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FISHERIES OF THE U.S.S.R., 1976

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ABSTRACT

The Soviet Union harvested over 10 million metric tons of fishery products in 1975, deploying the world's largest fisheries fleet. Large capital investments and application of Western technology transformed the centuries-old coastal and inland fisheries into a modern industry, fishing in all of the "seven seas". The Soviets have invested over 12 billion rubles ($16 billion) in their fishing industry since planned development began in the 1920s. Most investments have been made in the post-World War II period; over two-thirds of total expenditures were to expand the high-seas fleet and modernize the processing technology. The rapidly expanding industry increased the demand for a highly skilled labor force and high-grade technical specialists. To meet that demand, the Ministry of Fisheries has transformed what used to be an unskilled occupation into a Government-recognized profession. Over 60,000 students are enrolled in an extensive system of secondary fishery schools and universities. As a result of Government investment and training programs, the fishing industry now makes an important contribution to the country's food supply. The reported per capita consumption of fishery products in 1975 was 16.9 kilograms, more than triple the 5.5 kg consumed in the United States. The increasing catch has made a significant change in Soviet foreign trade in fishery products. In 1959, the earlier pattern of imports exceeding exports was reversed and the fishing industry is now an important earner of foreign exchange. Soviet fishery products are exported to Eastern and Western Europe, Cuba, and many African countries.

THE SOVIET FISHING INDUSTRY: A REVIEW

(By Milan A. Kravanja[1])

General Background

For centuries Russia's marine fisheries were coastal and remained so during the first decades of Soviet power. In the early 1950's, however, the Soviets began to expand into both Atlantic and Pacific high-seas fisheries. Twenty-five years later, the U.S.S.R. has become one of the world's leading fishing nations. The U.S.S.R. today has the world's largest distant-water fishing fleet operating in all of the world's oceans. The 1975 catch of 10.3 million metric tons (including marine mammals and other aquatic products) exceeds by more than 6 times the 1.7 million tons harvested in 1950, and places the Soviet Union second among the fishing nations of the world (after Japan).

During the past 50 years, the Soviet Union has converted its labor-intensive fishing industry to modern, capital-intensive fisheries. The number of Soviet fishermen in 1975 is estimated at approximately 250,000, or about the same as in 1913. However, the 1913 fisheries catch was slightly over 1 million metric tons, whereas the 1974 catch surpassed 9.6 million tons. Total employment in the fishing industry, including processing workers, and service and administrative personnel, is about 750,000. The average yearly capital investment in fisheries has grown from US$2.9 million in 1940 to over US$1 billion in 1975. This figure includes total investments for new vessels, processing plants, refrigeration facilities, ports, and repair yards.

No official plan for maritime expansion has ever been made public, nor can it be expected that one will be released or even acknowledged in the near future. It is clear, however, from the rapid and controlled expansion of the Soviet naval, merchant and fishing fleets, that guidance and planning are coming from the highest levels of the Soviet Government. While the specific planning details and final objectives of this expansion are not fully known, much can be inferred from the results.

The Soviet fishing industry is not only an important, but is rapidly becoming an essential part of the contemporary Soviet food economy. In addition to providing a significant contribution to the nation's food supplies, it is also a large user of human and material resources. The Soviet Government determines the proportion of the Soviet budget to be invested in the fishing industry, sets the production targets for the industry in terms of annual and 5-year plans, fixes the salaries of all persons employed in the fisheries, and determines the price of fishery products sold on domestic and foreign markets. Thus, the control of the fishing industry by the Soviet State is complete.

[1]Chief, International Fisheries Analysis Division Office of International Fisheries National Marine Fisheries Service, NOAA U.S. Department of Commerce, March 1976.

FISHING INVESTMENTS

During the past 50 years, the Soviet Union has invested over 12 billion rubles in her fishing industry. Investment allocations, which were meager during the first 20 years (about 300 million rubles), increased spectacularly during the 1960s. At present, over 800 million rubles are invested in the fishing industry each year: this is almost triple the sum authorized during the entire first 20 years of planned investment policy.

A dramatic switch occurred in the mid-1950s (after Stalin's death) in the type of programs financed by fishery investments. Until then, about half of the total annual fishery investments was spent on building up the fishing fleet; the other half was used to build "shore plants" (ports, cold storage, processing plants, etc). During the subsequent decade (from 1956 to 1965), investments allocated to the build-up of the fishing fleet amounted to 78 percent of all fishery investments. It was during those 10 years that the U.S.S.R. more than doubled the gross tonnage of her fishery fleet, entered into all major distant-water fisheries (including those off the United States and Canada) and became a major fishery power with interests in all of the world's oceans.

Since 1966, this one-sided investment policy has changed somewhat, although 69 percent of all investments are still spent for procurement of fishing and fishery support vessels. It is expected that during the 1970s the Soviets will switch their priorities once again and increase investment capital for programs aimed at perfecting the "shore facilities." Several new fishing ports are now being constructed and the modernization of cold-storage plants and automation of fish-processing plants are both becoming major investment objectives.

In 1975, the decision was made by the Soviet Ministry of Fisheries to construct 100 retail fish stores in major urban centers throughout the Soviet Union as well as 15 giant fish-processing complexes. These projects will absorb a large proportion of the total fishery investments during the 1976-80 planning period. However, exact data on the amounts to be spent are not yet available.

THE FISHERIES CATCH

During the early stages of its development, the Soviet fishing industry concentrated on inland freshwater fisheries and on the marine fisheries of the Caspian and Black Seas. After the Second World War, the high-seas fisheries expanded rapidly and by 1975 accounted for 90 percent of the total catch. The North Atlantic and the North Pacific are the most important grounds for Soviet fishermen. Since the late 1950's, the Soviet Union has conducted extensive factoryship fishing operations in the Bering Sea and the Gulf of Alaska. In the mid 1960's, the fleet extended its operations southward to waters off Oregon and Washington, and by 1972, Soviet vessels were fishing off the coast of California.

In 1961, a Soviet fishing fleet entered the fisheries on Georges Bank off the New England coast. The Soviet Union has since operated large, highly-modernized fishing fleets off New England and along the mid-Atlantic coast as far south as Cape Hatteras (North Carolina).

Because many fish stocks in the North Atlantic fishing grounds are now depleted, the Soviet fishing industry has begun a move to previously unexploited grounds in the Southern Hemisphere. The latest Soviet fishing thrust has been in the Indian Ocean, the areas around Australia and New Zealand, in the Southern Pacific, and off Antarctica. Soviet expansion in South American waters has been hindered by the unilateral extension of fishing zones to 200 miles by most South American countries.

The average annual increase in the Soviet fisheries catch amounted to over 18 percent per year during the last 25 years, increasing almost sixfold from 1.8 million tons in 1950 to over 10 million tons in 1975. The most significant factor in this increase is the spectacular build-up of the Soviet fishing fleet: as more vessels were added, the catches increased. The part played by the increased productivity and greater experience of the individual Soviet fishermen in this development is difficult to judge, mainly because the Soviet Fisheries Ministry does not publish an annual yearbook of fishery statistics which would make such data more than an educated guess. The data exist, but they are locked in the desk drawers of Minister Ishkov and the Soviet fisheries "establishment."

The U.S.S.R. is today the second largest fishing country competing in a neck-and-neck race with the largest fishing industry of the world—Japan. Because of the unusual and continued investments in its fisheries, the Soviet Union will probably surpass Japan's catches—but not the high productivity of the Japanese fishermen—in the next few years.

The worldwide competition for fishery resources between Japan and the Soviet Union will grow even hotter after the 200-mile fisheries jurisdiction becomes universally accepted. In a recent article in Pravda (Feb. 12, 1976), the U.S.S.R. announced that it does support the so-called "200-Mile Economic Zone" under which the coastal states have sovereign rights to all living and mineral resources within their respective zones. By embracing this concept, the Soviet Union is not only showing support for a widely-accepted international principle, but also allowing for the possibility of its own extension to a 200-mile fishery limit.

To alleviate somewhat the impact of the extended jurisdiction, Japanese private companies, supported by the Government, have during the last 10 years, concluded a number of joint fishing ventures, or have bought out foreign fishing companies to insure their vessels' access to the fishing grounds in the "post-200-mile" world. Over 80 joint fishing ventures have been concluded throughout the world by Japanese businessmen.

There are some indications that the Soviet Ministry of Fisheries is currently embarking on a similar policy, imitating—as it often has in the past—a successful Japanese precedent. The Soviet thrust is concentrated in Africa, but important fishery deals have also been concluded with (of all places) Franco's Spain, France, and other European and Asian countries. In South America, the Soviets have been less successful except in Cuba where politics are more important than fisheries. The Chilean joint venture fell apart after Allende's downfall, and in Peru, the Government complains that the Soviets promised much (U.S. $60 million) for reasons of good public relations,

but delivered only a trickle ($1.8 million). The chief protagonist of the Peruvian-Soviet fisheries cooperation, General Vanini-Tantalean, is under arrest accused of corruption.

The Soviet fisheries catch in 1975 amounted to an estimated 10.3 million metric tons, or close to 15 percent of the world's catch. Only a decade earlier, in 1965, this percentage was one third smaller (9.5 percent). Since most of the Soviet fisheries expansion after 1965 occurred in the waters adjacent to the developing nations of Asia and Africa, the Soviet fishing fleets are thus in direct competition with rapidly developing fishing industries in those countries. The realization of this fact by developing nations has given an added impetus to the movement to extend fishery jurisdictions as far as possible: many African countries have unilaterally extended their fishing limits to 30, 50, even 200 miles, and others are preparing to claim the 200-Mile Economic Zone, which would give preference to nearby coastal states in the harvesting of fishery stocks within the zone. This action could be taken either unilaterally, or in unison with the current United Nations' Law of the Sea (LOS) Conference.

Soviet fishing off Latin America is practically non-existent. Most countries in South America already claim a 200-mile fishing limit, or even a 200-mile Territorial Sea (and thus full sovereignty), and the U.S.S.R. has by and large respected these limitations. In 1966–67, an attempt was made by the Soviet Fisheries Ministry to enter the virgin Patagonian hake fisheries off Argentina. However, this "invasion" was so clumsy and so devoid of any feeling for Argentine sentiment that it provoked an almost immediate extension of Argentine fishery limits to 200 miles. The Soviet catches from the Patagonian Shelf, which increased from zero to almost 700,000 tons in 3 years, were reduced to zero again by 1969.

The Argentine episode brings to mind another extension of fishery limits which was directly caused by the predatory behavior of the Soviet fishing fleets. In April 1966, the Soviet Far Eastern Fisheries Administration began an intensive fishery for hake off the U.S. Pacific Northwest coast (the states of Washington and Oregon). Without any prior warning or announcement, the number of Soviet vessels increased daily until, a few weeks later, almost 120 large and medium trawlers and support vessels effectively disrupted the operations of U.S. coastal fishermen, crowding them out of their traditional fishing grounds, causing damage to their gear, and overfishing the species on which their livelihood depended (Rockfishes). The U.S. Congress reacted with a fulminating speed and extended—to the great surprise, shock and chagrin of the Soviet Fisheries Ministry—the U.S. fisheries jurisdiction 9 miles beyond and contiguous to the traditional 3-mile fishing limits in October 1966.

This expansionary drive of the Soviet fishermen could not be moderated by any advice the U.S. offered in friendly persuasion. The same policy was followed on the East Coast where, in 1965 and 1966, the Soviet fleets overfished the Atlantic haddock to a point where the very existence of the species was threatened, causing a ban on fishing and the resulting serious economic dislocation of New England's haddock fishing industry.

In the next 10 years, the U.S.S.R. and its East European allies—East Germany, Poland, Bulgaria and Romania—overfished several species

(Pacific ocean perch, Atlantic mackerel, and others) and seriously threatened, Mid-Atlantic herring, Mid-Atlantic river herring, or alewife, Pacific halibut, etc.).

This careless behavior of the Soviet fishing fleets led at first to subdued demands for an extension of the U.S. fisheries jurisdiction to 200 miles and, in the early 1970's, to an avalanche of repressed sentiment which, sweeping aside Defense and State Departments objections, resulted on January 29, 1976 in the Congressional passage of the 200-mile bill, named officially the Fishery Conservation and Management Act of 1976.

The worldwide extension of fishing limits will severely dislocate the operations of the Soviet fishery fleets. A large percentage of the Soviet "distant-water" catch comes from the coastal waters of West European, North American, Asian and African countries. This portion of the catch, which can be estimated at between 80 and 90 percent of the total, will be unavailable to foreign fleets except by permission of the coastal countries. If "the past is prologue", such permission not only will be far below the present levels of the Soviet catches off foreign coasts, but will also be more costly to the Soviets.

The Soviet fisheries hierarchy is well aware of the coming storm. In mid-1975, Minister Ishkov formed an LOS committee, chaired by his Deputy Fisheries Minister for International Affairs, Mr. Georgii Vladimirovich Zhigalov, a former fisheries official from Vladivostok, who has had vast experience in negotiating with foreign countries and settling conflicts between foreign and Soviet fishermen. A level-headed man with good common sense, Mr. Zhigalov will be hard put to find answers to the uncertain future which the Soviet fishermen face as the Law of the Sea Conference gets into the decisive and possibly final stages of its deliberations. (The Third Substantive Session of the Conference began in New York on March 15, 1976.)

FLEET

The U.S.S.R. has not supplied data (as far as is known) on the gross tonnage and the number of its fishing vessels to the Food and Agriculture Organization of the United Nations (FAO) since 1956, when the buildup of its distant-water fishing fleets began seriously. This fact may indicate that the Soviet military (naval) establishment decided that such statistics are "sensitive" information and should be "classified".

Despite this Soviet secrecy, Western experts have a good idea of the size and comparative position of the Soviet fishing fleet. It numbers over 80,000 fishing vessels, most of which are small coastal craft, or even boats used in inshore and internal waters.

A feeble effort to modernize the fishing fleet began during the 1930's, but the main thrust came after the Second World War—in the late 1950's and after. The Soviet fishing fleet currently totals 18,000 powered vessels, including medium side trawlers, stern factory and freezer trawlers, processing vessels, floating canneries, rescue tugs, research vessels, and various other fishery support vessels. The Soviet fleet accounts for about 25 percent of the world's fishing fleet in terms of the number of vessels, but about 50 percent of the world's

fishing fleet when measured in gross registered tons. This is an indication that the Soviets support their worldwide, distant-water fisheries with vessels larger than those of any other nation, including Japan. These larger vessels, on the other hand, not only increase the costs of fishing operations enormously, they also lower the average productivity per gross ton.

The total number of Soviet high-seas fishing vessels is about 4,450. Many of these vessels were purchased in Poland, the German Democratic Republic, and in West European countries. A total of about 780 large stern factory trawlers currently fish under the Soviet flag, representing an estimated investment of about 2 billion rubles.

The Soviet fishing fleet is the largest in the world, both by number of vessels and gross tonnage. Comprising over 4,500 high-seas, distant-water vessels totaling in excess of 6 million GRT, it represents more than 50 percent of the world's high-seas fishing fleet tonnage estimated at 11–12 million GRT. The U.S.S.R. fleet outranks the second largest fishing fleet—that of Japan—both by number of vessels and by tonnage, but not by the amount of fish caught.

The average annual catch of Soviet fishermen per gross registered ton is comparatively low because the Soviets use fishery support (non-fishing) vessels much more extensively than any other country in the world. In 1973, the Soviet fishery fleet managed to catch on the average only about 1.6 metric tons of fish per gross registered vessel ton. This was about one-fifth what Japanese fishermen caught. Even U.S. fishermen, operating on small but efficient vessels, landed on the average almost 4 times as much per gross ton as did Soviet fishermen.

After the 1917 Revolution, the Communist regime began to modernize the obsolete fishing fleet left over from Tsarist Russia. In the first 5 Year Plan (1928–32), priority was given to the development of a trawler fleet. Subsequent 5-year plans anticipated further modernization, but were severely hampered by internal political strife and ultimately by World War II, when the existing fleet was practically annihilated.

