and to the south as far as the South Seas.

Four species of tuna are caught in considerable quantity: long finned tuna (Thunnus alalunga), yellow tuna (Neothunnus macropterus), black tuna (Thunnus orientalis) and mebachi (Parathunnus mebachi).

The first of these, the long-finned tuna, is rarely found in the Japan Sea, but is widely distributed in the Pacific. It migrates northward in spring, reaching the northeastern shores of Japan in summer where it is caught with bonito. Yellow tuna is widely distributed along the Pacific coast from Hokkaido south to Formosa, but is rarely caught in the Japan Sea. It migrates to the northeast coast of Japan in summer, approaching fairly close to shore. Black tuna has wide distribution from the Kuriles to the South Seas and unlike the other species is caught in fair amounts in the Japan Sea. South of Kyushu it is found all year round but along the coast of Honshu moves north in early summer and returns south in late autumn. Mebachi has a distribution from about the northern boundary of Chiba Prefecture to waters south of Formosa on the Pacific side, and is not found in the Japan Sea.

The peak season for tuna in the coastal waters is the summer although some species, for example the black tuna on the Pacific side, are taken in winter.

Sugiura 16/ divides the deep sea tuna grounds into the following six districts of which the first three accounted for more than 90 percent of the catch:

1. Hokkaido and northeast Honshu
2. The Izu district, extending south from the Izu Peninsula
3. The Nankaido district extending from Shizuoka Prefecture southwestward toward Shikoku
4. From south Satsuma southward

16/ Sugiura, Y. Suisan, 1939.

5. Northwest Kyushu district covering the seas northwest of Kyushu

6. The South Seas district covering seas south of Formosa.

The peak season in Hokkaido and northeastern Honshu lasts five months from July until November. In southern Izu, the Nankaido and southern Satsuma autumn, winter and spring are the seasons and in the South Seas the tuna fishing is done largely in winter and spring.

Bonito, smaller than tuna, frequent waters of the Kuroshio following this warm current toward the northeast in the spring reaching as far north as Aomori Prefecture and late in autumn return southwestward. Bonito fishing is conducted along the entire Pacific coast, but the most important centers are Shizuoka, Kochi and Kagoshima prefectures. Although in the southern prefectures bonito is taken all through the year, the main fishing season is from April to October.

Buri or yellowtail 17/ (*Seriola* sp. chiefly *Seriola quinqueradiata*), a member of the Carangidae is taken in large quantities; in 1938 about 73 million pounds were caught in Japanese coastal waters. They move northward along the Pacific coast in the warm waters as far as northern Honshu. They are most abundant in the coastal waters of southeast Japan from Choshi to the coast of Shikoku, Sagami Bay being particularly productive. They are most abundant along the coast of Shikoku in January but remain until May; they migrate to the waters of Tosa province during the months of December and January. In general winter and spring constitute the fishing season.

17/ Relative of the Atlantic amberjack. It should not be confused with the many other fish called "yellowtail" in various parts of the world.

Horse mackerel accounted for 66 million pounds of the coastal catch in 1938. This fish is taken in the water throughout central and southern Japan.

Tai (porgy, sea bream or red snapper) is really several species of which thru-madai (Pagrus major), chidai (Pagrus cardinalis) and kidai (Pagrus tumifrons) are the most important. These species together accounted for about 46 million pounds of fish landed in Japan proper in 1938 -- 27 million pounds of which were caught in coastal waters and 19 million pounds in the deep sea. Considered as a group these fish are caught from Hokkaido to Formosa along both the Pacific and Japan Sea coasts and are caught throughout the year. Madai, taken in largest numbers, swarms in the Inland Sea and the southern Japan Sea but is seldom found along the Pacific coast; kidai, on the other hand, is a deep-sea variety rare in the shallow waters of the Inland Sea.

Flatfish, largely flounders, are taken in quantities of 50 million pounds. Winter and spring are the main seasons.

Swordfish, i.e. kajiki 18/ which is an inclusive term used for several species, are caught in Pacific waters 50 to 300 miles off the eastern shores of Honshu and Hokkaido. In all about 3 - 5 million pounds of these are landed annually. The best catches are made in October, November and December with somewhat smaller catches made during August, September, January, February and March. The spawning season (April to July) is an off season. The catch is landed in largest quantities in

18/ Spearfish are sometimes included in this term.

Kanagawa and Miyagi prefectures with lesser amounts in Iwate, Aomori and Hokkaido.

Spanish mackerel, cuttlefish, octopus, sharks, samma 19/ and numerous species of shellfish and crustaceans are caught in the waters of central and southern Japan. Carp and eel are both caught and reared, ayn is reared and trout is caught in stocked inland lakes and streams. Some of these are mentioned later in connection with other aspects of the fishing industry as are shellfish, crustaceans and molluscs and seaweed, all important fishery products.

19/ Sanna (Cololabis samma) is found in the same general grounds as tuna and bonito. In the high sea fisheries it is taken chiefly north of Chiba Prefecture and closer to shore than bonito and tuna.

II FISHING OPERATIONS: FISHERMEN, BOATS, PORTS, METHODS AND PRODUCTION

On the basis of actual operations Japanese fishing may be divided into the following groups, each of which has certain special characteristics: (1) Coastal Fisheries; (2) Aquiculture; (3) Deep-Sea Fisheries in Home Waters; (4) Trawling; (5) Northern Fisheries and (6) Special Fisheries. Each of these will be considered in turn, pointing out the methods and equipment of the operations, the species caught, etc. But because this classification lists some fisheries which are not mutually exclusive and because some types of data are not available by this grouping, a general discussion dealing with fishermen, boats, ports and the catch as landed by prefectures precedes the discussion by fisheries.

Fishermen

Number. Approximately $1\frac{1}{2}$ million Japanese are directly engaged in the fishing industries, i.e. fishing, aquiculture and the processing of marine products. It has been estimated that 20 percent of the people are directly or indirectly dependent on the fishing industry.

In fishing itself 1,027,170 people were employed in 1940 -- 624,739 full time and 402,431 part-time; in aquiculture 127,813 were employed of whom 23,396 were full time workers and 104,417 part-time (Table 4). ^{20/} Of those employed in fishing and aquiculture together about 45 percent were part-time fishermen, most of these depending upon farming for part of their livelihood.

^{20/} A later figure, an estimate for 1941, fixes the number of "marine laborers" as 700,000. The higher figure above appears to arise out of differences in classification. The 700,000 approximates the total number engaged full-time in fishing and aquiculture.

TABLE 4

Number of Persons Engaged in Fishing and Aquiculture in Japan Proper

	Fishing			Aquiculture				
	Employers	Employees		Employers	Employees			
		Male	Female		Total	Male		
<u>Principal Occupation</u>								
1936	232,828	360,123	69,640	429,763	7,875	12,256	6,027	18,283
1937	228,504	353,920	66,833	420,753	7,919	11,885	6,098	17,983
1938	220,296	333,539	68,432	401,971	7,673	10,547	5,828	16,375
1939	220,061	328,945	65,443	394,388	7,971	10,626	5,903	16,529
1940	221,108	335,340	68,291	403,631	7,933	9,696	5,767	15,463
<u>Subsidiary Occupation</u>								
1936	244,689	137,935	57,287	195,222	86,421	21,620	20,428	42,048
1937	236,210	134,872	57,803	192,675	85,290	21,440	19,794	41,234
1938	231,026	126,541	56,044	182,585	78,212	21,113	20,762	41,875
1939	226,318	118,514	55,191	173,705	74,177	20,518	20,342	40,860
1940	224,647	120,644	57,140	177,784	66,993	17,962	19,462	37,424

Source: Toyo Keizai Nenkan, 1943 (Oriental Economy Yearbook)

In 1940 about 86 percent of those engaged in fishing and aquiculture were men and 14 percent women. During the war period the proportion of women has increased due to military conscription and the attraction of more lucrative occupations in war industries.

Distribution. Table 5 gives the data available concerning the regional distribution of fishermen. Hokkaido, the leading fishing prefecture, has the largest number -- more than 200,000 persons are supported directly by fishing and aquiculture in this prefecture. Nagasaki, Chiba, Shizuoka, Mie, Iwate and Yamaguchi prefectures each had more than 50,000 persons engaged in fishing in 1937. (Table 5).

Wages and Organization. Information concerning the method of payment and the wage rates of fishermen is fragmentary. Many are paid by a profit share system and many by a regular wage plus a share of the profits; some may receive only a direct wage payment.

In some of the small units of the coastal fisheries a simple profit share system is used whereby the owner of the boat receives a larger share than the fishermen, but is responsible for the cost of boat and net repair. This same system is also used in larger operations for a recent report of a large boat manned by 70-80 men indicates profit sharing. 21/ In this particular case, the profit after all deductions for ice, oil, bait, etc. were made, was divided at a ratio of 4 shares to the boat owner and 6 shares to the crew (the "shiburoku" or 4 to 6 system), the boat owner being liable for all expenses for the repair of

21/ Report of a prisoner of war, formerly a fisherman in Shikoku.

TABLE 5

Number of Fishermen and Fishing Craft by Districts, 1937

	<u>Number of Fishermen</u>	<u>Number of Fishing Boats</u>
Hokkaido	202,356	58,750
Aomori	46,006	9,864
Iwate	52,572	11,021
Miyagi	38,291	8,846
Akita	17,811	2,749
Yamagata	10,856	1,748
Fukushima	11,971	1,942
Ibaraki	32,074	6,502
Tochigi	5,263	356
Gumma	2,157	186
Saitama	3,465	185
Chiba	75,932	18,104
Tokyo	35,616	8,792
Kanagawa	28,016	7,160
Niigata	33,649	7,969
Toyama	24,412	2,662
Ishikawa	25,150	7,499
Fukui	12,496	3,695
Yamanashi	3,180	77
Nagano	19,884	682
Gifu	23,834	482
Shizuoka	53,951	8,497
Aichi	41,515	7,601
Mie	52,768	12,613
Shiga	18,112	1,268
Kyoto	13,318	3,369
Osaka	8,412	2,826
Hyogo	30,668	11,162
Nara	4,767	64
Wakayama	23,763	7,620
Tottori	14,125	2,821
Shimane	38,372	8,611
Okayama	20,191	7,043
Hiroshima	38,331	11,247
Yamaguchi	51,127	16,160

TABLE 5 (Continued)

Number of Fishermen and Fishing Craft by Districts, 1937

	<u>Number of Fishermen</u>	<u>Number of Fishing Boats</u>
Tokushima	17,796	6,049
Kagawa	24,803	8,339
Ehime	45,337	16,874
Kochi	40,110	8,978
Fukuoka	28,166	6,625
Saga	17,850	3,957
Nagasaki	80,476	20,853
Kumamoto	44,510	10,255
Oita	40,499	9,100
Miyazaki	18,276	3,588
Kagoahima	47,630	9,216
Okinawa	<u>14,568</u>	<u>2,247</u>
TOTAL	<u>1,534,432</u>	<u>366,254</u>

Source: Nippon Suisan Nempo, 1938.

boat and equipment. In the trawl fisheries the men are guaranteed a minimum wage and in addition receive a certain percentage allowed on the catch. ^{22/} Likewise on the floating canneries the men are allowed a percentage in addition to regular wages.

In the smallest coastal units the owner of the boat may be a single fisherman or several working in cooperation; in the larger coastal units, on the other hand, the owner is likely to be a joint stock company with the capital raised among wholesale fish dealers, ship-chandlers, bankers and others as well as fishermen. Thus the stock company, receiving a substantial share of the profit, may be largely or even entirely in the hands of non-fishermen. ^{23/} In the deep-sea operations the boat owner is in many cases a company.

Japanese fishermen are organized into various types of organizations -- societies and cooperatives; details concerning these are given on pages 172 - 177.

Legislation regulating conditions of work in fishing was almost non-existent in 1933 and no recent information is available concerning this aspect. ^{24/}

^{22/} In 1930 the percentage was 10 percent of the profit.

^{23/} The Economic Development of the Fishing Industry. Published by the Tokyo Association for Liberty of Trading, Bulletin No. 7, 1935.

^{24/} Industrial Labour in Japan, I. L. O. Studies and Reports, Series A, Geneva, 1933.

Fishing Boats

Number and Type. Official Japanese statistics place the total number of fishing boats at about 355,000 in recent years of which almost 80 percent were non-powered (Table 6). ^{25/} Of the 279,000 boats without engines in 1940 about 98 percent were less than 5 tons; thus of the total number, 77 percent were sailing or other non-powered boats under 5 tons. Most of these small boats are typical Japanese "isaribune" built of wood, flat-bottomed and propelled by means of sculls and sails. Although the preponderance of non-powered boats is clear, in the past fifteen years small boats without engines have been on the decline and those with engines have shown a noticeable increase. Even in the 5-year period 1936 through 1940 the number of non-powered boats decreased by more than 25,000 and the number of powered boats increased by more than 12,000 (Table 6). The rate of building and scrapping of fishing boats is indicated in Table 7.

In 1935 there were 2,752 boats of more than 20 tons of which 2,622 were motor-powered, 86 steam powered and 43 sailing vessels. According to statistics of the Fishing Vessel Owners Association, fishing craft of more than 100 tons numbered 293 in 1936 and 372 in 1939. These include trawlers, cold storage transport ships, bonito and tuna boats, floating factory ships, whalers, and government training and experimental patrol

^{25/} Some sources place the total number of fishing vessels as 450,000. This higher figure must include unregistered small plank canoes, rafts and dugouts still common in the more backward coastal villages. (This figure is given in Table 9).

TABLE 6

Number of Fishing Craft by Type, 1936 - 1940

	<u>1936</u>	<u>1937</u>	<u>1938</u>	<u>1939</u>	<u>1940</u> ^{a/}
Total Number	366,267	364,260	356,482	354,729	354,042
<u>Without Engines</u>	304,098	297,961	288,327	283,090	279,018
Less than 5 tons	296,798	290,734	281,849	276,663	273,032
5 - 10 tons	6,779	6,637	5,982	5,949	5,550
10 - 20 tons	499	568	478	464	417
20 tons or more	22	22	18	14	19
<u>With Engines</u>	62,169	66,299	68,155	71,639	75,024
<u>Steam Engines</u>	106	97	194	123	
Less than 50 tons	24	3	98	39	80
50 - 100 tons	10	1	5	{ 84	{ 93
100 tons or more	72	93	91	{	{
<u>Oil Engines</u>	62,063	66,202	67,961	71,516	
Less than 5 tons	44,774	48,105	50,111	{	{
5 - 10 tons	6,999	7,198	7,568	{ 68,411	{ 71,885
10 - 20 tons	7,454	7,804	7,346	{	{
20 - 50 tons	2,117	2,295	2,105	{ 3,105	{ 3,139
50 tons or more	719	802	831	{	{

Source: Official figures of Ministry of Agriculture and Forestry. 1935 and 1936 figures from The Statistical Abstract of the Ministry of Agriculture and Forestry, 1937 and 1938 figures from The Japan Yearbook, 1940-1 and 1939 and 1940 figures from Toyo Keizai Nenkan, 1943.

^{a/} Figures for 1940 as in source. They do not add to the total given.

TABLE 7

Number of Fishing Craft

	Without Engines			With Engines		
	<u>Newly Built</u>	<u>Scrapped</u>	<u>Total</u>	<u>Newly Built</u>	<u>Scrapped</u>	<u>Total</u>
1934	17,880	21,683	311,553	6,275	3,799	53,029
1935	17,247	18,699	308,541	6,413	3,571	57,478
1936	14,358	17,645	304,098	6,691	3,631	62,169
1937	11,385	14,959	297,961	5,530	3,326	66,299
1938	8,691	13,509	288,327	4,624	3,180	68,155
1939	8,524	12,144	283,090	4,200	3,023	71,639

Sources: Norinsho Tokeihyo, 1939; Japan-Manchukuo Yearbook, 1940.

vessels (Table 8). These larger vessels may be described briefly by type: 26/

Trawlers. In 1937 there were 94 licensed trawlers, including those engaged in operations in foreign waters. Most of these were vessels of 200 - 600 tons, Diesel powered, with motor driven winches, freezing and cold storage facilities. The size of these by operating areas is indicated by the following data. 27/

<u>Operation Area</u>	<u>Number of Craft</u>	<u>Total Tonnage</u>	<u>Average Tonnage per Craft</u>
Eastern coast of China and Yellow Sea	68	18,726	275
Southern China Seas	18	9,495	527
Bering Sea	3	1,217	405
Australian waters	3	1,419	473
Mexican waters	2	1,062	531

Small type trawlers. Only the larger boats of this type are 100 tons, some being as small as 20 tons. Most of these vessels have hand-manipulated drag nets and are provided with refrigeration facilities.

Cold storage transport ships. The number of this class of vessels is not known although one estimate places it as 27 (Table 8). The Nichiro Gyogyo K. K. had 10 refrigerator vessels operating in northern waters freezing freshly-caught salmon and salmon-trout.

26/ Further details and pictures of fishing vessels are given in Office of Strategic Services typed report "The Fishing Industry of Japan," 1942.

27/ Japan Fisheries Industry 1939 (Special Issue of Japan Times and Mail, 1939).

TABLE 8

Number and Tonnage of Large Japanese
Fishing Vessels, 1939

<u>Type of Vessel</u>	<u>Number</u>	<u>Aggregate Tonnage</u>
Government ships	38	9,785
Trawlers	82	25,238
Tuna and mackerel boats	122	16,358
Whaling floating factory ships	6	100,370
Whale catcher boats	70	18,116
Crab and salmon floating canneries	18	59,209
Fish transport ships	27	39,226
Fishing boats owned abroad by Japanese private concerns	<u>9</u>	<u>3,886</u>
Total	372	272,188

Source: Civil Affairs Guide -- Japan -- Resources (6).

Bonito and tuna vessels. These are Diesel-engined vessels some of which are smaller than 100 tons but others being from 100 - 200 tons. They are equipped with livebait compartments and cold storage facilities. They are seaworthy vessels, many of all-steel construction, with cruising radii up to 2,000 miles.

Floating factory ships. In 1939 there were reported to be 19 floating factory ships aggregating 64,000 tons which were employed in the salmon and crab fisheries. Although these average about 3,400 tons some are as large as 8,000 tons. They each have a number of smaller auxiliary ships; some have but three or four such auxiliaries, but the larger factories have 10 or 12.

Whaling ships. In 1939 there were six large Japanese whaling factory vessels operating in the Antarctic with 49 catcher boats. The whalers averaged about 16,700 tons and the catcher boats about 350 tons.

The whaling ships operating in coastal and colonial waters are smaller but modern vessels — typically 100 - 120 tons of the Norwegian type.

Government vessels. The government of Japan and the governments of the various prefectures have training vessels, oceanographic research vessels and patrol craft. These are modern vessels, most of them from 300 to 500 tons in size.

Distribution. Table 9 shows the general distribution of all Japanese vessels. Of the deep-sea vessels more than 8800 were operating off Japan proper. These vessels totaled about 212,000 tons or an average of little more than 20 tons.

TABLE 9

Distribution of Japanese Vessels, 1938

Coastal fishery, home waters	ca. 440,000
Deep-sea fishery	10,000
Home waters	8,836
Korean waters	ca. 1,000
Formosan waters	26
Kwangtung Leased Territory	146
South Seas area (Nanyo)	191
West-central Pacific whalers	30
Antarctic whalers (mother ships only)	6
Soviet waters	132
Floating canneries	15

Source: Japan Yearbook, 1940.

Data concerning the distribution of fishing boats by prefectures is presented in Table 5; unfortunately this regional breakdown by type and size of boats is not available. Hokkaido leads in total number with more than 58,000 boats in 1937 and Nagasaki, Chiba, Ehime and Yamaguchi prefectures each had more than 15,000 fishing boats in that year.

Fishing Ports

The coasts of Japan are thickly strewn with small fishing villages, many of them combination agricultural-fishing villages. These are the true fishing ports of Japan at which about 50 percent of the total catch is landed. In the parts of the country which have been long settled (Honshu, Kyushu and Shikoku) the distribution of these "ports" is closely related to the location of economically valuable coastal fisheries. In these three main islands no coastal area adjacent to good fishing grounds lacks fishing villages; even the most inhospitable stretch of coast has settlements proclaiming their trade by the fishing smacks ("isaribune") drawn up over the sloping rocky shore. These conditions, however, do not prevail in the northern areas (Hokkaido and Karafuto) which were settled intensively only after the middle of the last century.