Although the first post-World War II 5 Year Plan (1946–50) provided for the reconstruction of the fishing fleet, serious efforts did not begin until 1955. Most Soviet fishing vessels were then built in East Germany, which was occupied by the Soviet Army, and sent to the U.S.S.R. as war reparations. Although the German Democratic Republic remains to this day one of the main suppliers of fishing vessels,[1] the Soviet Union also buys vessels from a number of other countries. In addition, a considerable number of fishing vessels are being constructed in domestic shipyards.

The new fleet has the ability to operate far from Soviet shores. This distance gradually increased from an average of 200 miles in 1950 to over 4,000 miles in the late 1960's.

An important factor in the development of this high-seas fleet has been the introduction of the so-called stern factory trawler, a British invention. These vessels are capable of handling a much larger quantity of fish and operating at sea for up to 1 year. They are equipped with processing facilities, including fishmeal plants which reduce fish offal into fishmeal used in feeding cattle, chickens, and other domestic animals as well as mink.

[1] The East German shipyards delivered 1,077 high-seas fishing vessels by June 1976.

The Soviet Union has not decreased the rate of expansion of its fishing fleet up to this time. In fact, it has been announced that 900 new fishing vessels and 70 refrigerated transports were added during the just completed ninth 5 Year Plan (1971–75). According to Western estimates, the U.S.S.R. presently deploys about 4,450 high-seas fishing vessels.

The attention of the Soviet Ministry of Fisheries is now being directed toward further modernization of the fleet and increased productivity of its fishermen.

After the death of Stalin in March 1953, and the resulting interest in Western nonmilitary technological innovations, the Soviets obtained from the British the blueprint for one of the most brilliant inventions in modern fishing—the stern factory trawler. Lacking the necessary technology, the Soviet fishing vessel designers were unable to reproduce the vessel and the U.S.S.R. was forced to order her first 24 stern factory trawlers from the Kiel Shipyards in West Germany. Once these were delivered, the U.S.S.R. began its own production (in the Nikolaev Shipyards on the Black Sea), and induced Poland and East Germany to follow suit. Soon all three countries began to mass-produce stern factory trawlers. Since most Polish- and East German-built trawlers went to the Soviet Union, the Soviets were able to expand their high-seas fisheries rapidly. In the Atlantic, they were fishing off Canada (Newfoundland Banks) by 1956, off New England (Georges Bank) by 1961, and by 1962 their vessels were sighted in the Caribbean.

Today, almost 780, or about 15 percent of all Soviet high-seas fishing vessels, are large stern factory trawlers constructed domestically or bought in the German Federal Republic, France, Poland, and East Germany.

A similar number of support vessels—processing vessels, motherships and refrigerated fish carriers—was purchased in many West European countries (the Netherlands, France, Denmark, Sweden, FRG, etc.), in Japan, and in Eastern Europe (especially in Poland, but also in East Germany and even in Bulgaria).

The rest of the Soviet fishing fleet is composed of smaller (250–800 GRT) side trawlers and an armada of supply tankers, floating repair shops, water carriers, fishery enforcement vessels, and tugs.

PORTS OF CALL

For transshipping the catch, and refueling and resupplying the fishing fleet, the Soviet Union uses a number of ports of call near the grounds where its fishing fleet operates. The most important of these ports are Singapore for the Indian and Pacific Oceans, Havana for the western Atlantic Ocean, the Canary Islands for the eastern Atlantic Ocean, and St. John's and Halifax in Canada for fishing grounds adjacent to the Atlantic coasts of Canada and the United States.

Those arrangements are sometimes accompanied by joint ventures such as a projected seafood processing plant in Singapore and export facilities on Spain's Canary Islands.

In September 1962, a special agreement was signed with Cuba for the construction of a modern fishing port in Havana Harbor. Although the Cuban missile crisis delayed the construction, the

Havana fishing port was officially opened on July 26, 1966. The Soviet Ministry of Fisheries, in return for constructing the facilities, has the right to use the port of Havana for servicing its fishing fleet. This agreement expires July 26, 1976, but is expected to be extended.

Besides their regular points of transshipment and refueling, Soviet ships regularly call at other ports of the world as well. Until the late 1960's, the United States denied Soviet fishing vessels entry into its ports except in emergencies. After extensive negotiations, an agreement was reached in 1967 allowing four Soviet vessels to call once a month at Boston, New York, Philadelphia, and Baltimore.

The Soviets imitated Japan in the manner of their distant-water fishery operations: an "expeditionary flotilla" is set up with as many as 100–150 vessels, its own Fleet Manager, and its own logistic supply. While most of the vessels fish, the motherships stand by to accept primary or semiprocessed catch and supply the fishing fleet with daily necessities and information on where the best fishing is available. The latter data are collected continuously by exploratory research and scientific research vessels accompanying the fleets.

FLEET INVESTMENTS

During the last 30 years, since the end of World War II, the Soviet Union has invested an estimated 8 billion rubles in adding new fishing and fishery support vessels to its antiquated and inefficient prewar fleet.

The capital investments in the fishery fleet have almost doubled during each of the 5-year planning periods. However, during the last 5 Year Plan (1971–75), the total amount was so large (an estimated 3 billion rubles) that doubling it would have resulted in the construction of more fishing vessels than the Soviet Ministry of Fisheries could find crews to man, or facilities to support.

During the next 5 Year Plan (1976–80), capital investments for the construction, or purchase abroad, of new fishing vessels will be considerably smaller (possibly as much as the one-third smaller) than during the 1971–75 period.

Many new vessels will be replacements for older vessels built 20 to 25 years ago and now ready for retirement. The buildup of the high-seas fishing fleet will be deemphasized in view of the new realities of the "post 200-mile fishing limits world". More smaller vessels, suitable for coastal operations, will be built. Processing vessels with more automation, more modern plants and greater efficiency will be required to provide better quality fishery products; most of them will probably be bought from Polish or West European shipyards. The folly of building the giant 33,000 gross-ton mothership with 14 catcher vessels on board (the *Vostok*) will most likely not be repeated. The *Vostok* (built in the Leningrad Shipyards) was the idea of Soviet Fisheries Minister Ishkov and proved an expensive failure, both in its efficiency and in the productivity of its piggyback catcher boats.

FISHERMEN'S PRODUCTIVITY

No reliable statistical data or standards for measuring the productivity of Soviet fishermen, or comparing it to the productivity of fishermen of other countries exist.

The only comparison for which enough information was available was made by computing the ratio of total yearly catches to the gross tonnage of the fleet. These data show that the Soviet fishing fleet is the least productive when compared to the fishing fleets of Japan, Spain, Norway, or the United States, the five largest fish-catching countries in the world.

One reason for this low productivity is the fact that more than half of the gross tonnage of the Soviet fishery fleet consists of non-productive support vessels needed for long trips and distant fishing grounds. By comparison, only 14 percent of the Japanese fleet consists of support vessels. Unlike the Soviets, the Japanese are not reluctant to pay with hard currency for services to their fishing fleet in foreign ports, thus cutting down the need for their own support vessels. Japan also utilizes thousands of small vessels for coastal fishing. Furthermore, its economic system is based on incentives and free enterprise which do not tolerate inefficiency to the same degree possible in the Soviet state-owned socialist system.

Closest to the U.S.S.R. in terms of productivity (as related to gross register tonnage) is Spain, but even its fishermen are twice as productive as the Soviets.

EDUCATION

The rapid expansion of the Soviet fisheries fleet and the introduction of modern processing technology demands a highly skilled labor force and high grade technical specialists. To tap the tight Soviet labor markets, the Ministry of Fisheries transformed what used to be unskilled trade into a government-recognized profession with a well-developed system of secondary schools and universities.

There is no lack of candidates for Soviet fishery schools, in contrast to many Western countries where it is difficult for fishing companies to lure young people into fishery schools (provided they exist). Several factors explain the enthusiasm of young Soviets toward the fisherman's profession. For example, the salaries paid to Soviet fishermen are twice and sometimes three times as high as those paid to ordinary Soviet workers. Education in the fisheries schools, as in all Soviet schools, is free. Life aboard modern Soviet fishing vessels is relatively comfortable, vacations are long and well-paid, and fishermen, unlike most Soviet citizens, are able to travel and visit foreign ports.

There are four different types of fishery schools in the U.S.S.R. The first is available after graduation from the eighth grade and produces skilled workers without a secondary school diploma who remain low-paid employees. The next level includes the fishing industry's specialized secondary fishery schools, which train high-seas captains, navigators, and other officers. The 10 secondary coastal fishery schools train students for the same positions, but only for coastal and inland fishing fleets. Six higher technical and engineering institutes, the equivalent of U.S. colleges, are the third type of Soviet fisheries educational institution. Admission standards are rigorous and graduates become top-level economists, gear designers, planners, and managers of the fishing industry. Schools for improving the qualifications of fisheries personnel update the skills of medium and high level personnel.

In 1975, about 61,000 students were studying in 31 Soviet secondary and higher fishery schools and institutes. About one-half take correspondence courses while working fulltime in the fishing industry. Every year, approximately 10,000 students graduate from the system. There is no figure available on the total number of professors in Soviet secondary and higher fisheries schools; however, based on available data, the student-faculty ratio is estimated at 20–25:1. This would mean that about 2,500–3,000 fulltime faculty members teach in Soviet fishery schools.

It is interesting to note that about 50 percent of the professors in the schools of the Western Fisheries Administration (data for other administrations is not available) belong to the Communist Party of the U.S.S.R. This is an unusually high percentage, but is not surprising considering the large amounts of money the Soviet government has spent developing the high-seas fishing fleet, which operates off foreign shores and often visits foreign ports. The Fisheries Ministry doubtless wants to instill strong Party leanings in its future high level officers in order to protect its investment.

In 1973, the Soviet Fisheries Ministry budgeted a reported 48 million rubles for its fishery schools, or a little less than 5 percent of its entire budgetary allocations. The average cost per fisheries student would thus amount to about 800 rubles (U.S. $1,050) per year.

CONSUMPTION

Fishery products are an important source of animal protein in the Soviet Union, a country where a comparatively small percentage of the agricultural resources can be expended on beef production. The arable land, which is severely limited by climatic and geographical considerations, is cultivated mainly for food crops such as grain. Pasturage for beef cattle is therefore scarce, and fodder production low. Fish and fish products are a viable solution to what could become a serious protein deficiency in the Soviet diet.

This situation is illustrated by the fact that Soviet consumers eat more fish than consumers in most European countries. The Soviet annual consumption of fish per capita was 16.9 kg in 1975 (preliminary data). The Soviet Government would like to increase it to 18.2 kg per capita, a figure recommended by the Academy of Sciences of the U.S.S.R. as the optimal annual requirement of fishery products for the average Soviet citizen. Fisheries Ministry personnel have suggested that Soviet fish consumption could increase to as much as 20–22 kg per year, but this was before the extensions of fishery jurisdictions throughout the world cast a pall over Soviet plans for expanding fishery catches.

The Soviet population has been eating comparatively large amounts of fishery products during the last 25 years. In 1950, the Soviets consumed only 7.0 kg of fish per capita, but Soviet consumption of fishery products has increased steadily since that year. The growth in fisheries consumption was especially evident throughout the 1960's, when the catch was increasing dramatically with the development of the Soviet high-seas fishing fleet.

In recent years, however, the increase in the consumption of fishery products in the U.S.S.R. slowed down somewhat. Although the Soviet

Minister of Fisheries, A. A. Ishkov, announced in 1975 that consumption would reach 18.2 kg by 1976, the final 1975 figure of 16.9 kg falls far short. The problem seems to be one of getting the fish to the table of Soviet consumers, since Soviet fishermen have consistently been fulfilling and overfulfilling their catch plans. In any case, the Soviet consumption exceeds considerably the relatively small amounts of fishery products eaten in the United States (5.5 kg per capita in 1975).

FISHERY EXHIBITIONS

The first international fisheries exhibition sponsored by the Soviet Ministry of Fisheries was held in Leningrad in 1968. Called "Inrybprom-68," the exhibition was an effort on the part of the Ministry to attract foreign companies to display the latest developments in fisheries technology. The Ministry also took advantage of the exhibition to show off some of its own achievements, including a display of innovative fishery support vessels.

Based on the success of its predecessor, "Inrybprom-75" opened in Leningrad on August 6, 1975. The scope of this second Soviet international fisheries exhibition was much larger than that of the first. Over 400 organizations and 40 ministries and departments represented the U.S.S.R., while 284 foreign firms displayed fishery products, gear, and equipment manufactured around the world.

The exhibition lasted only 2 weeks, but Soviet reports indicate that 150 million rubles (U.S. $202.7 million) in contracts were signed. This figure is twice as large as in 1968, when final contracts for the 2-week exhibit totaled only 75 million rubles (U.S. $83.3 million).

There have been some indications that the Soviet Ministry of Fisheries went on a buying spree during "Inrybprom-75." For example, the first stages of a vessel construction project were discussed at the exhibition with representatives of the Polish shipbuilding industry. Four months later, a contract was signed to build a new class of fish-factory baseships in Polish shipyards. The contract, worth a quarter of a billion dollars, is said to be the largest in the history of Polish shipbuilding. The Soviets have also agreed to buy from Poland five supertrawlers of a completely new class, series B–400, the prototype of which was first displayed at "Inrybprom-75".

The single U.S. firm participating at the exhibition, the Xodar Corporation of Rhode Island, also found the Soviets in an agreeable mood; Ministry of Fisheries personnel reacted enthusiastically to its products, which included aquaculture and filtration systems and pollution-testing equipment.

FOREIGN TRADE

The expansion of the Soviet fishing fleet and the resulting increases in the harvest of marine products have brought about a significant change in that country's foreign trade in fishery products. In 1959, the value of the Soviet Union's fishery exports for the first time surpassed that of fishery imports, and exports have consistently exceeded imports ever since. During the early 1960's, when Nikita Krushchev was still in power, the quantity and value of Soviet fishery exports began to increase sharply. Except for a few reverses suffered

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in the late 1960's, this trend has continued, becoming especially pronounced since 1972.

Soviet fishery imports, on the other hand, peaked in 1954 and have since been on a downward trend, excluding several fluctuations which were caused in part by political factors. In 1974, for example, Soviet imports of fishery products from abroad consisted of 2,000 tons of fresh and frozen fish and caviar from Iran and 11,500 tons of fresh and frozen fish, fish fillets, and fish meal from Iceland. The most valuable single purchase from Iran was caviar, which is not sold in the U.S.S.R., but reexported to West European countries and the United States to earn hard foreign currencies. The Soviet Union continues to buy fish in Iceland as part of a barter agreement under which the Soviets supply Iceland with oil and gasoline products.

Soviet fishery exports have become progressively more valuable, not only to the Soviet Ministry of Fisheries, but to the Soviet economy as well. Under the Soviet system, a Ministry generating foreign currencies has preferential treatment, both in obtaining domestic rubles for investment and hard-to-get foreign funds.

In 1974, Soviet fishery exports amounting to over 125 million rubles exceeded imports, totaling 17 million rubles, by more than 108 million rubles. This surplus balance of trade is almost as large as the total Soviet fishery imports for the past 8 years, and is a clear indication that the Soviet fishing industry is becoming an important earner of foreign exchange for the Soviet Government.

Large amounts of Soviet fishery products are sold to African countries such as the Ivory Coast, Togo, Sierra Leone, and Egypt. The Soviet Union, since the early 1960's, has pursued a policy of selling fish in Africa as a form of "foreign aid" to these developing countries. Soviet trawlers, operating off the African coasts, come into nearby ports and sell their catch directly to local merchants at low prices. The trawlers, which are large and visible, cannot help but make an impression on the population of the port.

The fishery exports sold to African countries are mostly fresh and frozen semiprocessed products. Fishery commodities exported to Western and Eastern Europe, however, are generally more valuable products such as canned crab, caviar, and canned fish of various kinds, including salmon and tuna.

Fishery Investments

During the current 5 Year Plan (1971–75), the Soviet Government is to spend about 4 billion rubles (U.S. $5.2 billion [2]) for the development and expansion of its fishing industry (see table 1). About 60–70 percent of this sum will be invested in new fishery vessels. The 1971–75 annual fishery "appropriations" are about 20 percent greater than they were during the previous 5-year period.[3] Nevertheless, their rate of growth has slowed down from that of the late 1950's and 1960's when fishery investments doubled every 5 years.

The Soviet budget is published in two parts: One includes all expenditures (including social, cultural and economic expenditures), the

[2] Because of changing exchange rates, figures will be given in rubles. The current exchange rate is U.S. $1.32 equals 1 ruble.