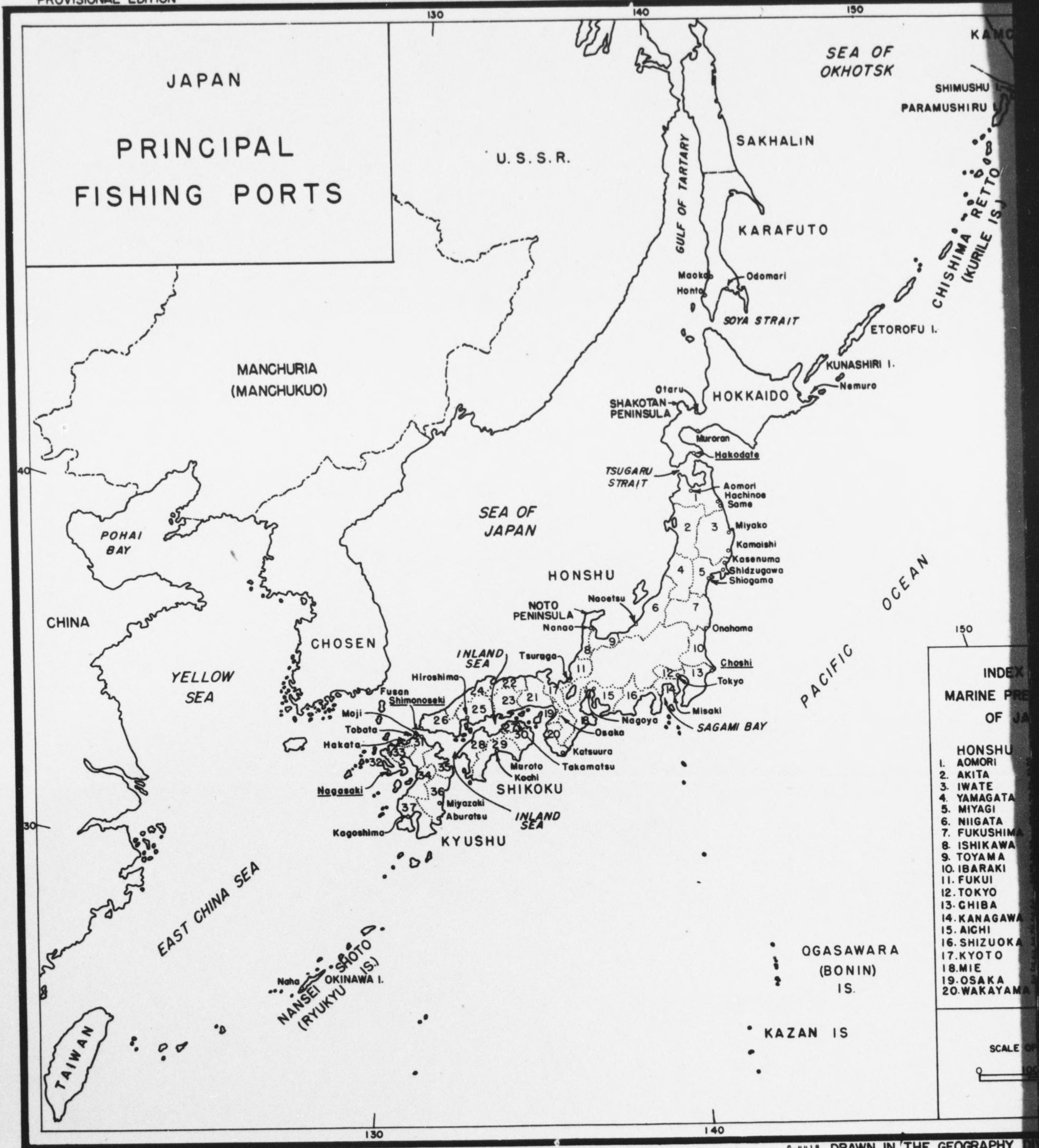
Although the fishing products of the coastal waters enter Japan through a thousand or more villages, the deep-sea fleets are based on a few leading harbors. These bases are concentrated in three areas:

(1) in Hokkaido, the base-area for the northern fisheries of the Okhotsk Sea and the Kurile-Kamchatka area; (2) in east-central Honshu the base area for the northern part of the great Scombroid range of the warmer Pacific waters; and (3) Kyushu, the base area for the Yellow Sea and the East China Sea trawl fisheries.

The important fishing ports of Japan are shown in Figure 7 and listed in Table 10 by prefecture. It should be noted, however, that many of the productive coastal areas are unrepresented here because their "ports" are merely small villages on bays and protected beaches. Of the ports shown on the map the following four can be regarded as the chief ports: Hakodate, Choshi, Shimonoseki and Nagasaki. Only Choshi, which supplies the metropolitan area of Tokyo, can be described as a "fishing harbor" in the fullest sense of the word. Tokyo, Nagoya, Osaka and Kobe, the large commercial ports of Japan, are important to the fisheries as destinations for aquatic products and as transshipment points rather than as fishing ports.

Even in the more important fishery villages, wharves, docks and piers are the exception. Where they do exist, however, they are nearly all of well-constructed masonry. Only in the northern ports of Hokkaido and Karafuto are there the soon-dilapidated piers of piling, weather-beaten timber docks, and wooden sheds reminiscent of New England or British Columbia fishing villages.

PROVISIONAL EDITION

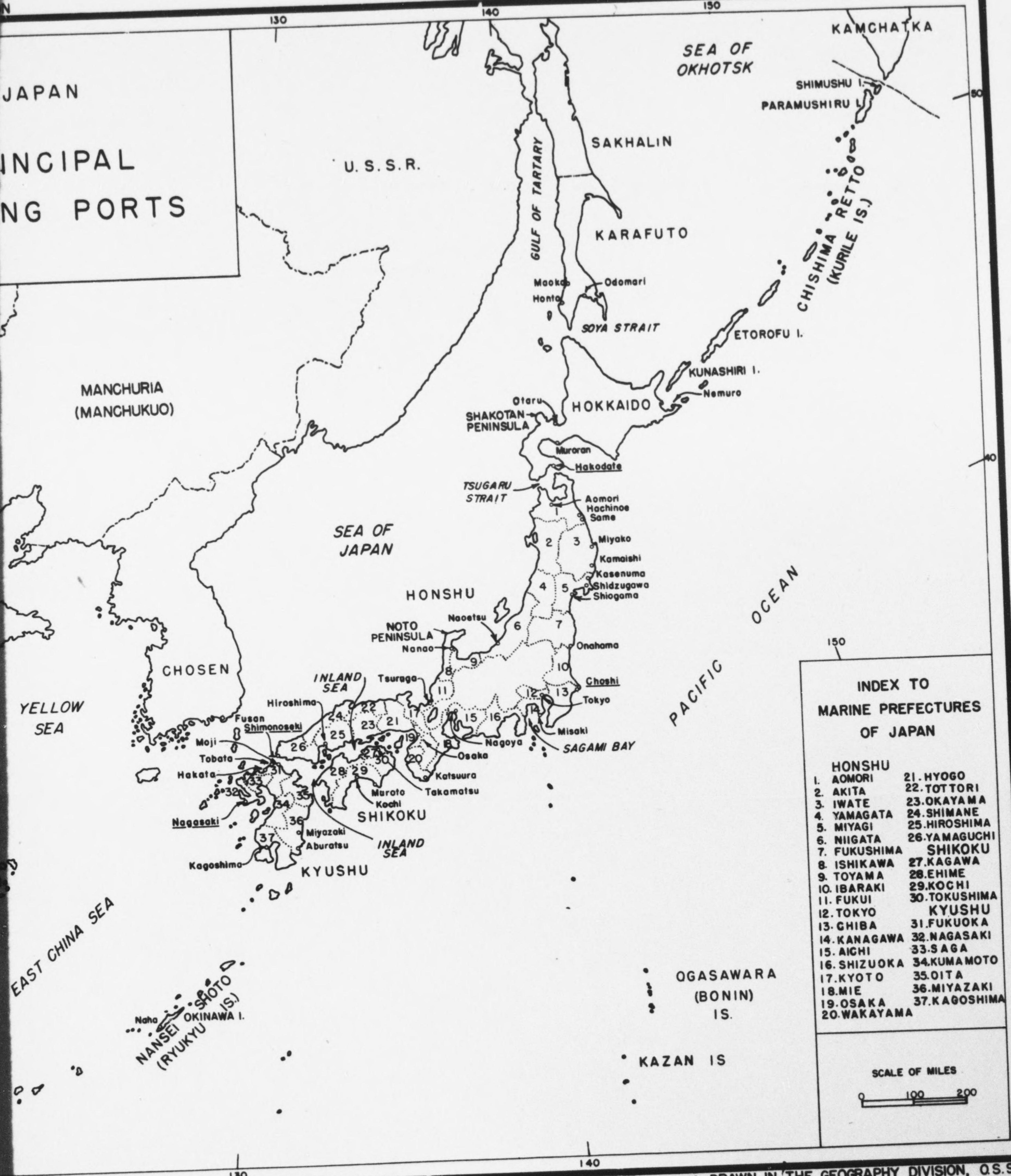


MAP NO. 625, JUNE 20, 1942

4-4418 DRAWN IN THE GEOGRAPHY DEPARTMENT

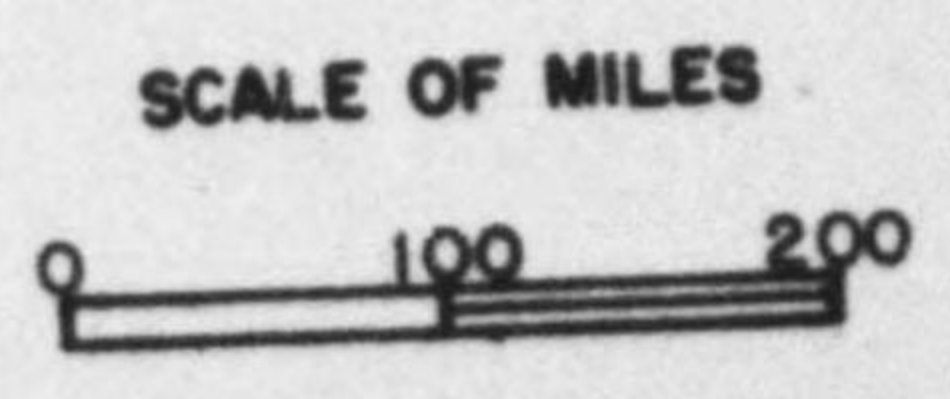
RESTRICTED

JAPAN
PRINCIPAL
PORTS



INDEX TO MARINE PREFECTURES OF JAPAN

HONSHU		
1. AOMORI	21. HYOGO	
2. AKITA	22. TOTTORI	
3. IWATE	23. OKAYAMA	
4. YAMAGATA	24. SHIMANE	
5. MIYAGI	25. HIROSHIMA	
6. NIIGATA	26. YAMAGUCHI	
7. FUKUSHIMA	SHIKOKU	
8. ISHIKAWA	27. KAGAWA	
9. TOYAMA	28. EHIME	
10. IBARAKI	29. KOCHI	
11. FUKUI	30. TOKUSHIMA	
12. TOKYO	KYUSHU	
13. CHIBA	31. FUKUOKA	
14. KANAGAWA	32. NAGASAKI	
15. AICHI	33. SAGA	
16. SHIZUOKA	34. KUMAMOTO	
17. KYOTO	35. OITA	
18. MIE	36. MIYAZAKI	
19. OSAKA	37. KAGOSHIMA	
20. WAKAYAMA		



JUNE 20, 1942

A-4418 DRAWN IN THE GEOGRAPHY DIVISION, O.S.S.

TABLE 10

Important Fishing Ports by Districts ^{a/}

<u>Karafuto</u>	<u>Honshu (continued)</u>
Maoka	<u>Kanagawa Prefecture</u>
Honto	Misaki
Otomari	<u>Aichi Prefecture</u>
	Nagoya
<u>Hokkaido</u> ^{b/}	<u>Shizuoka Prefecture</u>
Nemuro	Shimizu
Otaru ^{c/}	<u>Osaka Prefecture</u>
Muroran	Osaka
Hakodate ^{c/}	<u>Wakayama Prefecture</u>
	Katsuura
<u>Honshu</u>	<u>Hiroshima Prefecture</u>
<u>Aomori Prefecture</u>	Hiroshima
Aomori	<u>Yamaguchi Prefecture</u>
Hachinoe	Shimonoseki ^{d/}
Same	
<u>Iwate Prefecture</u>	<u>Shikoku</u>
Miyako	<u>Kagawa Prefecture</u>
Kamaishi	Takamatsu
<u>Miyagi Prefecture</u>	<u>Kochi Prefecture</u>
Kasemuma	Kochi
Shizugawa	Muroto
Shiogama	
<u>Niigata Prefecture</u>	<u>Kyushu</u>
Naoetsu	<u>Fukuoka Prefecture</u>
<u>Fukushima Prefecture</u>	Moji
Onahama	Tobata
<u>Ishikawa Prefecture</u>	Hakata ^{d/}
Nanao	<u>Nagasaki Prefecture</u>
<u>Fukui Prefecture</u>	Nagasaki ^{d/}
Tsuruga	<u>Miyazaki Prefecture</u>
<u>Tokyo Prefecture</u>	Miyazaki
Tokyo	Aburatsu
<u>Chiba Prefecture</u>	<u>Kagoshima Prefecture</u>
Choshi	Kagoshima
	<u>Loochoo Islands (Ryukyu Islands)</u>
	<u>Okinawa</u>
	Naha

- ^{a/} These ports listed here from north to south are shown in Figure 7.
^{b/} Lesser ports of Hokkaido are Kushiro, Abashiri, Rumoe, Iwairai, Kiritappu, Suttu, Esahi and Urakawa.
^{c/} Chief ports for operation of northern fisheries.
^{d/} Chief ports for trawling operations.

Production by Region

Table 11 gives the 1939 regional production of the fisheries of Japan proper, i.e. the amount landed in each prefecture from coastal fisheries and "deep-sea fishing in home waters". The production of the northern fisheries, trawling, fishing in colonial waters and aquiculture are not included. This table, providing regional production data, is the basis for later consideration of surplus and deficit areas.

Although fishing is widespread throughout Japan, three districts stand out as major producing areas: Hokkaido; the eastern coast of Honshu northward from Shizuoka Prefecture; and the west side of Kyushu and extreme southwestern Honshu (including Nagasaki and Yamaguchi prefectures).

Coastal Fishing.

General. Coastal fishing, largely in waters within 20 - 30 miles of shore, accounted for more than 2 million tons or two-thirds of the total production of fish, shellfish, crustaceans and molluscs of Japan proper in recent prewar years. It also provided most of the seaweed produced -- about 410,000 metric tons (Table 12).

Sardines constituted approximately half of the coastal fish catch with mackerel, herring, trout, cod, dog salmon, tuna, horse mackerel, flatfish, yellowtail, bonito, shark, red sea bream and grey mullet each providing sizable portions of the total (Tables 12 and 13).

TABLE 11

Production of Fish, Shellfish and Crustaceans by Regions,
1939 a/
(metric tons)

<u>Regions and Prefectures</u>	<u>Coastal Fisheries</u>	<u>Deep-Sea Fisheries</u>	<u>Total</u>
Hokkaido	838,635	156,246	994,881
<u>Tohoku</u>			
Aomori	92,738	15,717	108,455
Akita	8,155	2,171	10,326
Iwate	78,217	20,586	98,803
Yamagata	2,963	3,848	6,811
Miyagi	23,488	50,280	73,768
Fukushima	24,309	72,566	96,875
Total Tohoku	229,870	165,168	395,038
<u>Kanto</u>			
Niigata	23,257	2,724	25,981
Tochigi	458	—	458
Ibaraki	63,606	5,478	69,084
Chiba	36,160	145,001	181,161
Gunma	215	—	215
Saitama	330	—	330
Tokyo	17,014	348	17,362
Kanagawa	20,664	3,567	24,231
Yamanashi	147	—	147
Nagano	1,069	—	1,069
Total Kanto	162,920	157,118	320,038
<u>Tokaido</u>			
Shizuoka	56,411	38,797	95,208
Aichi	22,253	893	23,146
Mie	31,013	17,720	48,733
Gifu	1,044	—	1,044
Toyama	38,669	119	38,788
Ishikawa	55,216	2,122	57,338
Total Tokaido	204,606	59,651	264,257

TABLE 11 (Continued)

Production of Fish, Shellfish and Crustaceans by Regions,
1939 ^{a/}

(metric tons)

<u>Regions and Prefectures</u>	<u>Coastal Fisheries</u>	<u>Deep-Sea Fisheries</u>	<u>Total</u>
<u>Kinki</u>			4,494
Shiga	4,494	—	23,057
Fukui	22,465	592	26,258
Kyoto	25,836	422	186
Nara	186	—	22,746
Wakayama	18,686	4,060	9,414
Osaka	9,414	—	39,903
Hyogo	34,243	5,660	126,058
Total Kinki	115,324	10,734	
<u>Chugoku</u>			9,686
Tottori	8,841	845	10,336
Okayama	10,318	18	37,490
Shimane	25,013	12,477	16,736
Hiroshima	16,736	—	101,878
Yamaguchi	50,051	51,827	176,126
Total Chugoku	110,959	65,167	
<u>Shikoku</u>			10,287
Kagawa	8,616	1,671	19,253
Tokushima	15,899	3,354	59,761
Ehime	57,414	2,347	40,003
Kochi	28,113	11,890	129,304
Total Shikoku	110,042	19,262	
<u>Kyushu</u>			215,266
Nagasaki	169,281	45,985	24,892
Saga	16,425	8,467	88,418
Fukuoka	29,265	59,153	20,498
Oita	20,161	337	15,775
Kumamoto	14,667	1,108	27,702
Miyazaki	18,569	9,133	65,260
Kagoshima	42,603	22,657	457,811
Total Kyushu	310,971	146,840	
<u>Okinawa</u>	2,785	4,330	7,115
TOTAL JAPAN PROPER	2,086,112	784,516	2,870,628

Source: Norinsho Tokeihyo, 1939.

^{a/} Includes only production of coastal fisheries and deep-sea fisheries in "home waters". For aquiculture only value figures are available (Table 15). Seaweed is not included in the coastal production.

TABLE 12

Japanese Coastal Fishing Catch, 1934 - 1940

Quantity (1,000 kan)

Year ending March 31:	GRAND TOTAL	Wet Fish								Shellfish	Crustaceans and Mollusks		
		Total	Sardine	Herring	Mackerel	Tuna	Salmon ^{a/}	Red Sea Bream	Other		Total	Cuttlefish	Other
1934	867,927	593,913	340,831	103,181	18,132	5,896	7,029	3,228	116,616	48,009	50,794	26,246	24,000
1935	737,449	514,456	292,023	61,169	19,479	9,136	7,919	3,137	121,593	54,542	36,310	10,967	25,000
1936	782,032	571,592	347,283	38,122	22,611	9,009	17,703	3,231	133,633	40,621	42,133	18,960	23,000
1937	726,729	494,485	268,164	30,953	26,193	6,712	17,225	3,097	142,146	37,644	40,875	14,282	26,000
1938	596,862	449,431	250,284	11,578	27,437	4,646	19,411	2,969	133,106	31,169	56,437	28,230	28,000
1939	659,957	465,246	231,589	32,682	34,456	9,220	13,390	2,918	140,991	30,177	60,874	33,826	27,000
1940	667,549	403,013	173,091	49,364	21,306	11,511	12,572	3,048	132,121	46,866	60,585	35,619	24,000

Value (1,000 yen)

1934	173,137	128,143	26,314	7,157	5,830	4,992	4,690	9,685	69,475	10,094	25,617	10,277	15,000
1935	181,802	134,672	28,258	5,077	6,597	6,163	4,995	9,786	120,926	11,697	25,260	7,734	17,000
1936	212,648	159,764	40,958	4,381	8,407	7,165	9,155	10,200	79,498	11,202	29,373	12,030	17,000
1937	219,649	162,844	37,894	5,507	8,938	6,358	11,816	10,583	81,748	10,451	31,426	11,543	19,000
1938	248,895	179,908	42,363	2,674	10,892	6,175	13,034	11,609	93,161	10,721	43,934	19,827	24,000
1939	378,431	262,026	62,978	7,955	16,388	14,668	13,431	15,248	131,358	16,149	72,953	39,928	33,000
1940	488,300	333,209	74,767	15,597	20,440	24,154	16,526	20,039	161,677	29,606	86,601	45,126	41,000

a/ Largely dog or chum salmon.