[3] The planned investment for the 1966–70 period was 3.5 billion rubles, but the actual investment was reportedly 3.3 billion rubles.

other lists separately expenditures used for "national economy investments". Average current yearly investments for fisheries amounting to about 800 million rubles,[4] represent 0.5 percent of the total Soviet budget and 1.1 percent of the "national economy" investments.

During 1928–75, the Soviet Union invested almost 12 billion rubles in its fishing industry. Investment allocations, which were meager during the first 20 years, increased spectacularly after the end of World War II. The rapid increase from about 20 million rubles to over 70 million rubles a year was needed to rebuild the fishing fleet in the Barents, Baltic, Black, and Caspian Seas where German air supremacy in the first years of the conflict inflicted severe losses of fishing craft. Most Soviet vessels engaged in those fisheries were sunk or damaged. Rebuilding destroyed port facilities and processing plants also required large investment funds.

The capital investments in the Soviet fishing industry for the past 50 years are shown in table 1. They are divided into the 5-year planning periods. [5]

[4] This sum does not include expenditures for the construction of housing for fishermen, fish-processing workers, and fishery administrators.

[5] During the war years 1941–45 there was no 5-Year Plan; nevertheless, a total of 96.8 million rubles was invested in the fishing industry.

Table 1. Capital investments in the Soviet fishing industry, by planning periods.
(in million rubles)

Period	Total investment	Per Year	For fishing fleet		For shore-based plants	
			Total	Per Year	Total	Per Year
1st FYP: 1929-1932	17.6	4.4	1.6	0.4	16.0	4.0
2nd FYP: 1933-1937	55.0	11.0	5.0	1.0	50.0	10.0
3rd FYP: 1938-1940	46.2	15.4	3.6	1.2	42.6	14.2
1941-1945	96.8	19.4	7.7e	1.5e	89.1e	17.8e
4th FYP: 1946-1950	366.0	73.2	218.0	43.6	148.0	29.6
5th FYP: 1951-1955	721.0	144.2	386.0	77.2	335.0	67.0
6th FYP: 1956-1958	886.5	295.5	560.1	186.7	326.4	108.8
7th FYP: 1959-1965	2,032.0	290.3	1,533.5	219.1	498.5	71.2
8th FYP: 1966-1970	3,500.0	700.0	2,450.0	490.0	1050.0	210.0
9th FYP: 1971-1975	4,000.0	800.0	2,600.0e	520.0e	1,400.0e	280.0e
TOTAL	11,721.1	254.8[1/]	7,765.5	168.8[1/]	3,955.6	86.0[1/]

10 FYP 76-80

Source: Sysoev N.P. Sostav i struktura osnovnykh proizvodstvennykh fondov rybnoi promyshlennosti SSSR. Trudy Atlantniro, No. 26. p. 19. Kaliningrad, 1970.

1/ Average annual investment.

The policy of reconstruction (1945–53) was followed by a policy of expansion after Stalin's death. During the two "Khrushchev" 5 Year Plans (1956–65), fishery investments doubled from 144 million rubles a year to over 290 million. At the same time, the new political climate made possible several initiatives in West European countries. Negotiations for the purchase of new vessels were concluded with the United Kingdom (1954) West Germany (1955), and other countries. Additions of new vessels made possible a preplanned expansion into new fishing grounds all over the world and necessitated a significant change in priority investments.

A dramatic switch occurred in the mid-1950's in the type of programs financed by fishery investments. Until then, about half of the total annual investment was spent on building the fleet; the other half was used to build "shore plants" (ports, cold-storage, processing plants, et cetera). During the subsequent 10 years (1956–65) investments allocated for the build-up of the fishing fleet amounted to 78 percent of total fishery investments (fig. 1). These large sums were spent on the design and development of several new classes of fishing vessels, including the large and medium stern factory trawlers and, more recently, the catamaran fishing trawler. It was during these 10 years that the U.S.S.R. more than doubled the tonnage of her fishery fleet, entered most major distant-water fisheries, including the grounds off the United States, and became a major fishery power with world-wide interests.

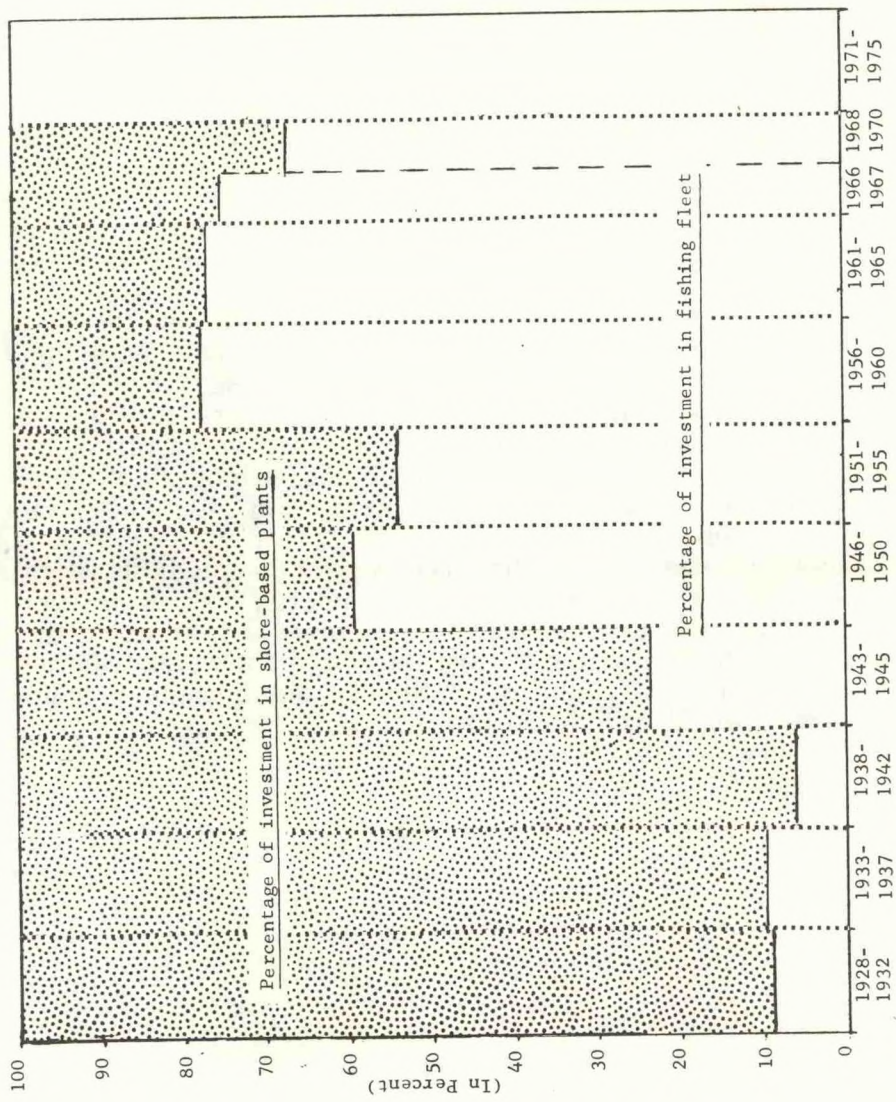


Fig.1 . Annual capital investments in Soviet fisheries, in percentage of fleet and shore-based plant investments; 1928-1975, (in percent of total).

Since 1966, this one-sided investment policy has changed somewhat, although 69 percent of all investments continued to be spent for fishing and fishery support vessels during the 1966–70 period. It is expected that during the 1970's the Soviets will switch their priorities once again and increase investment capital for programs aimed at perfecting the "shore facilities". Several new fishing ports were constructed in the early 1970's, and modernization of cold-storage plants and automation of processing plants are becoming major investment objectives.

In the last 20 years, the comparatively small volume of capital investment in shore-based enterprises, ship repair yards and port facilities, when compared to investment in the fishing fleet, has resulted in a rising disproportion between the development of the fleet and shore-based processing and support operations. A modern and technologically advanced fishing fleet operates on the high seas processing or semiprocessing up to 90 percent of the catch taken. This contrasts, however, with the inability of transport facilities and processing plants on shore to handle the catch efficiently once it reaches them. The result is spoilage and waste as products are held up in transit or improperly stored while awaiting distribution. A further consequence of the inadequate on-shore investment is the increased idling of fishery vessels in ports, ship repair time exceeding the planned periods, and the resulting under-utilization of the fleet.[6]

During the ninth 5 Year Plan (1971–75), industry planners are hoping to alleviate some of these discrepancies between the shore plants and the fleet by increasing the amount of capital spent on ship repair yards, port facilities, and processing plants. However, "replenishment of the fleet" still remains one of the major tasks of the Plan as new classes are continually added to the already long list of Soviet fishing vessels.

The Fisheries Catch

During the last 25 years, Soviet fishermen have been remarkably successful in adding to the country's fisheries catch. Increasing at an average annual rate of about 18 percent, the 1974 total Soviet catch of fish, shellfish, marine mammals, and other aquatic animals and plants amounted to 9.6 million metric tons (11.1 billion pounds), or 450 percent more than the 1.8 million tons which were harvested in 1950. This large increase was made possible by a spectacular build-up of the Soviet fishery fleet, which includes now over 850 vessels supporting far-flung harvesting operations conducted by almost 3,500 fishing vessels[7] throughout the world's oceans. (For details see the chapter, "Soviet Fisheries Fleet; a Statistical Review.")

The Soviet fisheries catch is increasing much more rapidly than the world's catch and constituted about 14 percent of the latter in 1973, the latest year for which comparative data are available.[8] From 1950–73, the world's fisheries catch increased at an annual rate of

[6] During 1972, the "nonoperational" time of all large stern trawlers, the most modern and efficient vessels in the Soviet fleet, amounted to 27.3 percent. (V. Pozdniakov in Politicheskoe Samoobrazovanie, No. 12, 1973)

[7] Fishing vessels are equipped with gear to catch the fish. Fishery support vessels have no fishing gear and do not catch fish. Their function is to provide support to fishing vessels by receiving their catches, supplying stores, fuel, water, etc.

[8] In 1965, the Soviet fisheries catch was only 9.5 percent of the world's.

6.7 percent by a total of 154 percent (from 25.9 million tons to 65.7 million tons); during the same period of time, the Soviet catch increased at an annual rate of 17.9 percent by a total of 413 percent (from 1.7 to 9 million tons). The total world investment in fisheries is not available, but it is believed that it is, on a pro-rated basis, considerably more modest than the huge Soviet fishery investments which currently exceed $1 billion per year. It was the large infusions of investment capital over the past 25 years that made possible the domestic construction and purchases abroad of numerous new fishing vessels with resultant increases in the harvested catch.

The current plans provide for a 1975 catch of 10.3 million tons, 700,000 tons more than in 1974. Preliminary data indicate that the 1975 fishing season was proceeding smoothly: During the first half of 1975, Soviet fishermen exceeded the planned January–June catches by 200,000 tons,[9] a certain indication that the total catch will exceed 10 million tons for the first time and that the fulfillment of the 1975 catch plan is probable.[10]

COMPARISON WITH OTHER MAJOR FISHING COUNTRIES

The Soviet Union is rapidly approaching the time when it will become the largest fishing country in the world. It has had the largest fishing fleet since the the mid-1960's, but because of the much lower average productivity of its fishermen, it continues to lag behind Japan in terms of catch. (See table 1.)

[9] Sovietskaia Latviia, July 12, 1975.

[10] The 5 Year Plan for 1971–75 provided for a total Soviet annual catch of 10.3 million tons by the end of 1975. The accomplishment of fulfilling the 5 Year Plan is an important political consideration in the Soviet Union.

Table 1. World fisheries catch, by selected countries and years; 1938-1975[1/].

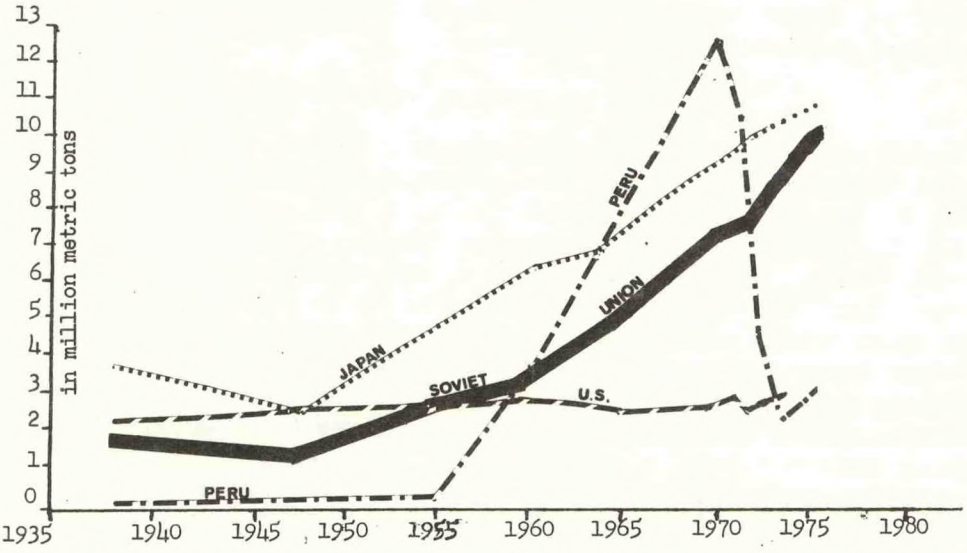
(in thousand metric tons)

YEAR	JAPAN	USSR	U.S.	PERU
1938	3,689.7	1,523.0	2,260.1	23.4
1948	2,526.2	1,485.0	2,416.6	84.1
1955	4,921.2	2,495.0	2,790.4	235.5
1960	6,207.1	3,051.0	2,814.7	3,727.0
1965	6,928.8	5,099.9	2,696.2	7,631.9
1970	9,366.4	7,252.2	2,776.5	12,612.9
1971	9,949.6	7,337.0	2,819.5	10,606.1
1972	10,272.6	7,756.9	2,649.5	4,768.3
1973	10,701.9	8,618.7	2,669.9	2,299.3
1974	10,773.4	9,235.6	2,743.7	4,149.9
1975[2/]	11,000.0	10,000.0	n.a.	3,300.6

1/ These catch data are given as each country reports them to the FAO in Rome. Both Japan's and the USSR's data do not include marine mammals and other aquatic products (see chapter III C for details).

2/ Estimated.

Fig. 1. World fisheries catch, by selected countries; 1938-1973



Prepared by: International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA, Commerce.

The three largest fishing countries in the world were at one time Peru, Japan, and the U.S.S.R. (The People's Republic of China is reportedly in the same league, but its Government refuses to publish any meaningful catch statistics and, as a result, no one knows precisely what its fisheries catch is. FAO estimates it at about 7 million metric tons. For purposes of this discussion, we shall leave out the PRC.)

After the occurrence of "El Niño" [11] in the early 1970's and the evident overfishing in the late 1960's, Peruvian catches decreased rapidly. The fishing industry of Peru has been almost entirely dependent on the anchovy catch since 1955, when Peruvian investors realized that large stocks of anchovy off its coast could be utilized for fishmeal which was in growing demand on the world markets. With resultant heavy investment in vessels and reduction plants, the Peruvian catch increased from a few hundred thousand metric tons in 1955 to over 12 million tons in 1970.

The unexpected demise of Peru as the largest fishing nation of the world leaves Japan as the Soviet Union's only major competitor for the fisheries catch of the world.

Figure 1 shows graphically the status of the race between the two world fishery giants—Japan and the U.S.S.R. They were running neck-and-neck until 1973 when a large increase in the catch lifted the Soviet statistical curve upward on a collision course with that of Japan. It is expected that the Soviet Union will become the world's largest catcher of fish and shellfish sometime before 1980, and possibly as early as 1977.

Unlike the dramatic fluctuations of Peru, or the steady increases scored by Japan and the Soviet Union, the U.S. fisheries catch has remained stagnant for the past 30 years.

CATCH IN HISTORICAL PERSPECTIVE

Soviet national statistical data provide a reliable image of the total Soviet fisheries catch. They are collected for the years 1913–74 in table 2. The first column (total catch) is also graphically presented in fig. 2. One can see how the Soviet fisheries catch languished during World War I, the Civil War period, and the early years of Soviet power. The New Economic Policy (NEP) in the late 1920's gave it a spurt which was quickly spent in the difficult years of Stalin's political terror and purges. After the end of World War II, considerable progress was made, but it was not until Stalin's death that the attention of the Soviet Government was turned to fisheries (and other marine industries) on a priority basis. The foundations for a large investment program were laid during Khurshchev's 7 Year Plan (1959–65) [12] which began to pay dividends soon. By the early 1960's, the catch curve was beginning to climb toward the 10 million mark with a geometric precision, briefly interrupted in 1971 when bad weather caused the catch to be smaller than the year before (column 2 in table 2).

[11] "El Niño" refers to a natural phenomenon that brings about changes in the Humboldt Current flowing off the west coast of South America. An influx of warm water into the current affects the usual habitat of plankton and fishery resources.

[12] Average annual investments in the Soviet fishing industry during 1956–60 were about 60 million rubles. During 1961–65, they rocketed to 384 million rubles per year—a six-fold increase.

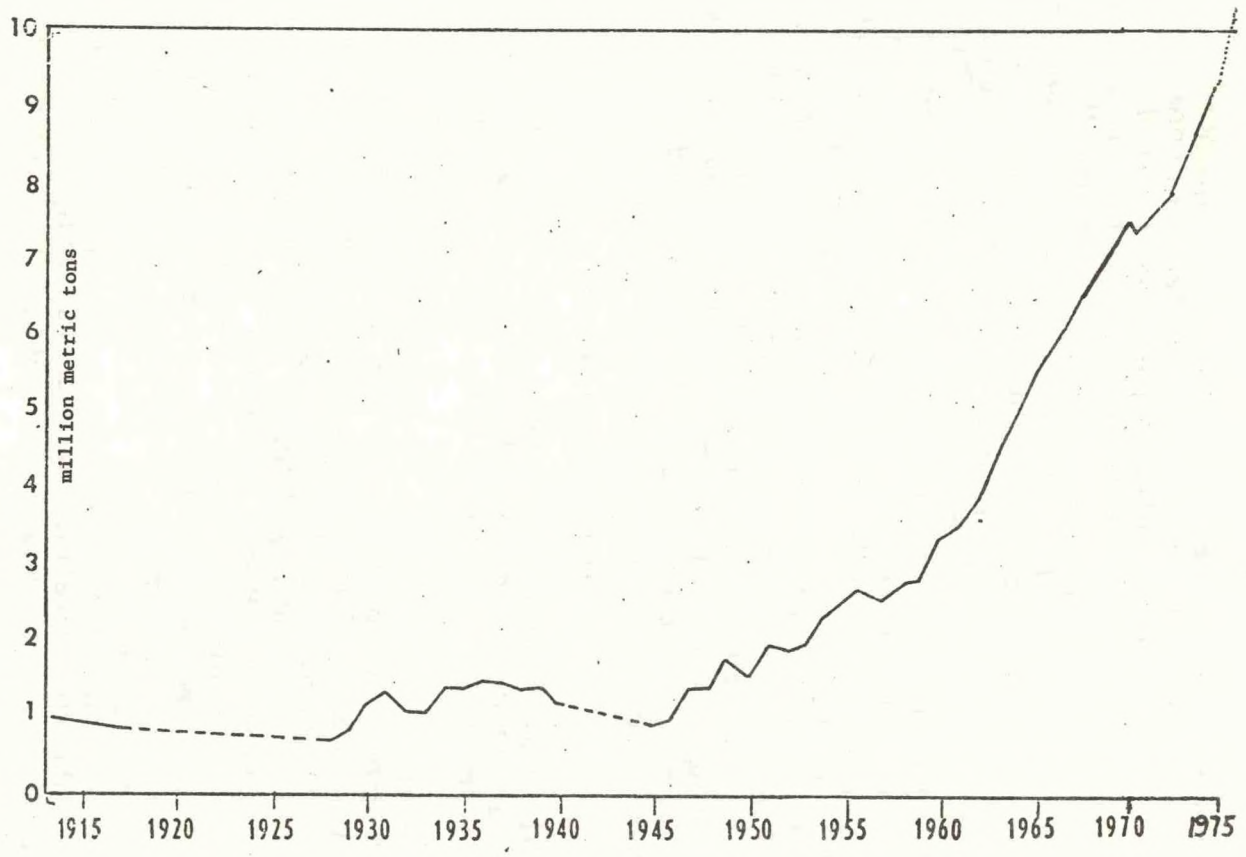
Table 2 . U.S.S.R. Fisheries catch; by year 1928-1974.

YEAR	Total Catch (in 1,000 metric tons)	Change From Previous Year (1,000 t)	Percent of Change	Catch Data Given To FAO (1,000 t)	Difference of FAO Data From Total Catch (1,000 t)	Difference as a Percentage of Total Catch
1913	1,051	n.a.	n.a.	n.a.	n.a.	n.a.
1917	893	-158	-15.0	-	-	-
1920	257	-636	-71.2	-	-	-
1928	840	583	227.0	-	-	-
1929	956	116	13.8	-	-	-
1930	1,283	327	34.2	-	-	-
1931	1,441	158	12.3	-	-	-
1932	1,333	-108	- 7.5	-	-	-
1933	1,303	- 30	- 2.3	-	-	-
1934	1,547	244	18.7	-	-	-
1935	1,520	- 27	- 1.7	-	-	-
1936	1,631	111	7.3	-	-	-
1937	1,609	- 22	- 1.4	-	-	-
1938	1,542	- 67	- 4.2	1,523	19	1.2
1939	1,566	24	1.6	n.a.	n.a.	n.a.
1940	1,404	-162	-10.3	-	-	-
1941	(e) 1,301	-103	- 7.3	-	-	-
1942	(e) 1,046	-255	-19.6	-	-	-
1943	(e) 1,230	184	17.6	-	-	-
1944	(e) 1,235	5	.4	-	-	-
1945	1,125	-110	- .8	-	-	-
1946	1,208	83	7.4	-	-	-
1947	1,534	326	27.0	(e) 1,500	(e) 34	(e) 2.2
1948	1,575	41	2.7	1,485	90	5.7
1949	1,953	378	24.0	(e) 1,850	(e) 103	(e) 5.3
1950	1,755	-198	-10.1	(e) 1,655	(e) 100	(e) 5.7
1951	2,142	387	22.0	(e) 2,042	(e) 100	(e) 4.7
1952	2,107	- 35	- 1.6	1,888	107	5.1
1953	2,195	88	4.2	1,983	212	9.7
1954	2,505	310	14.1	2,258	247	9.9
1955	2,737	232	9.3	2,495	242	8.8
1956	2,849	112	4.1	2,616	233	8.1
1957	2,761	- 88	- 3.1	2,531	230	8.3
1958	2,936	175	6.3	2,621	315	10.7
1959	3,075	139	4.7	2,756	319	10.4
1960	3,541	466	15.2	3,051	490	13.8
1961	3,724	183	5.2	3,250	474	12.7
1962	4,168	444	11.9	3,616	552	13.2
1963	4,681	513	12.3	3,977	704	15.0
1964	5,171	490	10.5	4,476	695	13.4
1965	5,774	603	11.7	5,100	674	11.7
1966	6,093	319	5.5	5,349	744	12.2
1967	6,538	445	7.3	5,777	761	11.6
1968	6,784	246	3.8	6,082	702	10.3
1969	7,082	298	4.4	6,498	584	8.2
1970	7,828	746	10.5	7,252	576	7.4
1971	7,785	- 43	- 0.5	7,337	448	5.8
1972	8,209	424	5.4	7,757	452	5.5
1973	9,005	796	9.7	8,619	386	4.3
1974	9,600	595	6.6	9,236	364	3.8

(e) - estimated. Prepared by: Office of International Fisheries (F41), NMFS, NOAA, Commerce.

The annual increases or decreases in the total Soviet catch are also given in table 2 both in absolute figures (column 2) and in percentages of change (column 3). As was already evident in the graph (fig. 2), Soviet fishery catches sustained many ups and downs during the Stalin era, but in the post-Stalin years (1953–75) they decreased only twice and only by small amounts: in 1957 and in 1971.

Fig. 2. Soviet fisheries catch in historic perspective
1913-1975



Prepared by: International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA, Commerce.

COMPARISON WITH FAO CATCH DATA

In addition to providing complete catch data to the Soviet national statistical office, the U.S.S.R. Ministry of Fisheries also provides catch data to the Food and Agriculture Organization (FAO) of the United Nations in Rome. These data are provided to FAO in accordance with FAO statistical requirements and do not include the catch of marine mammals (in metric tons) and the amounts of marine plants harvested. This is the reason why the FAO data are always lower than the actual total Soviet fisheries catch which is published only in Russian. The data submitted to FAO are given in table 2 (column 4) with calculations of the difference between the two sets of data. This difference is the approximate Soviet catch in metric tons of Antarctic and Pacific whales, various species of fur seals and the harvest of marine algae and other plants. An attentive reader will note that, as the Soviets began to expand their Antarctic whaling in the late 1950's and early 1960's[13] the difference between FAO data and Soviet national catch data increased. In recent years, when the International Whaling Commission, prodded by the United States, began to decrease the catch quotas for Soviet and Japanese whale fishermen, this difference has grown progressively smaller.

MAJOR FISHING AREAS

In 1913, Russian fishermen obtained their catches mostly from inland waters. Only 17.3 percent of the total catch was taken on the high seas, mostly in the Barents, Baltic and Black Seas, and in the Pacific.

During the 1917–41 period, Soviet fishermen had already begun to shift increasingly to these open seas. In World War II, however, the high seas Soviet European fleet was practically wiped out; only fishery vessels operating in the Pacific were saved.

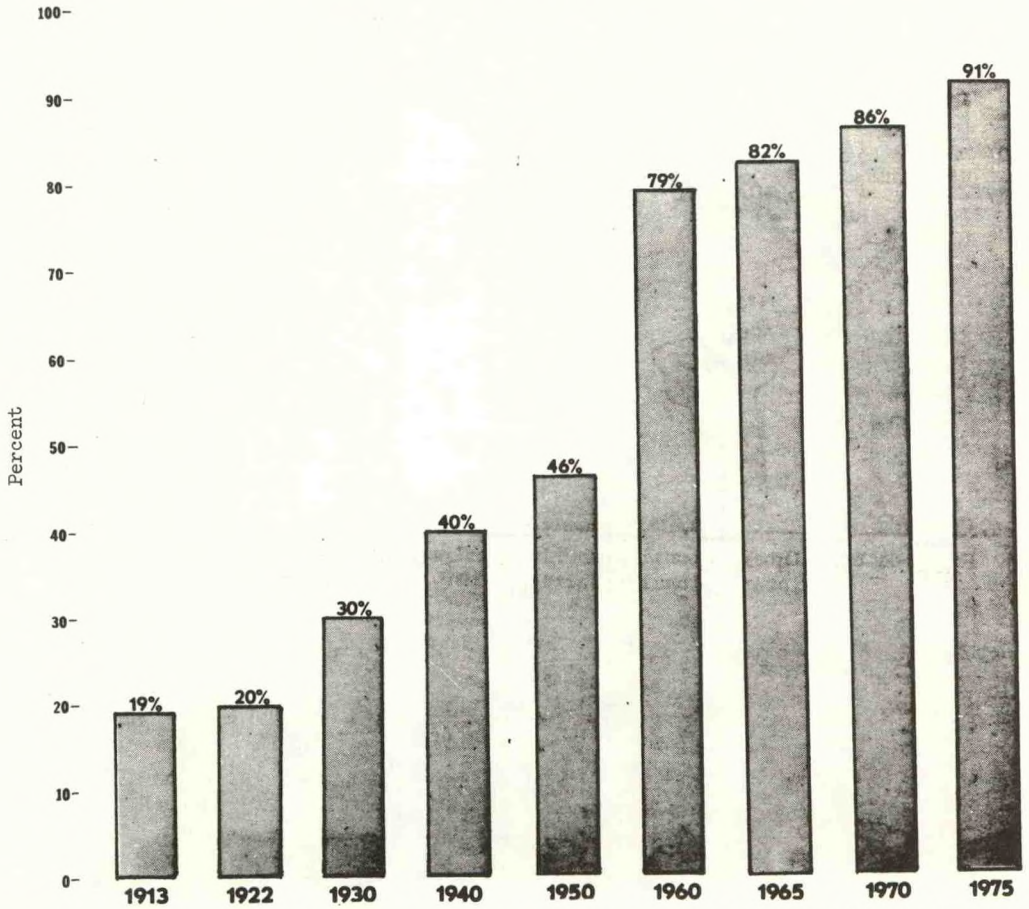
Wartime destruction slowed Soviet expansion into the high-seas only temporarily. The Pacific fishing fleet was reinforced and a new Baltic fleet was organized, mostly from vessels seized by victorious Soviet troops. By 1946, the high seas provided 46 percent of the total catch, a percentage that has increased ever since. (See fig. 3.) In 1975, over 90 percent of the total Soviet catch will be obtained from international waters and the most important Soviet fishing grounds today are adjacent to foreign coasts (see fig. 4).

During the past 25 years, Soviet fisheries have been characterized by two major trends:

1. In the Pacific, they began to expand in the 1950's to the east and southeast off the coasts of the United States (1958—Alaska, 1966—Pacific Northwest, 1972—California);

[13] Between 1958 and 1963, the U.S.S.R. added 5 whaling motherships to its fishing fleet: three went to Antarctica, the other two operate in the North Pacific.

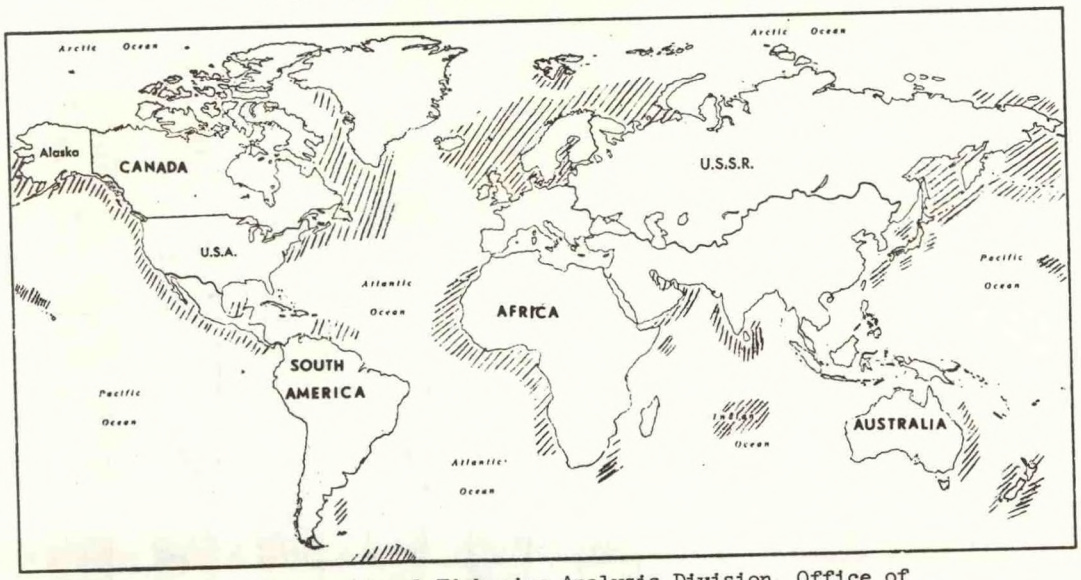
Figure 3. The Soviet high-seas catch as a percentage of the total catch; 1913 - 1975.



Source: Rybnoe Khoziaistvo and Vodnii Transport, July 12, 1975 (for 1975 data).

Prepared by: International Fisheries Analysis Division, Office of International Fisheries, National Marine Fisheries Service, NOAA, Commerce.

Fig. 4. U.S.S.R. Major high seas fishing grounds



Prepared by: International Fisheries Analysis Division, Office of International Fisheries, NMFS, NOAA, Commerce.

2. In the Atlantic, the expansion went first southwest (off Canada—1956, off New England—1961, off Mexico—1962) and then south (off West Africa—1962, off Argentina—1966).