Source: Toyo Keizai Nenkan, 1943.

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TABLE 12

Japanese Coastal Fishing Catch, 1934 - 1940

Quantity (1,000 kan)

	Wet Fish								Shellfish	Crustaceans and Molluscs			Seaweed
	Total	Sardine	Herring	Mackerel	Tuna	Salmon ^a / Red Sea Bream	Other	Total		Cuttlefish	Other		
1927	593,913	340,831	102,181	18,132	5,896	7,029	3,228	116,616	48,009	50,794	26,246	24,548	175,211
1944	514,456	292,023	61,169	19,479	9,136	7,919	3,137	121,593	54,542	36,310	10,967	25,343	132,141
1932	571,592	347,283	38,122	22,611	9,009	17,703	3,231	133,633	40,621	42,133	18,960	23,173	128,685
1929	494,485	268,164	30,953	26,193	6,712	17,225	3,097	142,146	37,644	40,875	14,282	26,593	153,725
1962	449,431	250,284	11,578	27,437	4,646	19,411	2,969	133,106	31,169	56,437	28,230	28,207	109,824
1957	465,246	231,589	32,682	34,456	9,220	13,390	2,918	140,991	30,177	60,874	33,826	27,048	103,660
1954	403,013	173,091	49,364	21,306	11,511	12,572	3,048	132,121	46,866	60,585	35,619	24,966	157,085
	Value (1,000 yen)												
1937	128,143	26,314	7,157	5,830	4,992	4,690	9,685	69,475	10,094	25,617	10,277	15,340	9,283
1902	134,672	28,258	5,077	6,597	6,163	4,995	9,786	120,926	11,697	25,260	7,734	17,526	10,173
1948	159,764	40,958	4,381	8,407	7,165	9,155	10,200	79,498	11,202	29,373	12,030	17,343	12,308
1949	162,844	37,894	5,507	8,938	6,358	11,816	10,583	81,748	10,451	31,426	11,543	19,883	14,827
1985	179,908	42,363	2,674	10,892	6,175	13,034	11,609	93,161	10,721	43,934	19,827	24,107	14,332
1943	262,026	62,978	7,955	16,388	14,668	13,431	15,248	131,358	16,149	72,953	39,928	33,025	27,304
1930	333,209	74,767	15,597	20,440	24,154	16,526	20,039	161,677	29,606	86,601	45,126	41,475	38,884

^a chin salmon.

^b sai Nenkan, 1943.

TABLE 13

Production of Coastal Fisheries, 1938 - 1939 ^{a/}

<u>Fish</u>	<u>Quantity</u> (1000 kan)	<u>Value</u> (1000 yen)
Sardines	231,589	62,978
Mackerel	34,456	16,388
Herring	32,682	7,955
Trout	27,753	12,876
Cod	25,180	9,417
Dog salmon	13,390	13,431
Tuna	9,220	14,668
Horse mackerel	8,362	9,368
Flatfish	6,248	8,731
Yellowtail	5,982	11,667
Bonito	3,802	4,072
Shark	3,689	1,663
Red sea bream	2,918	15,248
Grey mullet	2,594	4,355
Others	<u>57,381</u>	<u>69,209</u>
Total	465,246	262,026
<u>Shellfish</u>	30,177	16,148
<u>Crustaceans and Molluscs</u>		
Cuttlefish	33,826	39,928
Crab	7,261	3,164
Octopus	6,314	7,953
Prawn and shrimp	4,570	12,096
Other	<u>8,902</u>	<u>9,812</u>
Total	60,873	72,953
<u>Seaweeds</u>	103,660	27,304
Grand Total	659,956	378,431

Source: Norinsho Tokeihyo, 1939.^{a/} This table is included in addition to Table 12 as it gives production for several additional species.

Coastal fishing was characterized by small-scale operations with limited capital. Many of the fishermen were farmers who took to the sea only in slack seasons or fishing was the principal occupation of the father of the farm family while the wife and children tilled the soil. The entire coast of Japan was thickly strewn with little combination agricultural-fishing villages; two-fifths of these villages total earnings from fishing were more than half the earnings from farming.^{28/} Much of the coastal fishing consisted of very small units of operation, frequently involving a single family or several families.

Although coastal fishing was important along all sections of the coast of Japan proper its greatest relative importance was in Hokkaido. This large northern prefecture accounted for about 40 percent of the total volume of the coastal catch, due in part to its position in relation to converging currents and to its disproportionately long coastline as compared with other prefectures. Other regions of high production were the Pacific coastal waters of northern Honshu and along the western coast of Kyushu.

The fishing grounds in coastal waters were operated under a license system. For the purpose of licensing the fishing village was considered as a legal entity, each village being given exclusive rights to the waters along its shores. Most villages had their own fishing

^{28/} Fritz Bartz, "Japans Seefischereien," in Petermanns Geographische Mitteilungen, 86 (May 1940).

organizations which enter into all phases of the economic life of the fishermen (see pages 172-177).

The coastal waters have been worked intensively for a long period of time. Gradual depletion has been reported, and locally special restrictions have been imposed in order to prevent further diminution of these resources. The coastal waters of Hokkaido and northern Honshu are considered less depleted than those of other parts of Japan proper.

Methods and Gear of Coastal Fisheries. Japan's coastal fishing industry in immediate prewar years was a curious combination of old, time-honored indigenous methods and some of the most modern methods and equipment used anywhere in the world. Although the deep-sea techniques and much of the gear employed in the northern fisheries generally paralleled those of Western countries, included in the large assortment of gear used in the coastal fisheries were nets and traps of types unfamiliar in the United States and Europe. The complexity of techniques in the coastal fisheries was greatest in southern Japan. Here long settlement had permitted the development of a multiplicity of devices for specialized purposes and there was also a greater number of species than in the northern waters and fewer of the migratory types which could be secured in great masses by relatively simple procedures.

It is not possible in all cases to clearly draw the line between the methods of coastal fishing and those of the deep sea, but the

following pages describe some of the more important methods and gear used in the fisheries of the coastal waters, i.e. within 20 to 30 miles of the shores of Japan proper. ^{29/} Some of these same methods, purse-seining and gill-netting, for example, were used farther from shore.

Japanese fishing gear falls into two general categories, both of which were used in the coastal fisheries: (1) nets, including traps; and (2) hook and line. Japanese nets, in turn, may be considered as of seven general types:

1. scoop or dip-nets, designed to scoop or dip fish from the water.
2. casting nets, designed to spread out over fish, capturing them as the weighted bottom is pulled together.
3. laying nets, designed to catch fish by laying a net beneath fish, collecting them upon the net as it is lifted.
4. dragging nets (haul-seines) operated either from shore or from boats.
5. trap or pound nets devised so as to entrap fish. The greatest yield of the coastal fisheries probably came from these.
6. enveloping or encircling nets by which fish are enveloped.
7. entangling nets spread across the path of fish so as to catch them by entangling them in meshes.

^{29/} Many of the details for such operations are unfortunately sketchy or lacking. It should be recognized that there are numerous variations of the gear described here.

Each of these general types had numerous varieties according to the species sought, the locality and, in some cases, according to the season of operation. Hook and line fishing, less important in total production than net fishing consisted of simple angling (not used extensively in coastal waters), hand trawls and line trawls.

In connection with the operations for the various species numerous devices were used to bring fish to a desired spot. These included lighting, baiting, sheltering and helping spawning. Lighting by means of oil, gas or electricity was used especially in the sardine, mackerel and squid fisheries. Baiting, using either real or false bait, was a common practice. By providing artificial shelter, by protecting their natural refuge, and by aiding spawning through the provision of shrubs, fish were assembled in places convenient for their capture.

Another characteristic of the Japanese coastal fisheries, which is brought out in the succeeding descriptions, perhaps needs emphasis. The crews of the boats of the coastal fisheries were disproportionately large; eight men were quite common in a small boat and 12 to 30 in ones slightly larger.

Sardines. There were many methods used to catch sardines. Nets used were encircling nets, entangling nets, dragging nets, trap nets, laying nets, casting nets and scoop nets - i.e. nets of all seven general types.

The encircling nets, of which the purse seine was the most important, were operated on a large scale for catching vast schools of fish. With the increase in motor boats the use of these nets became easier and more popular so that they were in recent years the principal nets used in the deeper waters for sardines. Of the numerous varieties of the Japanese purse seines the dimensions of two are given here. One type about 800 feet long and 180 feet deep was carried by two boats 6 - 8 feet in beam manned by 20 to 30 or more men. Another 1,200 feet in length and 120 feet deep was handled by 30 or more fishermen in two boats of about eight feet in beam.

The drift net was simple and could be operated with relatively small capital investment. One type consisted of 15 smaller nets (each about 80 feet long) stitched together to make a length of 1,200 feet. The net was cast across the current by men in several small boats and was generally left drifting from sunset until the following morning.

The drag net (haul seine) was the principal means used in earlier years, but gradually had fallen into relative disuse as it could be operated only when the fish came close to shore. One type consisted of a large pocket 180 feet long and 180 feet in circumference and two wings, each about 1,500 feet long. Two boats manned by 30 men carried the net and when a sardine school was surrounded by it, the boats hauled the seine toward the shore where the fish were finally caught by being driven into the pocket as the wings were gradually drawn to the land.

Bottom laying nets 60 feet square laid flat in fairly shallow water were also used for sardines. As soon as the fish were collected in sufficient numbers over the net, it was rapidly lifted from all sides by the combined crews of 4 - 8 boats.

Traps or pound nets were used at points near the shore to trap schools of sardines; these frequently took enormous catches, but the in-shore nature made for years of plentiful production alternating with years of low production.