Both of these major moves had one common characteristic: they were directed away from Soviet shores. The introduction of large vessels with refrigeration and (later on) freezing capability, canning lines, and fishmeal reduction plants, as well as the addition of mothership, floating canneries and other longrange support vessels, have been instrumental in this expansion of fishing operations. Catches by major fishing areas are illustrated in figure 4a.

Atlantic Ocean

Catch statistics in table 3 show that the Atlantic Ocean remains the basic fishing ground of the Soviet Union. In 1973, almost 4.6 million metric tons, or 53 percent of the total catch, was harvested from Atlantic waters. This percentage has been on the increase during the past 10 years (from 46 percent in 1964). As the total Soviet high seas catch has increased, the ratio of the Atlantic catch has increased even more (fig. 5).

The Soviet catch in the Northwest Atlantic doubled in the last 10 years to 1.4 million tons in 1973 as U.S.S.R. fishermen moved in force into the traditional fishing grounds of U.S. and Canadian fishermen. The fisheries of this area are managed by the International Commission for the Northwest Atlantic Fisheries (ICNAF), of which the U.S.S.R. has been a member since 1956. The Commission, consisting of 17 member countries, was established in 1949 to investigate, protect and conserve the fisheries of the Northwest Atlantic by establishing catch quotas for certain species of fish which could be taken from the treaty area. During the last few years, so many new nations have increased their ICNAF catch so rapidly that a serious overfishing problem developed, endangering several key species (haddock, mackerel, herring, and flounder). As a result, the Commission is drastically lowering the total allowable catch quotas. During the recent (September 1975) special meeting in Montreal, the Commission reduced the 1976 catch quotas in the waters off U.S. coasts (ICNAF subareas 5 and 6) to 650,000 tons, or by 22 percent.[14] At the same time, Canada closed all of its Atlantic ports to the Soviet fishing fleet and kept them closed until the Soviets promised, in bilateral negotiations, to reduce their future catches off Canada by 40 percent (for details, see appendix 3). It can therefore be safely predicted that Soviet catches in the Northwest Atlantic, having reached their zenith in 1973, will continue to decline.

A similar situation exists in the Northeast Atlantic which provides almost one third of the Soviet Atlantic catch and one-fifth of the total catch. (See fig. 7.)

[14] The total allowable catch in the ICNAF subareas 5 and 6, covering the waters from the Gulf of Maine to Cape Hatteras, decreased from 924,000 metric tons in 1974 to 850,000 tons in 1975 (or by 8 percent) and to 650,000 tons in 1976 (or by 30 percent of 1974 quota).

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Fig. 4a. Soviet fisheries catch, by major fishing areas, 1973.
(in million metric tons)

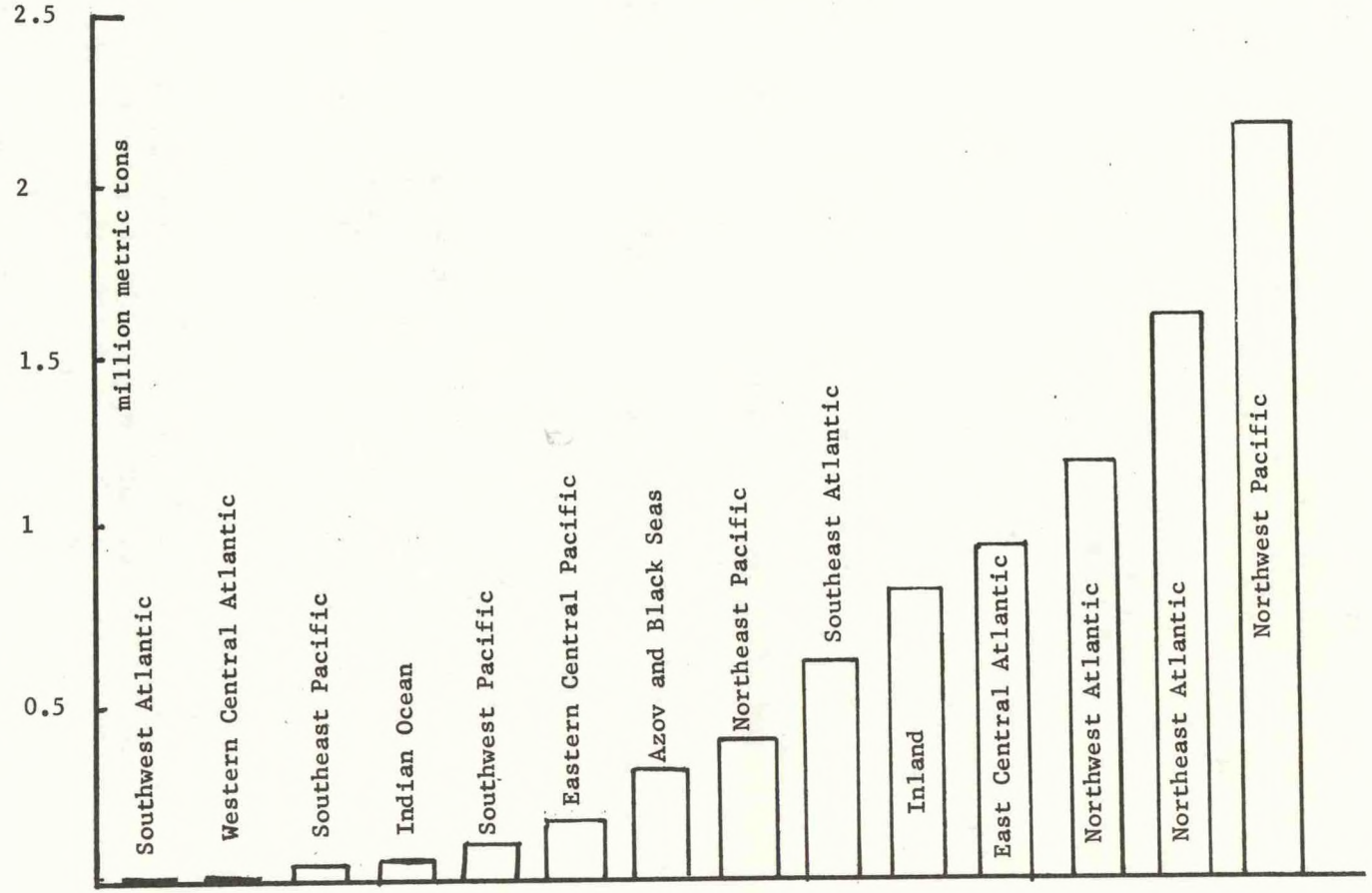


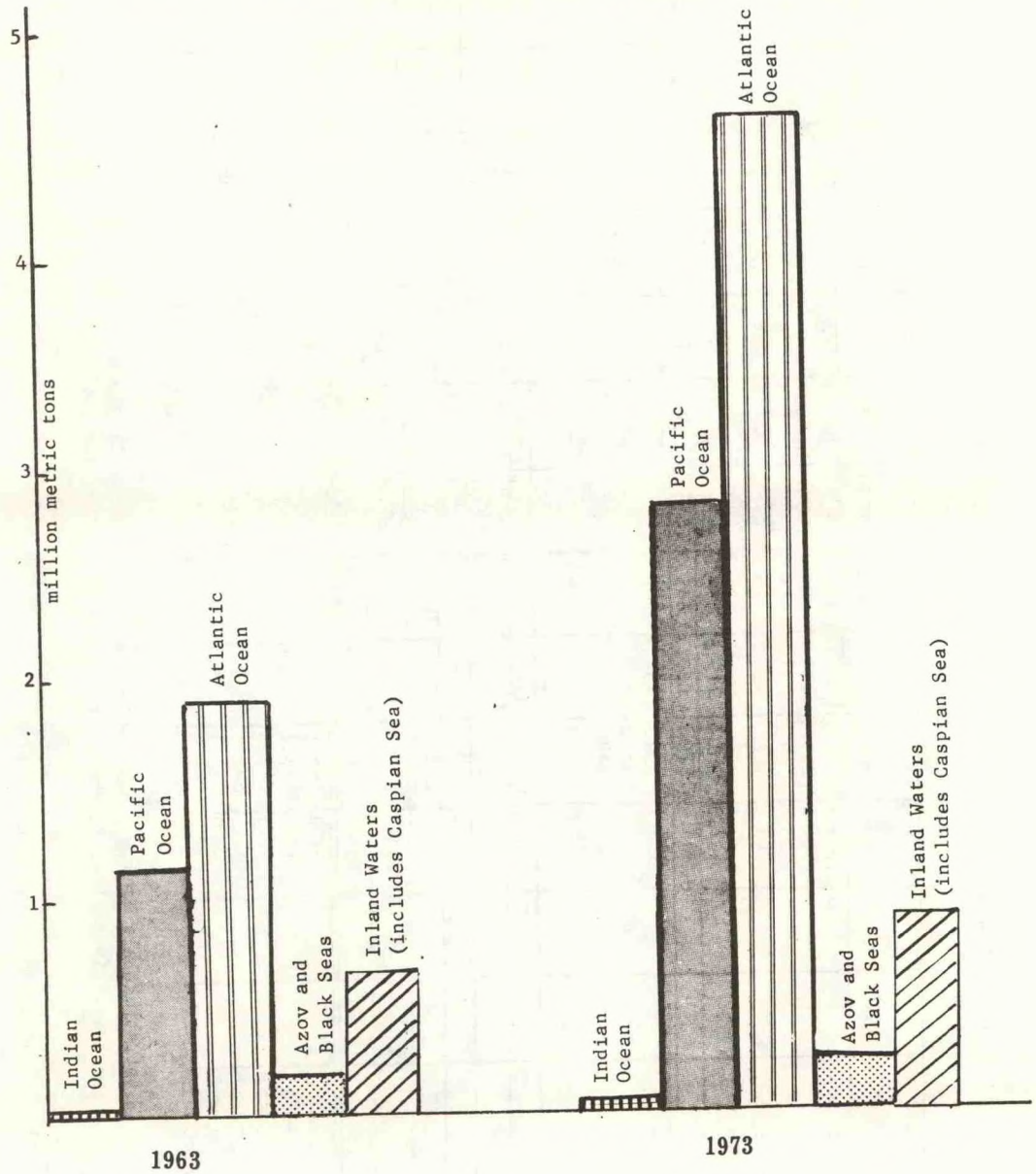
Table 3. Soviet catch by main fishing areas. 1964-1976. (In 1,000 metric tons)

Fishing area	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964
Atlantic, Northwest			1,157.0	1,357.4	1,150.0	1,021.7	811.5	982.7	794.0	623.1	842.3	886.5	645.5
Atlantic, Northeast			1,997.0	1,611.1	1,272.1	1,377.5	1,565.9	1,469.7	1,416.1	1,118.7	1,147.7	1,048.0	1,076.0
Atlantic, Western central			225.6	8.8	73.8	11.2	negl.	4.8	6.8	23.9	37.4	17.3	12.6
Atlantic, Eastern central			1,145.0	942.7	848.8	789.8	612.5	569.7	318.6	153.5	79.3	82.4	163.8
Atlantic, Southwest			512.9	6.1	4.6	26.2	420.6	92.6	189.8	677.7	73.3	-	-
Atlantic, Southeast			447.5	648.6	719.8	438.6	422.6	407.2	484.5	251.0	361.2	360.7	166.8
Atlantic, total			4,785.0	4,574.7	4,069.1	3,665.0	3,833.1	3,526.7	3,209.8	2,847.9	2,541.2	2,394.9	2,064.7
Pacific, Northwest			2,358.1	2,232.9	1,434.2	1,562.1	1,447.6	1,394.0	1,302.2	1,204.2	1,091.6	1,114.6	922.8
Pacific, Northeast			701.3	379.8	869.2	656.0	747.6	642.8	434.3	569.1	543.6	476.1	517.5
Pacific, Eastern central			22.2	138.1	12.9	1.9	20.2	25.4	52.8	-	-	-	-
Pacific, Southwest			88.8	74.3	53.7	10.4	-	-	-	-	-	-	-
Pacific, Southeast			-	39.2	35.1	-	-	-	-	-	-	-	-
Pacific, total			3,170.4	2,864.3	2,405.1	2,230.4	2,215.4	2,062.2	1,789.3	1,773.3	1,635.2	1,590.7	1,440.3
Indian Ocean			135.8	44.2	129.0	242.4	47.0	20.8	10.3	38.2	75.7	36.1	4.6
Arctic			-	-	-	-	0.8	3.5	7.4	1.2	-	-	-
Azov & Black Seas			371.5	285.9	283.7	263.8	302.5	138.7	284.8	300.6	307.7	251.8	239.6
Inland[1/]			772.9	849.6	870.0	935.4	853.4	746.5	780.5	816.0	789.0	826.4	726.5
Total Soviet catch[2/]			9,235.6	8,618.7	7,756.9	7,337.0	7,252.2	6,498.4	6,082.1	5,777.2	5,348.8	5,099.9	4,475.7
Atl. catch as % of tot. catch			51.8	53.1	52.5	50.0	52.9	54.3	52.8	49.3	47.5	47.0	46.1
Pac. catch as % of tot. catch			34.3	33.2	31.0	30.4	30.5	31.7	29.4	30.7	30.5	31.2	32.2
Ind. O. catch as % of tot. catch			1.5	0.5	1.7	3.3	0.6	0.3	0.2	0.7	1.4	0.7	0.1
Arctic catch as % of tot. catch			negl.	negl.	negl.	negl.	negl.	0.1	0.1	negl.	negl.	negl.	negl.
Azov & B. Seas % of tot. catch			4.0	3.3	3.7	3.6	4.2	2.1	4.7	5.2	5.8	4.9	5.4
Inland catch as % of tot. catch			8.4	9.9	11.2	12.7	11.8	11.5	12.8	14.1	14.8	16.2	16.2

Source: TsNIITEIRKh, Statisticheskie dannye o vidovom sostave i razmeshchenii ulovov SSSR po raionam Mirovogo okeana. Moscow 1971 for 1964-1970 and FAO Yearbook of Fishery Statistics for 1971-73.

1/ Includes Caspian Sea, Aral and Balkash lakes, and Siberian catch.
2/ Exclusive of whales, seals, and other marine products.

Fig. 5. U.S.S.R. Fisheries catch, by major fishing areas; 1963 and 1973
(in million metric tons)



Soviet Caribbean catches (Western Central Atlantic) are negligible. Most of the catch comes from the Campeche Banks off Mexico's Yucatan Peninsula.

The most rapid increase in Soviet catches during 1964–73 occurred in the Central Eastern Atlantic off the coast of West Africa. In 1964, this region contributed less than 3 percent of the total catch; by 1973, more than 11 percent of the Soviet fisheries catch, approaching 1 million tons, came from West African waters. Recent extensions of fisheries limits by several West African states will put a dent in the Soviet capability to exploit these waters. The Soviet Fisheries Ministry is fighting this trend by organizing joint ventures with local companies and extending fisheries assistance to West African governments.

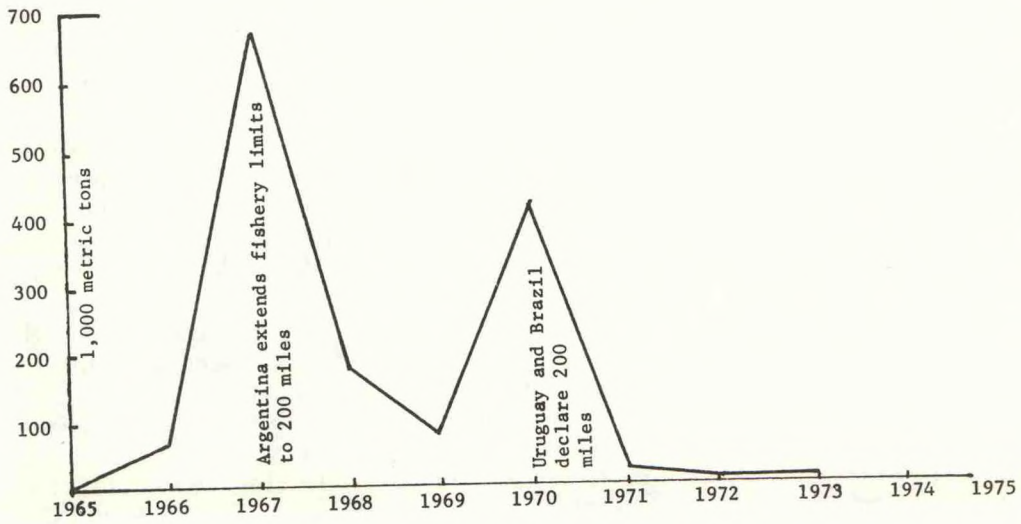
The Soviet fishing in the Southwest Atlantic, off the coast of South America, has an interesting history. After having secured a fisheries base in Cuba in 1962 and having built a large modern fishing port there (1963–65), the Soviet fishing fleet could, logistically speaking, expand into the virgin waters of the Patagonian Shelf where large, unexploited fishery resources were available. Losing no time, the Soviets began to fish off Argentina in the summer of 1966 and caught 73,000 tons of fish, mainly Patagonian hake (table 3). The following year, an armada of Soviet fishery vessels appeared off Argentina.[15] The intense fishing operations so provoked the Argentine Government that it proclaimed the extension of its fisheries zone out to 200 nautical miles.

The Soviet fleet, although officially advised of the new decress, delayed in leaving the Argentine-claimed waters. Finally, in June 1968, two large Soviet stern factory trawlers were ordered by an Argentine naval vessel to stop for boarding and seizure, but did not heed Argentine orders. They were shot at; after one was hit amidships, both surrendered and were escorted into an Argentine port. Following weeks of negotiations, the two trawlers were released, but the Soviet fleet had to leave the Patagonian Shelf. Their catch there, which in 1967 amounted to 677,000 metric tons, was reduced to negligible proportions the following year.

The Soviet fleets moved northward off Uruguay and when that country declared a 200-mile fisheries zone, continued their operations off Brazil, where they caught 420,000 tons of fish in 1970 (fig. 6).

[15]According to Argentine press reports (which were not always reliable when discussing Soviet fishing activities), the total number of Soviet fishery vessels off Argentina and Uruguay in 1966 exceeded 200.

Fig. 6. Soviet fisheries catch in the Southwest Atlantic, 1965-1975.
(in 1,000 metric tons)



Source: FAO, Yearbook of fishery statistics, various years.

But the Soviet fishing off Brazil was similarly short-lived. In early 1971, that country began to enforce its newly-claimed fishery limits of 200 miles and closed off its coastal waters to foreign fishermen. Negotiations between Brazil and several countries which traditionally fished off her coasts were soon initiated, but it is believed, that the U.S.S.R. has not approached the Brazilian Government to obtain such privileges. As matters stand now, there are no opportunities for Soviet fleets to fish off eastern South America. In 1973, the U.S.S.R. caught there only 6,000 tons, a negligible contribution to its total catch (less than 1/10th of 1 percent).

In the Southeast Atlantic, most Soviet fishing takes place off the coasts of South Africa, Namibia, and Angola.

Pacific Ocean

The Pacific, the second most productive fishing area for Soviet fishermen, contributed about 2.8 million tons to the total catch in 1973, or one third of the total. Most of this catch came for the Northwest Pacific encompassing the Sea of Okhotsk, the Sea of Japan and the waters off Japan, the Kurile Islands, and the Kamchatka Peninsula. (See fig. 7.)

In the northeast Pacific region, which includes fishing grounds in the Bering Sea, the Gulf of Alaska, and off the Pacific northwest (Washington and Oregon states), the Soviets harvest in excess of 0.5 million tons. In this area, as well as in the northwest Pacific, the U.S.S.R. is beginning to catch large amounts of Alaska pollock (1.3 million tons in 1973) in competition with the Japanese (3 million tons) and Korean (0.3 million tons) fishermen. Much will depend on the status of this species in determining whether the Soviet catches in the northern Pacific will continue to expand. Some U.S. scientists believe that the Alaska pollock catches are rapidly approaching the level of maximum sustainable yield and that limitations on their uncontrolled exploitation will become necessary to prevent the depletion of the species.

Soviet catches in the eastern central Pacific consist mostly of Pacific hake taken off California and the Pacific Northwest. This fishery has been expanding rapidly since 1973 and substantially larger catches were taken in 1974 and especially in 1975. Soviet fishing off Mexico and the western coasts of Central American countries is minimal. Depite its increasing significance, the eastern central Pacific contributed only 5 percent to the Soviet Pacific catches (and less than 2 percent of the total catch).

In the Southwest Pacific, off Australia and New Zealand, the U.S.S.R. sent over 20 research and exploratory vessels in late 1965 [16] to determine what fishery resources were available. Commercial fishing in this area, begun in 1971, is increasing rapidly, and will probably continue to do so.

What is being caught by the Soviets off the western coast of Latin America in the southeast Pacific is not known. Chile, Peru, and Ecuador all claim 200-mile fishery zones which the Soviets generally respect. It is possible that the small catches (39,000 tons) represent fish which the Allende Government in Chile permitted the Soviets to catch within the Chilean 200-mile zone in exchange for fisheries assistance.

[16] The project was known as the "Lira Expedition" named after the stern trawler Lira.

Indian Ocean and inland fisheries

In the early 1960's, the Soviet Ministry of Fisheries planned to greatly expand its catches in the Indian Ocean, where hitherto no fishing had been done by the Soviet Union. The plans provided for a 200,000 ton catch by 1965. This timetable was repeatedly delayed, but in 1963, Soviet commercial vessels from the Black Sea Administration did begin to fish in the Arabian Sea and the Persian Gulf. The catches increased rapidly to 76,000 tons in 1966, but when, in June 1967, the Arab-Israeli war caused the closure of the Suez Canal, the Soviet plans suffered a setback. Catches were minimal in the next 2 years (table 3). After the Soviet Ministry of Fisheries concluded several contracts with Pakistan and other countries adjacent to the Indian Ocean to explore the availability of fishery resources off their coasts, the catches suddenly went up to over 240,000 tons in 1971. The contract with the Pakistanis was soon terminated and the Soviet catches decreased rapidly to only 44,000 tons in 1973. With the opening of the Suez Canal in mid-1975, a new Soviet attempt to increase the Indian Ocean's contribution to the total catch, which in 1973 amounted to only one-half of 1-percent, must be expected.

In the Azov and Black Seas as well as in the Soviet inland waters, the fisheries catch is relatively stable. It appears that the level of maximum sustainable yield has been reached in both of these traditional fishing areas: each time the Soviet fishermen attempt to increase their catch, the fish resources of the area cannot sustain the increased exploitation and the catches begin to decrease. These cyclical movements are shown statistically in table 3, and graphically in figure 8.

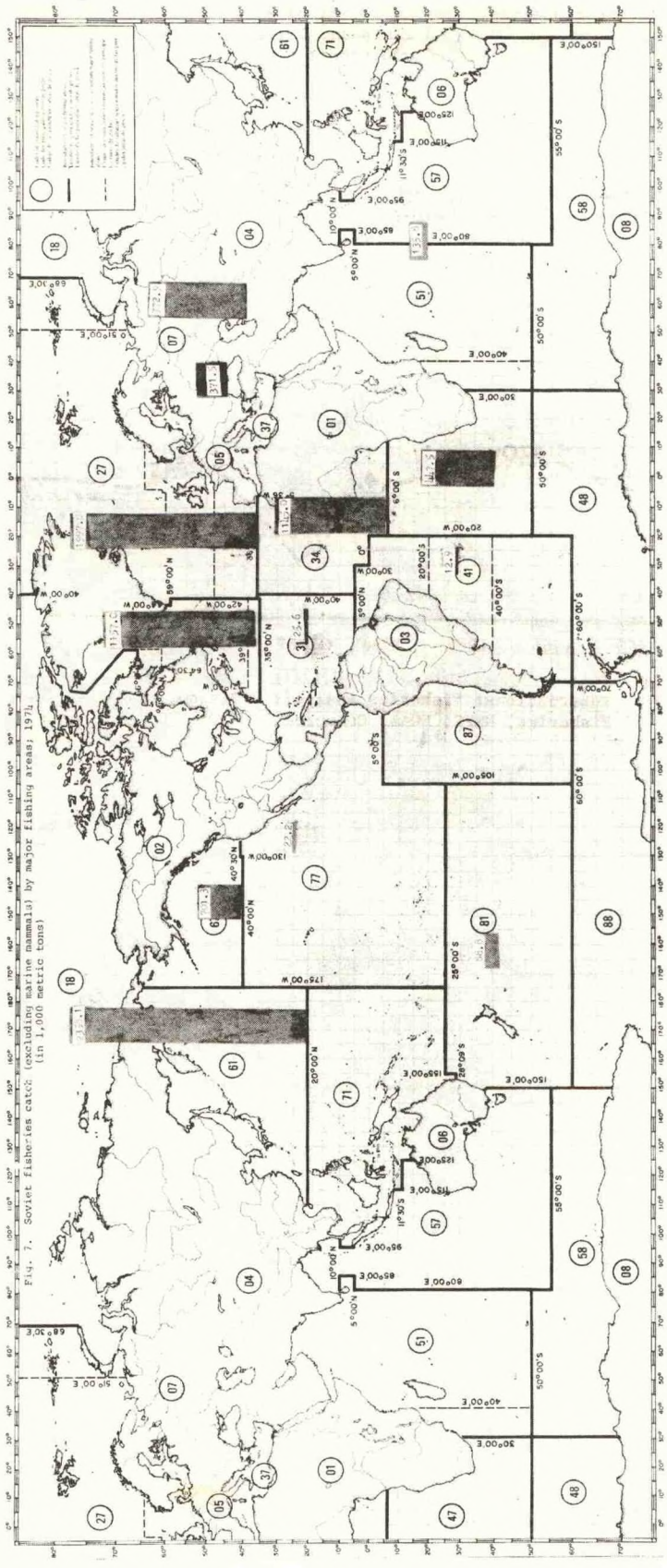
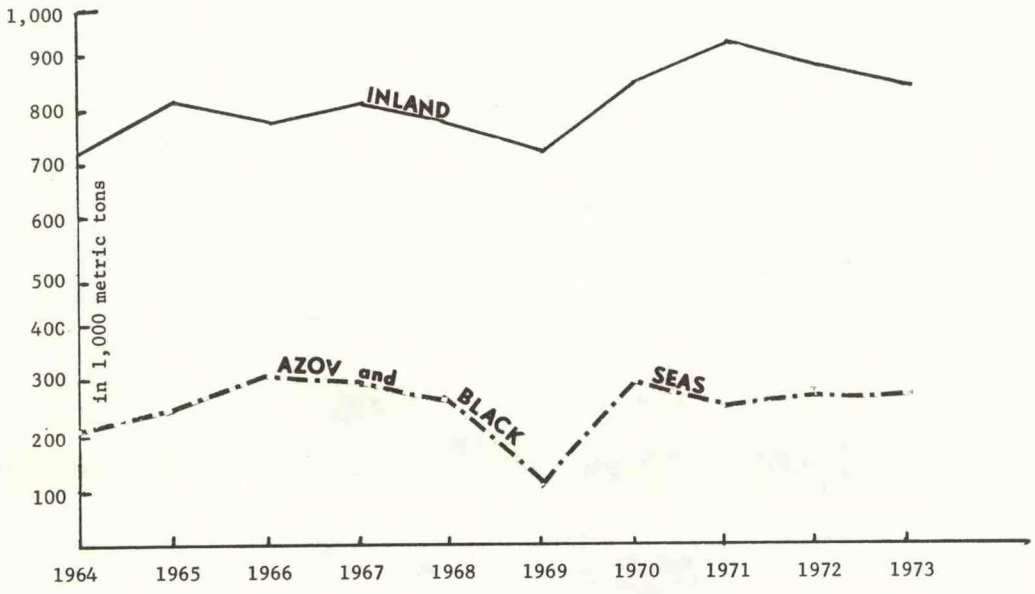


Fig. 7. Soviet fisheries catch (excluding marine mammals) by major fishing areas; 1974 (in 1,000 metric tons)

Fig. 8. Soviet fisheries catch in Inland waters, and in the Azov and Black Seas, 1973.
(in 1,000 metric tons)



Prepared by: International Fisheries Analysis Division, Office of International Fisheries, NMFS, NOAA, Commerce.

The Fishing Fleet

INTRODUCTION

In Tsarist Russia before World War I, fishing was mainly conducted from small sailing craft or even from row boats operating close to the shore. Deep-sea fishing was conducted in the Baltic and Barents Seas. After the 1917 Revolution, the new Communist regime began to mechanize the fishing fleet by introducing diesel and gasoline-powered craft. In March 1920, the Government established the first Fisheries Administration, the White Sea Administration of Fisheries and Marine Mammal Harvesting. This organization received the first 12 fishing vessels which were converted from naval mine sweepers.

When the Soviets began to plan their economy, the establishment of a trawler fleet to fish in the Barents Sea was given priority in the first 5 Year Plan (1928–32). In the second and third 5 Year Plans, a further modernization of the fishing fleet was foreseen, but this expansion was delayed by Stalin's purges in the 1930's and seriously interrupted by World War II which erupted in June 1941.

During that war, most of the Soviet fishing fleet was destroyed by German airplanes or by naval action. Most losses occurred in the Caspian and the Black Sea during the 1942 and 1943 German offensives. The Murmansk fishing fleet was also decimated. Only the small and antiquated Far Eastern fleet remained intact.

When the Second World War ended, the Soviet fishing industry, which had produced a total catch of 1.4 million metric tons in 1940 was almost completely destroyed. More than 5,000 fishing vessels were either sunk or extensively damaged.

To rebuild the fishing fleet rapidly, the Soviet fourth 5 Year Plan (1946–50) provided for the standardization of the construction of about 150 side trawlers and over 13,000 smaller fishing craft. Nevertheless, in the first years after World War II, only a small part of the Soviet shipbuilding capacity was directed to the construction of fishing vessels. Only in the mid-1950's did the Soviets seriously begin to construct fishing vessels in domestic shipyards.

During the early post-World War II years, most of the Soviet fishing vessels were built in East Germany where the Soviet Army was the occupying force, and sent to the U.S.S.R. as war reparations. GDR remains one of the chief suppliers and it is estimated that by 1975, the East German shipyards had delivered to the Soviet fishermen more than 1,800 fishing and fishery support vessels, having a capacity of over one million gross registered tons, or about one sixth of the total current Soviet gross tonnage.

The reconstruction of damaged port facilities and the buildup of the fishing fleet were made more difficult by extensive shipbuilding programs of the Red Navy. As a result, the Soviet Union bought many fishing vessels from abroad, especially from the neighboring socialist states where the Soviet Union had considerable political and economic leverage and could request the building of the vessels for its own fleet on a priority basis.

In addition to the East German deliveries, Poland's shipyards also began to produce fishing vessels for the Soviet Union. Other purchases were made in France, the Netherlands, United Kingdom, Sweden,

Finland, Denmark, Japan, the Federal Republic of Germany, and other countries. At the present time, the Soviet Union is building a larger proportion of its fishery vessels in domestic shipyards; however, foreign purchases still comprise a large and the most modern part of the fleet.

One of the deciding factors in the development of the Soviet fishing fleet has been the need to operate on grounds progressively farther away from the U.S.S.R. coasts. In 1950, the average distance for the Soviet fleet to the fishing grounds was only 200 miles. This distance increased to 1,655 miles in 1965 and to over 4,000 miles in the late 1960's. By 1975, 90 percent of the total catch was brought in by the high-seas fleet. Industrial pollution and overfishing have been major causes for the drop in the coastal and freshwater catch, and have resulted in the Soviet fishing industry having to look farther afield for profitable grounds.

Two major innovations which have contributed to the rapid increase in high-seas catch are the stern factory trawler and the flotilla fishing method. Prior to the mid-1950's, fishing vessels had rather limited catch capability because their nets were hauled in over the sides. With too large a catch a side trawler would become unstable, so small nets were used, and the catch was therefore limited.

The most important development in Soviet fisheries has been the invention in the United Kingdom of a new method of high-seas fishing whereby the vessel has a stern ramp through which the catch is brought aboard. These vessels, called stern factory trawlers, have greater stability and as a result are more seaworthy. Such a vessel can use much larger nets, hauling in about six times as much fish as a side-net trawler. These vessels come equipped with canning and freezing equipment on board for immediate processing of the incoming catch, and for reducing incidental catches and offal into fish meal for use as fertilizer. They can remain at sea and fish for up to 1 year with periodic crew rotation, resupplying, and refueling.