Herring were caught principally by trap or pound nets, encircling nets, haul seines and gill nets. A square shaped net called kaku-ami consisting of a main net and a fence net was the most commonly used trap net. The main net was about 420 feet long, 60 feet wide and 60 feet deep, and the fence net about 700 feet long. The trap was set near the shore with the fence net spread out so as to guide the fish toward the trap. Also used was another type of trap net called yukinari-ami.

One type of gill net consisted of 30 or more sets of nets 18 feet long and 45 feet deep stitched together. This net was cast by either a single boat or several small ones working in cooperation.

Salmon were taken along the coast by haul seines, trap nets and gill nets. One type of haul seine is reported as 3,000 feet long, and a kaku-ami trap net is reported to consist of a main net about 400 feet long and a fence net of more than 700 feet.

Cod were taken from boats by hand lines and trawl lines. Hand lines of more than 500 feet in length, bearing two hooks baited with herring or mackerel, were still used in immediate prewar years but trawl lines were more common. The trawl lines consisted of trunk lines about 1,200 feet long to which short lines were attached at the ends of which were hooks. A trunk line with 100 or more hooks made a "basket" and each boat carried 14 to 15 such baskets. Herring, sardines, squid or flounders were used as bait.

For mackerel a purse seine and what is called a "scare-cord seine" were commonly used. A purse seine for mackerel, 3,300 feet long and about 200 feet deep, was cast by two boats while one or two other boats assisted in surrounding the school; about 50 men were required. One of the scare-cord seines used, consisting of a pocket of about 108 feet and two wings each 3,000 feet long, was operated from four boats manned by 50 - 60 men.

Tuna were caught by drift nets, large trap nets, haul seines and purse seines and by trolling as well as by trawl lines and long-line (haenawa) although the latter two of these methods were used primarily beyond what can be called coastal waters.

Drift nets about 30 feet deep and 5,000 feet long were put out in the evening across a current or wind direction in seas 30 - 60 miles offshore.

Tuna pound nets (maguro daibo-ami) with leader nets of 700 - 800 feet were set so as to capture tuna.

One type of purse seine used for tuna consisted of a 60 foot pocket and wings of 2,500 feet of strong net. Several boats with about 60 fishermen operated this net. This type of net was used for tuna off Miyagi and Kanagawa prefectures.

Trawl lines about 1,400 feet long were used for tuna from boats with 10 or more fishermen to a boat.

Yellowtail were caught by numerous methods, varying according to the locality and season, but most commonly used were the large trap nets called ojiki-ami. Gill-nets, Japanese trawls, trawl lines and hand lines are also used.

The trap net used for this species consisted of a main net about 1,000 feet long and 600 feet wide at the opening with a leader net varying in length according to the nature of the fishing ground. The trap which was set at a point where the fish were known to pass in their migration was operated in some cases by as many as 12 boats, manned by more than 100 fishermen.

Baiting was commonly used to attract yellowtail for several of the methods.

Tai were taken in coastal waters by scare-cord seines, haul seines, gill nets, laying nets and hand and trawl lines.

The scare-cord seine consisted of a pocket about 100 feet long and two wings each more than 3,000 feet long. In this operation seven boats manned by 60 men were employed: two boats to handle the net, two boats to scare the fish into the net, two anchor boats and a look-out boat. The boats went out to the fishing grounds before dawn, the scare boats

cast the scare cord about 120 feet deep and by dragging it over the bottom drove the tai into the net which was cast in a circle by the boats. The fish were then driven into the pocket and caught.

Other species. Flounder and other flat fish were caught by gill nets, the Japanese trawl, hand trawl and trawl lines. Squid were caught by lines to which special gigs in the shape of false bait were attached. This fishing was done at night, at first catching squid in quite deep water but as the evening advances and the lights brighten catching them closer to the surface. Sharks, abundant along the Japanese coast, were taken by gill nets and trawl lines. Crabs were taken by gill nets cast 8 - 12 miles from shore and also by trawl lines. Lobsters were taken chiefly by gill nets, but the Japanese trawl and hand trawls were used for shrimps and prawns. The gill net used for the spiny lobster consisting of three sections (each about 60 feet long and 25 feet deep with four inch mesh) fastened together was cast by a boat manned by 2 - 3 fishermen in the evening and hauled the following morning. Abalone which cling to rocks at depths of 12 to 120 feet were taken by "lancing" them from the rock by means of a long spade or by a small iron implement used by divers. Seaweed was gathered by various dragged hooks.

Aquiculture.

General. About 120,000 metric tons of edible fish and shellfish, 35,000 metric tons of seaweed and smaller amounts of other products (goldfish, pearls and pearl shell) were produced annually in the immediate prewar period by aquiculture, an occupation in which more than 150,000 persons were engaged either part or full time from 1934 through

1937 (Table 4). From 141,000 to more than 162,000 places were reported in operation (Table 14).

TABLE 14

Number of Establishments Engaged in Aquiculture,
Area and Value of Products

	<u>Number of Establishments</u>	<u>Area (tsubo) a/</u>	<u>Value of Product (yen)</u>
1935	161,779	157,761,107	25,534,550
1936	162,326	154,930,254	25,551,596
1937	159,038	149,314,974	28,974,262
1938	158,629	151,201,913	30,110,429
1939	141,000	141,352,000	43,026,000

Source: Japan-Manchukuo Yearbook, 1940; Far East Yearbook, 1941.

a/ A tsubo equals 3.95 square yards.

The more important items produced were carp, eel, ayu and trout; various edible shellfish (particularly asari and oysters); seaweed (chiefly *Porphyra* species); goldfish; pearl oysters and pearl shell (Table 15). Tokyo, Shizuoka, Aichi, Mie, Chiba and Hiroshima prefectures were the largest producers, each having a yield valued at more than a million yen in 1937 (Table 16).

Carp Culture. The annual production of carp was about 11,000 - 12,500 metric tons; in 1940 the production, lower than in other recent years, was 10,504 tons (Table 15). Carp were raised in rearing ponds, ricefields and in reservoirs, lakes and rivers; in 1936 almost 150,000 places were raising carp. Shiga, Miyazaki, Niigata, Gifu and Akita were important in this production as suggested by the large number of hatcheries (Table 17). Chiba and Gunma prefectures were also large

TABLE 15

Production of Japanese Aquiculture, 1936 - 1940
(Quantity in 1,000 kan; value in 1,000 yen)

	1936		1937		1938		1939		1940	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Carp:										
Ricefields	509	683	497	706	418	685	n.a.	n.a.	n.a.	n.a.
Breeding-ponds	1,607	2,203	1,612	2,345	1,525	2,551				
Reservoirs, marshes, etc.	1,257	1,629	1,250	1,973	1,033	1,820				
Total	3,373	4,515	3,359	5,024	2,976	5,056	3,007	7,413	2,801	8,559
Eel:										
Breeding ponds	1,809	4,931	1,864	5,019	1,919	6,549	n.a.	n.a.	n.a.	n.a.
Reservoirs, marshes, etc.	35	82	27	74	30	88				
Total	1,844	5,013	1,891	5,093	1,949	6,637	2,034	9,230	2,012	10,984
Goldfish	555	581	554	667	386	531	n.a.	n.a.	n.a.	n.a.
Oyster	15,741	1,858	14,949	2,023	12,145	1,961	11,085	3,290	12,357	3,754
Asari	11,359	890	16,460	1,274	13,805	1,803	14,689	3,319	15,953	3,066
Pearl ^{a/}	7,072	984	10,858	1,544	10,884	1,376	66,856	2,869	31,850	2,116
Pearl shells ^{a/}	36,216	905	29,790	870	24,936	407				
Amanori (Porphyra)	8,410	8,566	9,346	9,988	8,233	9,365	n.a.	n.a.	n.a.	n.a.
Others	n.a.	2,240	n.a.	2,491	n.a.	2,974	n.a.	n.a.	n.a.	n.a.
Total Value		25,552		28,974		30,110		43,026		46,774

Source: Data for 1936 - 1938 from Orient Yearbook, 1940; 1939 and 1940 data from Toyo Keizai Nenkan, 1943.

^{a/} Quantity given in thousands of shells.

TABLE 16

Value of Aquiculture by Prefectures, 1937
(1,000 yen)

Hokkaido	107	Kyoto	132
Aomori	26	Osaka	306
Iwate	237	Hyogo	181
Miyagi	656	Nara	579
Akita	138	Wakayama	107
Yanagata	271	Tottori	58
Fukushima	136	Shimane	55
Ibaraki	94	Okayama	141
Tochigi	57	Hiroshima	1,070
Gunma	328	Yamaguchi	245
Saitama	60	Tokushima	52
Chiba	1,546	Kagawa	68
Tokyo	4,861	Ehime	84
Kanagawa	815	Kochi	170
Niigata	258	Fukuoka	461
Toyama	64	Saga	500
Ishikawa	61	Nagasaki	399
Fukui	16	Kumamoto	495
Yamanashi	94	Oita	180
Nagano	619	Miyazaki	95
Gifu	187	Kagoshima	47
Shizuoka	3,570	Okinawa	<u>23</u>
Aichi	3,051	Total	<u><u>25,553</u></u>
Mie	2,538		
Shiga	315		

Source: Nippon Suisan Nempo, 1938.

producers, but carp was raised in all prefectures excepting in northern Honshu and Hokkaido where it is too cold for this species.

TABLE 17

Number of Carp Rearing Hatcheries

<u>Prefecture</u>	<u>Number of Hatcheries</u>
Shiga	250
Miyazaki	240
Niigata	185
Gifu	155
Akita	135
Shizuoka	75
Yamagata	50

Source: Japan's Fisheries Industry 1939 (Special issue of Japan Times and Mail, 1939).

In raising carp in rice fields young fish about two centimeters long were liberated about the end of June (shortly after rice planting) and were 10 - 15 centimeters long when gathered at the end of September (just prior to the removal of water from the paddy fields). Two-year old carp about 15 centimeters long and 100 grams in weight when liberated grew to about 32 centimeters and 500 grams by late September. Although the fish fed mainly on natural feed (chiefly water fleas) some prepared feed (silkworm chrysalises) was generally provided.

Carp were reared in ponds by two methods -- calm water and running water, of which the latter conducted most extensively in Gumma Prefecture was considered somewhat better.

Among the larger lakes in which carp were raised were Lake Kasumigaura, Lake Sagami, Lake Chuzenji and Lake Biwa (at the southern end where the water is sufficiently warm).

Eel Culture. About 7,500 metric tons of eels were produced annually chiefly in Shizuoka, Aichi and Mie prefectures. Shizuoka Prefecture is reported to have produced about 60 percent of the total and Aichi Prefecture about 25 percent. Although the industry was conducted mainly along bays (as in Shizuoka Prefecture), eels were also raised in ponds, reservoirs, lakes and swamps. In 1937 there were 1,370 eel-rearing farms with more than 1,400 hectares of ponds and eels were also raised at 131,000 places on swamps, and in reservoirs having a total area of 1,900 hectares. Among the lakes producing eels were Lake Biwa, Lake Chuzenji, Lake Towado and Lake Kasumigaura.

For this production young eels were secured either by catching them when they weighed about 20 grams along the ocean coast (particularly the Pacific coast of Kyushu) or by capturing them when they were very small (.13 to .2 grams) as they ascended rivers during the winter months. In the latter case the baby eels were reared in special ponds until they reached about 15 grams. Eels were fed raw sardines and silkworm crysalises.

Other Fish Culture. Ayu, salmon, trout and grey mullet were among the other edible fish produced in considerable quantities by aquiculture.

Ayu (Plecoglossus altivelis), a small fresh-water fish somewhat similar to the trout, is among the most prized fish for eating in the Orient. It is widely distributed in the rivers of Japan and in recent years has been cultivated. In 1938 there were more than a hundred commercial rearing ponds for this species. Young ayu, about 7 centimeters long and 3.8 grams in weight, were liberated into ponds in April and early

May and after a diet of sardines, powdered silkworm chrysalises and sweet potato flour were gathered when about 12 - 16 centimeters long and 15 - 37 grams in weight.

Several species of trout and salmon (both inland and sea varieties) were reared. A major part of this production was the rearing of spawning adult fish and the hatching of young for the purpose of stocking rivers and lakes. In 1936 there were reported to be 217 hatcheries which produced 106,655,000 individual fish and 361 rearing ponds producing 186,000 kilograms of fish. Hokkaido and Yamagata prefectures had the largest number of trout and salmon hatcheries and rearing ponds although they were numerous throughout northern and central Japan.

Among the lakes in which trout (ame masu) was reared in considerable amounts are Lakes Biwa (Shiga Prefecture), Ashi (Kanagawa Prefecture), Shishaku (Hokkaido), Haruma (Gunma Prefecture), Chuzuji and Nojiri and Kisaki (Nagano Prefecture). Rainbow trout (introduced from the United States in 1877) was stocked in Lake Inawashiro (Fukushima Prefecture) and Lake Towado (Akita-Aomori); river trout (hime masu) was reared in Towado and Chuzuji Lakes.

Aquiculture in lakes and large marshes (not only trout and salmon but also other species including eel, carp and ayu) is in most cases conducted by some government or public organization for public benefits whereas the cultivation of fish in small ponds, reservoirs or rice fields is largely done by private enterprise. Prefectural governments through their fisheries experiment stations, fishery associations, municipalities and villages and fishery unions have all helped in the stocking of lakes

The breeding of ornamental goldfish (a relative of the carp) produced annually 60 million fish valued at ¥ 531,000 - ¥ 667,000. The industry centered largely in Tokyo, Nara and Aichi prefectures.

Shellfish Culture. The ten principal species of shellfish cultivated for food purposes in Japan were:

<u>Japanese Name</u>	<u>Scientific Name</u>	<u>English Name</u>
Hamaguri	<u>Meretrix meretrix</u>	Clam
Asari	<u>Tapes philippinarum</u>	Clam-like
Baka-gai	<u>Mactra sulcataria</u>	Trough-shell
Ho-tate-gai	<u>Pecten yessoensis</u>	Pecten or scallop
Aka-gai	<u>Anadara inflata</u>	Bloody-clam
Hai-gai	<u>Anadara granosa</u>	Bloody-clam like
Mo-gai	<u>Anadara subcrenata</u>	Bloody-clam like
Age-maki	<u>Sinovacula constricta</u>	Razor shell like
Awabi	<u>Haliotis gigantea</u>	Sea-car
Ma-sizimi	<u>Corbicula leana</u>	Corbicula

All except ma-sizimi were reared along shallow sea coasts; it was produced in lakes, rivers and swamps in all parts of Japan except Hokkaido.

Of these asari and hamaguri (clam and "clam like") were reared most extensively, especially asari of which more than 60,000 metric tons were raised in 1937 (Table 15). They were reared in shallow coastal waters, especially in places where the bottom was sandy or slimy and where there was some admixture of fresh water from rivers with the sea water. Among the most important producing areas was Tokyo Bay where 1,200 fishermen were engaged in this industry.

Hotate-gai (scallops) were reared most extensively along the eastern coast of Hokkaido by a procedure similar to that used for oysters. The spats which are free-swimming were collected on old shells suspended in the water of calm bays and later the scallops were transferred to open coastal waters where they continued their development.

Oyster Culture. In the immediate pre-war years 46,000 - 60,000 metric tons of oysters were produced (Table 15). Although several species were raised, magaki (Ostrea gigas) was the main one. The principal centers of production were in Hiroshima, Miyagi, Saga and Shizuoka prefectures although small-scale culture was carried on in nearly all the southern prefectures bordering the Pacific and those bordering the Inland Sea. Hiroshima Prefecture claimed half the total production.

Two methods were used: (1) an older method of planting wiers of bamboo or branches at a height so that at low tide they are exposed above the sea water for the collection of spats; and (2) "the new-hanging method" by which oysters are suspended on floating rafts making it unnecessary to pay attention to the condition of the sea bottom.

Deep-Sea Fisheries.

General. The so-called Japanese "deep-sea fisheries" consist of operations in "home waters" plus trawling, fishing in northern waters, distant tuna and bonito operations and fishing off Korea, Formosa, Kwantung and the Mandated Islands. 30/ Whaling, here included under special fisheries, is also sometimes considered as part of the deep-sea fisheries.

In general, the deep-sea fisheries differ from coastal fishing in several respects. Boats go out much farther from their home bases as operations are either in the deep sea or in shallow waters at

30/ "Deep-sea" fishing is really a misnomer as some of these operations are carried on in shallow water. This classification is used here, however, since there are valid distinctions on the basis of type of operation and since Japanese statistics divide the industry this way.

considerable distance from the homeland. They are larger vessels and the equipment is more expensive; some of the vessels are more than 100 - 200 tons and many are equipped with steam or Diesel engines. Due to the expensive equipment required for it, deep-sea fishing is of rather recent development and is for the most part large-scale enterprise in the hands of companies. Equipment and methods are more standardized than in the coastal fisheries. The catch is landed at fewer ports. The total deep-sea catch, as here considered, amounted to well over a million metric tons in pre-war years divided as in Table 18.

In the following pages these fisheries are described but not by groupings which are mutually exclusive. The figures in Table 18, however, do not overlap and therefore provide as accurate a total figure for the production of deep-sea fisheries as can be obtained. These do not include, however, the production of the floating canneries.

Deep-Sea Fisheries in Home Waters. The area of operations in "home waters" is not delimited by the Japanese and may include operations off the Kuriles, the Bonins and Karafuto and bonito and tuna operations at considerable distances as well as fishing directly off Japan proper. This type of fishing may also include the drag net fishing near Japan proper. There is really no clear distinction between these fisheries and some of the coastal fisheries, on the one hand, and some of the other deep-sea operations, on the other hand.

TABLE 18

Production of "Deep-Sea Fisheries," 1936 - 1940
(1,000 kan)

	<u>1936</u>	<u>1937</u>	<u>1938</u>	<u>1939</u>	<u>1940</u>
Home Waters	259,964	229,796	210,255	209,204	211,359
Trawling	13,887	13,380	10,072	9,710	9,002
Northern Fisheries ^{a/}	22,854	21,994	19,190	20,403	13,609
Waters of Korea, Formosa, Kwantung and South Seas Mandated Islands	15,336	12,078	9,619	7,008	n.a.
Total	<u>312,041</u>	<u>277,248</u>	<u>249,136</u>	<u>246,325</u>	<u>n.a.</u>

n.a. - not available.

Source: Compiled from data given in other tables in this report. Data are official Japanese figures.

^{a/} Includes only the salmon production of Soviet waters. Catch data for other northern fisheries are not available.

Tables 19 to 22 summarize the production, the number of vessels and the methods used in deep-sea fishing in home waters in recent years. Production in 1938 was 788,000 metric tons for the operation of more than 8,800 vessels with crews totaling more than 113,000. Sardines made up more than a quarter of the catch by volume and bonito, tuna and cod were taken in large quantities. Landings by volume were largest in Hokkaido, Chiba, Fukushima, Fukuoka, Yamaguchi and Miyagi prefectures. (Table 11).

Tuna and Bonito Fishing constituted one of the important fisheries in "home waters". These fish together accounted for more than 135,000 metric tons annually in prewar years and for them and the species which associate with them, Japan operated modern fishing vessels capable of month-long cruises. ^{31/} Most of these vessels are 50 - 200 tons, Diesel powered and have arrangements for cold storage.

It is estimated that 1,500 to 2,000 deep-sea boats operated in the tuna and bonito fishery, most of them based upon ports of eastern Japan -- Shizuoka, Miyagi, Mie, Kochi, Oita, Kagoshima, Ibaraki, Wakayama and Miyazaki prefectures.

In the winter months some of the larger boats operated in the southern tropical waters, shifting northward in the spring and summer as these migratory species moved northward. The entire area thus fished was enormous, extending from the South Seas northward through the Bonins

^{31/} Although the description here speaks only of tuna and bonito, mackerel, spearfish and swordfish, yellowtail and samma are all taken by somewhat similar operations.