A second very important development is the concept of flotilla fishing. The Soviets adopted it after studying Japanese fishing operations. A fleet fishing far from its home port must be able to remain at sea for extended periods of time to meet the costs of transit to and from the grounds. Fishing vessels must be supplied with fuel, water, salt, fishing gear, food, and other provisions, and fleet personnel must be provided medical care and recreational facilities. "Flotilla"-type operations satisfy all these conditions. A flotilla of fishing vessels is under the control of a "Fleet Manager" (*Nachalnik Flota*) whose headquarters are aboard a large mothership, which receives the catch from the trawlers, processes or semiprocesses it, and passes it along to refrigerated fish carriers or cargo vessels for transportation to home ports. A mothership also accepts fuel and supplies from tankers and from supply ships for distribution among the vessels of the flotilla. The large factory stern trawlers often operate independently, providing their own processing and transport services.

The Soviet fishing fleet as a whole can be subdivided into five basic vessel groups: Motherships, fish processing and carrier vessels, factory trawlers, side trawlers and other fishing vessels. A sizable whaling fleet operates in Antarctica and in the Pacific.

Mothership-class vessels are designed to work not only with their own small "catcher boats," but also with a flotilla of other fishing vessels. The mothership can carry from 6-14 small catcher boats which are lowered to the sea once the fishing grounds are reached. The ship's factory facilities are equipped for canning the catch and producing fishmeal and oil. The best known and most advertised Soviet mothership, though by no means the most efficient, is the recently constructed *Vostok*.

A typical fish carrying and processing vessel is designed to receive, freeze, and transport processed or whole fish caught by trawlers operating on grounds far from Soviet ports. Some classes of these vessels are equipped to produce fishmeal, or engage in specialized fisheries, but most of them are not used for these types of operations. Fish handling is often completely mechanized and automatically controlled. Huge derricks lift the catch from the trawlers at sea and transfer it to elevators situated in the hold of the refrigerated carrier. Conveyor belts inside the hold speed up handling and sorting. Automation of fish handling systems has been an important improvement on the more recent classes of transport and processing vessels.

Soviet large stern trawlers are a wide and varied group of vessels built in a number of countries such as Poland, the German Democratic Republic, Denmark, the Netherlands, the Federal Republic of Germany, and France. The first to enter the Soviet fleet were the large stern factory trawlers (BMRT s). The Soviets bought the blueprint from a U.K. shipyard, which constructed the first stern factory trawler (the *Fairtry*), and ordered 24 Pushkin-class stern trawlers from Kiel shipyards in West Germany in the mid-1950's. The vessels were copied and improved by the Soviet, Polish, and East German shipyards which soon began to mass-produce them. Today these three countries build as many as seven stern freezer and factory trawlers per month (of which Poland produces two, East Germany two, and the Soviet Union three). These vessels are completely integrated fishing and processing units. After the catch is landed, it is either canned, frozen, or reduced into fishmeal, all aboard the same vessel. The large stern factory and freezer trawlers have become the backbone of the Soviet high-seas fleet. More than 740 were operational by October 1, 1975.

During the immediate post-World War II years, small side trawlers made up the major part of the Soviet fishing fleet. Certain classes of these vessels had refrigerated holds or were equipped to store the catch either wet or salted and to produce seimprocessed fishmeal and fish oil. Many of these small, standard trawlers, although no longer typical, are still in use today, but they are rapidly being replaced by more modern and larger vessels.

Other principal trawler types include medium stern and side trawlers, some with refrigeration and some with freezer capacity. Until 1967, all Soviet medium trawlers had been side trawlers. The first medium stern trawler in the Soviet fleet was completed in 1967. This vessel served as the prototype for a new series of trawlers intended for operation in the temperate and tropical zones of the Atlantic, Pacific, and Indian Oceans. They are able to operate independently or as part of a flotilla, and to freeze and pack their own catch.

There are no indications that the U.S.S.R. intends to slow the expansion of its fishing fleet. In fact, Soviet Fisheries Minister Ishkov an-

nounced that during the current 5 Year Plan (1971–75), "expansion (is to) continue at the same rate as (during) the last two 5-Year Plans." According to Pravda, 900 new fishing vessels and 70 refrigerated transports and motherships have been added to the fleet during the 1971–75 period.

The estimates of the Office of International Fisheries, National Marine Fisheries Service, indicate that 4,450 high-seas Soviet fishing vessels are now operational.

Several factors have contributed to recent modifications in the Soviet fishing fleet. The depletion of the fish stocks on traditional continental shelf grounds has forced Soviet planners to design vessels and equipment for deep-sea fishing operations. Industry officials are also concerned with increasing the fleet's efficiency. The Japanese, with one-half the high-seas fishing tonnage, still manage to land more fish than the Soviet fleet. The heavy investment in fisheries development must therefore be justified by increasing labor productivity.

To improve efficiency, Soviet designers have incorporated many new ideas into the vessel classes earmarked for expansion in the 1970–80 period. For example, more stern freezer trawlers are being built so that fishing and processing can occur simultaneously. Processing is being automated as much as possible to lower the number of crew needed and speed up production; at the same time, maximum engine horsepower increases the number of fishing days and decreases the number of days in transit. Larger vessels are being constructed which stay at sea longer and carry more cargo. Trawling gear is being improved so that it will automatically deploy for maximum catch efficiency. A new type of fishing vessel, the *Atlantik-III* class "supertrawler," features many of these recent developments. This, the third in the series of *Atlantik* classes, was designed and built in East Germany.

The continued expansion of the Soviet fishing fleet seems to indicate that the industry is not ready to cut back on the total catch as environmental considerations seem to demand. Rather than limit themselves to conserve the resources, Soviet fishermen tend to keep moving to the most profitable grounds to maintain catch levels and fulfill quotas. Although high-level officials in the Ministry of Fisheries are beginning to stress marine and freshwater fish culture as the trend of the future in their policy speeches, indications are that the Soviet fleet will continue intensively fishing the world's oceans.

STATISTICAL REVIEW

Unlike most other nations, the Soviet Union does not publish meaningful statistics on the gross tonnage or the composition of its fishery fleet. The last time such data were given in some detail was in 1956 when the Food and Agriculture Organization (FAO) of the United Nations published a statistical review of the world's fishing fleets. This occurred just before the spectacular build-up of the Soviet distant water fishing fleet began. As a result, today these data have mostly an historical value. They are cited only to give an idea of the "giant steps" that the U.S.S.R. has made in the world's seas during the last two decades.

TABLE 1.—U.S.S.R. FISHING FLEET, BY TYPE OF CRAFT FOR SELECTED YEARS

Type of craft		1940	1948	1953	1954	1955	1956
Total	N	36,406	44,332	54,595	55,837	58,624	60,443
Powered	N	2,727	3,158	8,303	9,925	10,872	12,387
	P	123,900	243,200	610,700	725,300	834,200	982,600
Trawlers	N	107	329	1,184	1,379	1,598	1,785
	P	62,500	88,000	303,200	362,400	451,800	549,300
Seiners	N	376	407	1,221	1,395	1,517	1,724
	P	18,900	29,200	147,200	175,800	194,200	225,700
Other	N	2,244	2,422	5,898	7,151	7,757	8,878
	P	42,500	126,000	160,300	187,100	188,200	207,600
Nonpowered	N	33,679	41,174	46,292	45,912	47,752	48,056
	T	103,600	83,300	131,700	125,800	126,100	127,400

Source: FAO. Yearbook of Fishery Statistics, Vol. VI (1955–1956). Rome: 1957
N—number
P—horsepower
T—tonnage (GRT)

The reader will note that the gross tonnage was given only for nonpowered vessels, most of which operate in Soviet inland lakes, rivers, and seas.

In 1962, when FAO published its second (and most recent) statistical compendium of the world's fishing vessels, the Soviet Union no longer contributed its data in even the rudimentary format submitted in 1956.

It is not unlikely that some authority in the Soviet defense establishment—probably in the Soviet Navy—decided that such statistics are "sensitive" information and prevented their release.

Despite this unnecessary secrecy, which smacks of the old Stalinist methods, U.S. specialists are (and have always been) comparatively well-informed about the size and the composition of the Soviet fishing fleet.

It numbers over 80,000 fishing vessels; most of these are small coastal craft or inland-water boats used in the Caspian Sea, Lake Aral, Lake Baikal, on rivers and lakes, et cetera. Only about 4,400 fishing and fishery support vessels are equipped for, or capable of, open-sea, distant-water operations. These vessels, however, constitute the largest fishing fleet in the world, with an estimated total tonnage of over 6 million gross tons.

Table 2 is an attempt to compare official Soviet 1955 and 1940 data, given to FAO, with what is known about the Soviet fishing fleet composition in 1975.

The emphasis during the last two decades was on constructing powered fishing vessels, whose number is estimated to have increased almost sixfold since 1940 (from about 2,700 to about 18,000 units). The number of nonpowered vessels during a comparable timespan increased by less than 50 percent. The latter are small vessels, used mostly in inland waters and having on the average less than 3 gross tons each (see table 1 above).

Table 2. U.S.S.R. The number of powered and non-powered fishery vessels for selected years.

TYPE OF VESSEL/YEAR	1975	1955	1940
POWERED, TOTAL	(E) 18,000 1/	10,872	2,727
Trawlers 2/			
Large Stern	760	-	-
Medium Side	1,810	1,498	107
Medium Stern	150	-	-
Seiner-trawler	40	-	-
Other	120	100	-
Total, trawlers	2,880	1,598	107
Seiners			
100 GRT or more	570	(E) 300	n.a.
less than 100 GRT	(E) 2,430	(E) 1,217	n.a.
Total, seiners	(E) 3,000	1,517	376
Support Vessels			
Fish carriers	380	(E) 100	-
Floating canneries	95	-	-
Motherships	5	-	-
Baseships	60	-	-
Cargo support	60	(E) 10	-
Repair ships	40	n.a.	-
Fuel tankers	75	10	-
Water carriers	35	(E) 10	-
Passenger transports	5	-	-
Fishery training	22	2	-
Research vessels	80 4/	(E) 13	10
Total, support	857	(E) 145	10
Other 3/	(E) 11,168	(E) 7,549	(E) 2,234
Whaling vessels			
Motherships	5 5/	3	-
Catcher boats	90	(E) 60	-
Total, whaling	95	(E) 63	-
NON-POWERED, TOTAL	(E) 62,000	47,752	33,679
GRAND TOTAL	(E) 80,000	58,624	36,406

(E)-estimated

1/ Sovetskaia Torgovliia, July 12, 1975.

2/ Includes only vessels having a capacity greater than 100 gross register tons.

3/ Includes vessels having less than 100 gross register tons.

4/ The figure 80 does not include those vessels which are engaged in exploratory fisheries research (promrazvedka), because they are owned by the respective Regional Fishery Administrations and not by the Fishery Research Institutes.

5/ One of these, the Iurii Dolgorukii, was retired in late 1975 before the 1975/76 Antarctic whaling season began.

Sources: FAO. Yearbook of Fishery Statistics, Vol. VI; Rome, 1957 (for 1955 and 1940 statistics)

Division of International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA (for 1975 data).

Among the powered vessels, the emphasis during the last 20 years was on additions of trawlers and fishery support vessels. The first increased from about 1,600 units in 1955 to over 2,800 units by 1975, while the number of the various types of support vessels more than quadrupled.

In the "trawlers" category, special attention must be paid to large stern trawlers. They were all constructed during the last 20 years. These are large high-seas vessels with a capacity of from 2,600–3,200 gross registered tons per vessel. The addition of 760 large stern trawlers during 1955–75 has added almost 2 million GRT to the total gross tonnage of the Soviet fishing fleet.

The total gross tonnage of about 4,400 Soviet high-seas fishing and fishery support vessels having over 100 GRT, is estimated at over 6 million GRT by the National Marine Fisheries Service, NOAA, U.S. Department of Commerce. The estimate is for the end of October 1975. Lloyd's Register of Shipping, which began to publish limited data on the Soviet fishing fleet in 1969 and improved them year after year, estimates that on July 1, 1974, a total of 4,043 such vessels had a gross tonnage of 5.6 million GRT. Lloyd's data are somewhat low. This may be due to the fact that quite a few Soviet fishery support vessels were constructed before Lloyd's began to collect its data, or because their construction was never announced. The National Marine Fisheries Service, which conducts an active surveillance program on foreign fishing off U.S. coasts, has often been able to add otherwise unreported new or old Soviet fishery vessels to its inventory rosters after such vessels were sighted and identified by its fishery enforcement patrols. Lloyd's, however, provides an interesting breakdown of the fleet by gross tonnage. (See table 3.) Smaller fishing vessels below 500 GRT, mostly side trawlers and seiners are by far the most numerous (2,025 units or 60 percent of all fishing vessels), but they account for only about 16 percent of the gross tonnage.

TABLE 3.—U.S.S.R. NUMBER AND GROSS TONNAGE OF FISHING AND FISHERY SUPPORT VESSELS, 1969 AND 1974.

	1969		1974		Average GRT	
Type of vessel and tonnage category	Number	GRT	Number	GRT	1969	1974
Fishing vessels:						
100–499 GRT	1,872	415,416	2,025	434,294	222	214
500–999 GRT	335	229,960	781	494,518	686	633
Over 1,000 GRT	397	1,138,551	710	1,876,130	2,868	2,642
Total	2,604	1,783,927	3,516	2,804,942	685	798
Support vessels	304	1,621,221	527	2,805,072	5,333	5,323
Grand total	2,908	3,405,148	4,043	5,610,014	1,171	1,388

Source: Lloyd's register of shipping statistical tables for 1974 and 1969.

On the other hand, the 710 fishing vessels over 1,000 gross register tons, all of them large stern factory and freezer trawlers, had a gross tonnage of almost 1.9 million in July 1974. This constituted almost 70 percent of the total, even though their number (710 units) was barely 20 percent of the total.

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Another interesting fact, which is immediately observable from table 3, is the rapid growth of the larger fishing vessels. Their number almost doubled (from 397 in 1969 to 710 in July 1974 and 760 in October 1975), while the number of smaller fishing vessels below 500 GRT increased by less than 10 percent. In terms of gross tonnage, the ratio is even more disproportionate. This development corresponded perfectly to Soviet needs during the early 1970's: as their fisheries expanded to ever-more distant fishing grounds—as far as off the shores of South Africa, New Zealand or Mexico—the need for vessels with greater endurance, longer cruising range, greater horsepower and more amenable living and working quarters was escalated. And so did the construction of vessels which satisfied these requirements—the large stern trawlers. An additional incentive was the fact that a large stern trawler can catch 6–7 times the amount of fish which a small or medium side trawler can, but its crew is only about 3 times as large.

STERN FACTORY TRAWLERS—THE BACKBONE OF THE FISHING FLEET

During the last 20 years, the Soviets acquired about 760 large stern trawlers, either built in domestic shipyards, or purchased abroad. This addition, an average of 40 large stern trawlers per year, each of which can catch as much as 10,000 metric tons of fish in a good year, has greatly contributed to the continually increasing Soviet fisheries catch. Stern trawlers are a wideranging and important part of the Soviet fishing fleet; in 1975 they represented, in terms of tonnage, over 60 percent of all fishing vessels and almost one third of the entire fisheries fleet.

In the 1950's, Soviet interest in modernizing its fleet led to the acquisition of the blueprint of a stern factory trawler, a British innovation. First, the U.S.S.R. ordered 24 stern factory trawlers from the Kiel shipyards in West Germany. Once these were delivered, the Soviet Union began its own production (in the Nikolaev shipyards on the Black Sea and later in the Klajpeda shipyards on the Baltic). Poland and East Germany soon followed suit. All three countries are now engaged in mass production of stern factory trawlers. Most Polish- and East German-built trawlers have been delivered to the Soviet Union, enabling the Soviets to expand their high seas fisheries rapidly. In the Atlantic, the Soviet fishing fleet appeared off Canada (Newfoundland Banks) in 1956, off New England (Georges Bank) in 1961; as early as the next year, the Soviet vessels were sighted in the Gulf of Mexico. By 1966, Soviet fishermen were operating off Argentina.