TABLE 19

Production of Deep-Sea Fisheries in Home Waters, 1936 - 1940

	Total Production		Sardine		Bonito		Mackerel		Tuna	
	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen
1936	259,964	87,483	86,922	7,779	22,881	12,963	10,967	4,321	11,247	11,071
1937	229,796	89,887	53,958	6,977	24,820	13,187	10,211	3,894	9,866	12,340
1938	210,255	110,542	38,889	5,551	27,857	19,514	8,078	3,895	10,654	15,440
1939	209,204	142,557	59,368	12,324	23,004	23,407	6,506	4,701	13,691	21,888
1940	211,359	194,611	57,762	21,700	25,629	36,527	11,233	10,611	11,446	25,127

Source: Toyo Keizai Nenkan, 1943.

TABLE 20

Production of Deep-Sea Fisheries in Home Waters by Species, 1939

	Quantity (1000 kan)	Value (1000 yen)
Sardine	59,368	12,324
Bonito	23,004	23,407
Cod	22,009	8,408
Tuna	13,691	21,888
Shark	13,669	6,565
Flatfish	11,646	11,271
Mackerel	6,506	4,701
Skipper	3,012	2,646
Sea bream	1,716	5,043
Others	<u>54,583</u>	<u>46,304</u>
Total	209,204	142,557

Source: Norinsho Tokeihyo, 1939.

TABLE 21

Vessels and Crews Engaged in Deep-Sea Fishing in Home Waters, 1935 - 1938

	Total			Vessels Without Engines			Vessels With Engines		
	Number of Vessels	Tonnage	Number of Crew	Number of Vessels	Tonnage	Number of Crew	Number of Vessels	Tonnage	Number of Crew
1935	8,984	199,069	115,689	171	1,321	1,133	8,813	197,757	114,556
1936	9,885	215,026	125,775	240	1,940	1,391	9,645	213,086	124,384
1937	9,783	221,925	122,892	215	1,679	1,134	9,568	220,246	121,758
1938	8,836	211,968	113,148	167	1,370	1,297	8,669	210,598	111,851
1938:									
Circle net	916	15,188	14,326	18	111	369	898	15,077	13,957
Deep-sea net	1,732	52,027	16,041	10	550	115	1,722	51,477	15,926
Drift net	1,185	20,280	11,302	11	44	49	1,174	20,236	11,253
Long line	2,780	63,654	30,603	15	73	60	2,765	63,581	30,543
Hand line	618	10,188	7,754	112	582	695	506	9,606	7,059
Bonito angling	891	37,192	24,821	1	10	9	890	37,182	24,812
Others	714	13,439	8,301	-	-	-	714	13,439	8,301
Total	8,836	211,968	113,148	167	1,370	1,297	8,669	210,598	111,851

Source: Japan-Manchukuo Yearbook, 1940.

TABLE 22

Production of Deep-Sea Fisheries in Home Waters by Method, 1938

	<u>Sardine</u>	<u>Bonito</u>	<u>Mackerel</u> (1,000)	<u>Tuna</u> kan)	<u>Cod</u>	<u>Shark</u>	<u>Tai</u>	<u>Total (including others)</u> (1,000 yen)
Circle net	33,283	16	1,128	102	81	71	-	6,875
Deep-sea net	71	21	336	14	11,201	5,782	2,656	43,623
Drift net	4,646	-	163	90)	193	5,079	-	6,621
Long line <u>a/</u>	-	503	743	8,409	14,146	2,559	626	26,012
Hand line <u>b/</u>	-	2,085	3,036	87	27	46	15	5,738
Bonito angling	-	25,230	492	829	-	420	-	17,984
Others	<u>949</u>	<u>9</u>	<u>2,179</u>	<u>312</u>	<u>-</u>	<u>109</u>	<u>-</u>	<u>3,688</u>
Total	38,889	27,857	8,078	10,654	25,647	13,627	3,298	110,542

a/ Trawl-line.

b/ Includes trolling.

Source: Japan-Manchukuo Yearbook, 1940.

to waters east of Japan proper north as far as the Kuriles. 32/ Eastward vessels range 2,000 or more miles from their home ports. The "mingling region" lying along the line of convergence of the Kuroshio and Oyashio, which shifts according to seasons and other factors, was the most productive zone for the pelagic Scombroids. The Japanese who had devoted much scientific study to the natural conditions related to tuna and bonito were unable to predict areas of high productivity. 33/

The chief method used for deep-sea tuna fishing was line-trawling; this accounted for about 80 percent of the deep-sea tuna catch. Bonito was taken largely by rod and line. Purse-seine, drift netting and trolling were used but were distinctly of minor importance (Table 22).

Line-trawling (haenawa) for tuna was similar to American line trawling except for differences in details. Wooden or glass floats were used instead of cork buoys and the line and ganging were kept aboard in baskets rather than in tubs. Approximately 100 "hachis" (baskets of trawl-line) were loaded for 50 - 100 ton vessels and 200 - 300 baskets for the larger 150 - 160 ton vessels. For a vessel of 60 or 60 tons 12 - 14 fishermen were needed; for the larger vessels 25 or more constituted the crew. The lines, baited with cuttlefish, mackerel or sardines, were usually cast at dawn or in the evening. 34/

32/ Tuna which have a wider distribution are taken off Hokkaido and the Kuriles whereas bonito are not taken in quantity north of 42° in the deep seas. The species which accompany tuna and bonito are more diverse and abundant in the southern waters.

33/ Office of Strategic Services typed report, "The Fishing Industry of Japan," June 1942 gives further details including maps, charts and tables concerning area of operation and seasonal changes.

34/ Y. Sugiura, Suisan, 1939.

Rod and line angling (ippon zuri) for bonito was carried on by large crews of fishermen who lined one side of the vessel, standing a few inches above the water on a narrow rack. When a shoal was sighted, livebait which was carried in tanks was thrown out to slow up the movement of the fish. As the bonito bit, the livebait was gradually replaced by lures. The biting was usually over in less than a half hour. The fish, piled on the deck during the operations, were then stowed below in the fish wells and the boat moved on to search another shoal. If the biting had been good several thousand fish were caught in a few minutes.

Trawling and "Bottom Dragging". The capture of bottom feeding species, chiefly Sciaena species and flatfish but also sea breams, sharks and others, by means of trawling was really of two rather distinct types as operated by the Japanese. The first was that by large modern vessels operating otter trawls; the second that of considerably smaller boats using simple drag nets. The term "trawling" sometimes applies only to the former, but at other times is used to include both. Table 23 gives the official production statistics.

Trawling. The large trawlers operated chiefly in the East China Seas and the Yellow Sea although some operated in the South China Sea and, in the years immediately preceding the war, a few worked in foreign waters (Table 8). The waters of the East China Sea, the Yellow Sea and the South China Sea were divided into districts which have been carefully mapped according to productivity. Konda 35/ reports that of the 20 fishing districts of the East China and Yellow

35/ Seiji Konda, Geography of the Marine Industry of Japan, 1936.

TABLE 23

Production from Japanese Trawling, 1935 - 1940

	Total Production		Sciaena schlegelii		Sciaena japonica		Flatfish		Shark		Pagrus major		Others	
	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen	1,000 kan	1,000 yen
1935	14,258	7,044	4,782	1,697	1,381	1,155	1,050	608	460	137	53	72	6,531	3,376
1936	13,887	6,831	4,753	1,854	738	723	881	612	572	178	28	51	6,915	3,413
1937	13,380	7,951	4,613	2,070	1,054	938	663	508	451	158	23	51	5,557	4,227
1938	10,072	7,670	3,230	1,989	1,037	1,080	458	482	305	136	18	25	5,024	3,958
1939	9,710	9,676	3,326	2,671	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1940	9,002	10,912	3,081	3,341	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a. - not available.

-27- Source: Statistical Abstract of the Ministry of Agriculture and Forestry, 1936;
Toyo Keizai Nenkan, 1943.

Seas, four produced about 60 percent of the entire production of this area. Likewise in the South China Seas some areas were very productive whereas others were low in productivity.

The trawlers were licensed by the Ministry of Agriculture and Forestry and were strictly limited in number. The number permitted to operate in waters of Japan proper, the China Sea and the Yellow Sea was limited to 70; a few other vessels of this class operated, however, in other waters. Trawling in the China Sea was also limited to certain seasons: north of 25° N. from October 1 to June 1; and south of 25° N. from May 1 to November 1.

The operations off the China coast which provided the bulk of the trawling production were of a large-scale commercial nature carried on chiefly by one company (Nippon Suisan K. K.) with modern vessels, equipment and production techniques. In 1937 it operated 61 of the vessels working in the East China Sea and the Yellow Sea. The trawlers of this company, vessels of several hundred tons driven by steam or Diesel engines, had their chief base of operations at Shimonoseki where constant control over the fleet was kept. Each trawler was equipped with wireless so that at all times it was in touch with the base. When a boat started work, it notified the business office in Shimonoseki of its location and after every 10 hauls made a full report on its catch (quantities and species). The office, which constantly kept in touch with the fish markets at home, notified trawlers at work of the prevailing prices for various kinds of fish so that the catch could be evaluated. Trawlers in touch with one another by wireless could rush to places where the catch was most

profitable at the time. In addition to these commercial purposes the wireless was also used to keep every trawler at sea fully informed of weather changes.

The trawlers were away 12 - 14 days each voyage; of these, 4 - 6 days were required in going to and returning from the grounds, some of which were more than 800 miles distant. Thus 8 - 10 days on the average were spent in actual work each trip. Each trawler made about 35 - 40 hauls during each voyage, one haul taking 5 - 5½ hours. Upon their return to port, the trawlers did not normally lay over more than 24 hours so that apart from the time necessary for periodic repair and overhauling (about one month per year) each trawler made about 20 - 24 voyages per year.

Fish caught by the company's fleet was landed at Shimonoseki, Hakata and Nagasaki, but the largest amounts were brought to Shimonoseki 36/ which had the best facilities for the quick transportation to the large urban fish consuming centers.

Bottom dragging. These operations carried on by smaller vessels of 20 to 100 tons had a more restricted cruising radius. They used hand-reel nets which in most cases were drawn by two vessels working together.

There appears to have been 1,800 - 2,000 such vessels in operation in recent years although one source reports more than 3,000 in 1931.

36/ According to one source 56 vessels made Shimonoseki their headquarters in a recent year while 8 worked from Nagasaki and 6 from Hakata.