Table 4 gives the current breakdown of the Soviet large stern trawlers by type, class, number and the country of construction.

The PUSHKIN-class of refrigerated stern factory trawlers (Soviet designation RRT) was delivered by Federal Republic of Germany shipyards in 1956–58. The original Soviet stern trawlers only had refrigerated holds (with a capacity of 800 metric tons). Their significance lies in the fact that they served as prototypes for similar vessels constructed in Soviet, and later in Polish and East German shipyards. The PUSHKIN-class refrigerated stern trawlers are gradually being phased out or converted into freezer trawlers.

Large stern trawlers with freezer facilities (BMRTs) were a later development, and added greatly to the distance a vessel could travel from its homeport.

TABLE 4.—U.S.S.R. FACTORY AND FREEZER STERN TRAWLERS OVER 100 GRT (DATA AS OF OCTOBER 1, 1975)

Type	Class	Number	Constructed in
Large Stern Factory Trawler (BMRT)	MAIAKOVSKII LUCHEGORSK	330	U.S.S.R.
Stern Freezer Trawler (RTM)	TROPIK ATLANTIK	240	E. Germany
Refrigerated Stern Trawler (RRT)	KOSMOS PUSHKIN LESKOV	90	Poland W. Germany Poland
Factory Processing Trawler (PRT)	GRUMANT SKRYPLEV ALTAI	60	Denmark Denmark U.S.S.R.
Seal-Hunting and Fishing Trawler	ZMS	20	U.S.S.R.
Seal-Hunting and Fishing Trawler	ZVEROBOI	20	Poland
Total		760	

Factory processing trawlers (PRTs) are a new type of vessel used for fishing and processing. Many of these processing trawlers have been built for the Soviet Union in Denmark.

Certain classes of stern freezer trawlers (*Tropiks*, *Atlantiks*) are built exclusively in East Germany. To date, there are over 240 of these vessels, designated RTM, in the Soviet fishing fleet. The 20 ZMS-class vessels are equipped for seal-hunting as well as fishing. These trawlers have complete factory processing facilities onboard. The *Zveroboi*-class is also a dual-purpose sealer and fishing trawler. *Zveroboi* vessels are equipped to produce seal oil, skins and meat, along with fishmeal and frozen fish. The *Zveroboi* trawlers were built in Poland for the Soviet Far Eastern Fishing Fleet. First ordered in 1971, there are now 19 in operation.

In mid-1975, the Soviet fishermen were trial-testing prototypes of two new classes of large stern freezer trawlers: the *Meridian*, and the *Gorizont*. The trials took place off Africa and if they were to be successful, mass-production of these two classes would begin in Soviet shipyards.

PORTS OF CALL FOR THE FISHING FLEETS

A large fishing fleet, operating far from its homeport, requires special facilities for transshipment of the catch, refueling, resupplying and for vessel maintenance and repairs. Catch transshipment is complicated, if not impossible, on the high seas due to heavy wave action which makes it difficult for vessels to anchor side by side. At the same time, it is much too expensive for a fishing vessel to move to and from distant fishing grounds to unload its catch and refuel. The countries with fishing fleets that fish off distant foreign coasts, therefore, often seek the use of nearby port facilities. The Soviet

Union in particular has established bunkering and transshipment points in almost every area fished by Soviet vessels. The most important of these include Singapore (servicing the Soviet fishery fleets operating in the Indian and Pacific Oceans); Havana, Cuba (Atlantic Ocean); and the Canary Island (Atlantic Ocean). Other ports such as Port Louis, Mauritius (Indian Ocean) and St. Pierre and Miquelon, French possessions off the Atlantic coast of Canada, also have been utilized this way.

The Soviets sometimes acquire port facilities by establishing joint ventures with the other country involved. For example, under an agreement signed in Singapore on June 19, 1975, a new seafood processing firm called Marissco, Ltd. is to be formed. SOVRYBFLOT, the foreign trading branch of the Soviet Ministry of Fisheries, and Straits Fisheries, Ltd., a company that is partly owned by the Development Bank of Singapore, will own the company jointly on an equal share (50–50) basis. Marissco, Ltd. will not only process, but also package and sell on the international market various species of fish, lobsters, squid, cuttlefish, prawns, and byproducts, including fishmeal. A large cold-storage plant will be built in the Jurong port complex to provide processing facilities and warehouse space for fishery catches unloaded from Soviet trawlers. Singapore's location halfway between the Indian and Pacific Oceans is ideal for the Soviet fishing fleet, which operates extensively in both areas.

A Soviet joint venture with Spain in the Canary Islands has been functioning successfully since 1969. In that year, the two countries signed an agreement creating "SOVISPAN," a company whose purpose is to develop the Canary Islands as a supply, crew rotation, and transshipment base for the Soviet fishing fleet. New port installations, which service Soviet vessels operating in the central Atlantic, have been built at Las Palmas and Santa Cruz de Tenerife. Fishery products not used for Soviet domestic consumption (octopus, squid, etc.) are exported directly from Santa Cruz.

The establishment of a Soviet fisheries base in Cuba involved a considerably greater degree of cooperation than did the agreements with Singapore and Spain. The Soviet Ministry of Fisheries, no less than the Ministries of Defense and Foreign Affairs, foresaw the excellent possibilities in establishing a base for distant-water fishing fleets on that strategically-located island. The U.S.S.R. desired Cuba as a fishing base, as much as the Cuban Government desired a rapid development of its marine fisheries. If the U.S.S.R. would build the Cubans a modern fishing port, then the Cubans would permit the Soviets to use this new port as a base for their fishery operations in the central and southern Atlantic.

The agreement on the construction of the fishing harbor was signed in Havana on September 25, 1962, by Soviet Minister of Fisheries Aleksandr Ishkov and Cuban Premier Fidel Castro. Under the terms of the agreement, the Soviet Union obligated itself to construct, during 1962–65, an entire port complex with fish processing, ship repair, and communication facilities capable of servicing and operationally supporting a large fleet. The Soviets promised to provide the complete blueprint for the construction of the port and its facilities; provide equipment and construction materials not available in Cuba; and to supply experts, engineers, construction foremen, and other personnel

needed to speed up the work and carry it out professionally. The Cubans obligated themselves to supply the labor force needed for the construction and to provide such materials and equipment as were available in Cuba. The Soviets gave the Cuban Government a loan covering the entire construction cost, both in pesos and in rubles. The Cubans were to repay the loan by servicing Soviet high-seas fishing vessels in the port of Havana for a period of 10 years from the date of the termination of construction.

Soon after the agreement was signed in Havana, the Cuban missile crisis erupted and delayed somewhat the beginning of the construction. In February 1963, the Cuban Government officially announced the beginning of the construction of Havana Fishing Port, although the excavation had already begun in December 1962 as soon as the American naval blockade was lifted. After 3½ years of construction, the Havana Fishing Port was officially opened on July 26, 1966, the seventh anniversary of Castro's rise to power. The Soviet fishing fleet began full use of the port as their supply and transshipping point in September 1966. The total cost of the project was 37 million Cuban pesos, a 300 percent overrun of the original cost estimate of 12 million pesos.

In order to pay back their loan, the Cubans must continue servicing Soviet fishing vessels in Havana until July 26, 1976. The original agreement provided, however, for an extension if the entire loan is not repaid by 1976 or (in case the loan were paid) if both Cuba and the U.S.S.R. agreed to do so. In view of the unfavorable Cuban balance of trade it must be expected that the Cubans will continue servicing the Soviet fleet as long as Castro remains in power and perhaps even afterward.

Soviet efforts to establish a transshipment and supply base on the strategic island of Mauritius in the Indian Ocean have met with varying degrees of success. In 1970, a fisheries cooperation agreement was signed by Mauritian and Soviet representatives which provided for crew exchanges and aid to Mauritius for the development of its fishing industry. However, only 15 Soviet fishing vessels each year would be able to refuel at Port Louis, a small number in comparison with Las Palmas in the Canary Islands where 360 Soviet vessels called in 1968 alone. The Mauritian Government was under some pressure from several European and African nations to limit the extent of fisheries cooperation with the U.S.S.R. For example, the British and South African Governments expressed concern at the signing of the agreement, which was concluded suddenly and without the prior knowledge of either. Both governments seemed to feel that the Soviet Union had gained a vital foothold in the Indian Ocean, although the Prime Minister of Mauritius assured them that the Soviets would not be authorized to establish a naval base on the island. In 1971, the Mauritian Government, pressured by the British, was forced to buy back at a loss a fueling station which it had sold to the Grand Port Ocean Terminal Company, a firm under Soviet control.[17] Although fisheries aid to Mauritius continues in the form of fishery development surveys and the training of fishermen, no recent moves have been made to increase the number of vessels permitted to supply in Port Louis.

[17] Le Mauricien (in French), December 4, 1971.

St. Pierre and Miquelon, French islands off the Newfoundland coast of Canada, have been developing their port facilities in recent years in order to serve as a transshipment base for European fishing fleets operating in the Northwest Atlantic. New wharves have been added, as well as a cold-storage plant equipped to freeze and store all kinds of fishery products. As an inducement to foreign fleets, the plant has been granted "duty free" status which means that no duty will be charged on goods brought in for freezing and/or storage and later shipped out of the island. The facilities at St. Pierre, however, offer comparatively little competition to the well-developed Canadian ports of St. John's (Newfoundland) and Halifax. The size of the harbor at St. Pierre limits the number of foreign vessels that can be serviced there. St. Pierre and Miquelon, however, did serve as nearby alternative ports for Soviet trawlers when the Canadian Government closed its Atlantic ports in August, 1975. This port closure did not last long. By late September 1975, Soviet and Canadian fishery delegations had reached an agreement and the ports were reopened. At best, St. Pierre and Miquelon can serve as an auxiliary to, but not replacement for, the traditional fishing ports of the Canadian Atlantic coast.

While a specialized fishing base, like the ones in Havana or on the Spanish Canaries, is of exceptional significance for the smooth operations of farflung Soviet fleets, it must not be forgotten that the Soviet fishing and fishery support vessels can, and do, call in almost any port in the world to obtain water, fuel, and other supplies.

The only consistent exception in allowing unlimited port calls to Soviet fishery vessels is the United States. When giant armadas[18] of these vessels first appeared off U.S. coasts in the early 1960's to fish the rich resources of its Continental Shelf, the U.S. Government maintained a "no-port-calls" policy (except, of course, in emergencies or for humaritarian reasons). By the late 1960's, the United States had negotiated a bilateral agreement on Soviet fishing in the Mid-Atlantic Bight (from Rhode Island to Cape Hatteras) and opened four of its Atlantic ports to a few Soviet vessels. This was in exchange for Soviet acceptance of certain limitations on their fishing which were deemed essential for the conservation of fishery resources or for the protection of U.S. coastal fishermen. Today, the Soviet vessels may call at the ports of Boston, New York, Philadelphia, and Baltimore, but only in severely limited numbers (4 a month).

INVESTMENTS IN THE FISHERY FLEET

During the last 30 years, the Soviet Union has invested an estimated 8.4 billion rubles[19] in new additions to its fishing and support fleets. Prior to World War II, such investments were minimal in accordance with Stalin's view of the U.S.S.R. as a land power and his policy of developing heavy industry rather than the output of consumer products.

[18] This is no exaggeration. In 1961, when the Soviets first began fishing off New England, a few dozen vessels participated. By the next summer, 300 Soviet vessels fished in the same area. In April 1966, a total of 118 Soviet vessels appeared on the narrow Continental Shelf off Washington state without any warning within a period of a few weeks, practically crowding smaller U.S. vessels out of their traditional fishing grounds. As a result, the U.S. Congress extended U.S. fishery limits an additional 9 miles to 12 miles, a step which greatly shocked the Soviet Fisheries Ministry.

[19] Or about U.S. $11.2 billion at current official exchange rate of 1 ruble equal U.S. $1.32.

This attitude of neglect changed radically in the postwar period. During the reconstruction years, large outlays of rubles were made for new fishing vessels as well as for the repair of damaged ones. Budgetary allocations during the first post World War II plan (1946–50) were 7 times greater than during the entire prewar and wartime period from 1928–45 (table 5).

TABLE 5.—U.S.S.R. CAPITAL INVESTMENTS IN THE FISHING AND FISHERY SUPPORT FLEET: BY PLANNING PERIODS (1928–1975).
[In million rubles]

Planning period	Capital investment by planning period	Increase over prior planning period	Percentage of increase over prior planning period
1928–45	31.0	N.A.	N.A.
1946–50	218.0	187.0	603.0
1951–55	386.0	168.0	77.0
1956–60	933.4	547.4	141.8
1961–65	1,346.3	412.9	44.2
1966–70	2,484.0	1,137.7	84.5
1971–75	[1] 3,000.0	[1] 516.0	[1] 20.8
Total	8,398.7 (e)		

[1] Estimate.

Soviet capital investments in the fisheries fleet grew rapidly until, during the 1966–70 5 Year Plan, they amounted to almost 2.5 billion rubles, or U.S. $2.8 billion (calculated at the 1970 exchange rate of $1.11 to 1 ruble). The annual sum of U.S. $560 million, invested in the construction of new fishery vessels during that planning period is by far the largest amount any government or a group of private companies, or both combined, have allocated for such a purpose. Data on capital investments earmarked for the fishing fleets in the free-enterprise countries are difficult to obtain, but they are estimated to be far below the sums the Soviets have been spending during the last decade.

Capital investments in the fisheries fleet have recently been growing at a rate almost double that of other Soviet capital investments. During the 1966–70 plan, for example, the Soviets invested a total of 501 billion rubles in the economy, or 42 percent more than during the previous 5-Year Plan 1961–65. The investments in the fisheries fleet, however, were 85 percent greater than during the 1961–65 plan.[20]

The investment estimates for the current 5 Year Plan were obtained by calculating that about 70 percent of total fishery investments, estimated at over 4 billion rubles, will be allocated for the modernization and expansion of the fisheries fleet. This percentage may be somewhat high in view of the recent trend to invest more in fish-processing plants and machinery, but on the other hand, it is hard to imagine that hundreds of large vessels, added to the Soviet fishery fleet during the last 5 years could cost much less than 3 billion rubles.

[20] Sysoev, N. P. Ekonomika rybnoi promyshlennosti, Moscow, 1972.

PRODUCTIVITY OF SOVIET FISHERMEN

Because of a lack of reliable Soviet statistical data, it is extremely difficult to determine the true productivity of Soviet fishermen. This difficulty is compounded when an attempt is made to compare that productivity with those of fishermen in other countries.

However, one general measure can be applied. Statistics on the gross tonnage of the world's fishing fleets are available, as are total catch data. We have therefore compiled statistics for the five countries which have the largest fishing fleets and calculated their fishermen's productivity on that basis. The results are given in table 4.

Table 4.--High-seas fishery fleets of selected countries, number of vessels, gross tonnage and catch per gross ton, 1973.

COUNTRY	Number of Vessels	Gross Tonnage (in GRT)	Percent of Total World Tonnage	Fisheries Catch (in million (mt) 5/	Catch per GRT (in mt)
U.S.S.R.	4,700	6,500,000 1/	56.2	8.6 6/	1.32
JAPAN	3,099	1,510,985 2/	13.0	10.7 6/	7.08
SPAIN	1,953	510,491 3/	4.4	1.6	3.13
U.S.	1,577	357,620 4/	3.1	2.7	7.55
NORWAY	604	202,745 4/	1.8	3.0	14.80
OTHER	6,679	2,491,113 4/	21.5	28.3 7/	11.36
TOTAL	18,412	11,572,954	100.0	54.9 8/	4.74

NOTE: Only vessels over 100 gross registered tons are included. Both fishing and fishery support vessels are included. "Other" is residual.

1/ Division of International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA. Data are for 1973.

2/ Fisheries Statistics of Japan, 1973, Fisheries Agency, Ministry of Agriculture and Forestry, Tokyo, 1975.

3/ Subsecreteria de la Marina Mercante. Annuario de pesca maritima, 1973. (p. IX). Lloyd's statistics report a gross tonnage of 509,600 tons as of July 1, 1974, but gave the number of vessels as 1,619 units.

4/ Lloyd's Register of Shipping Statistical Tables, 1974. (Data are for July 1, 1974). The figure is a residual.

5/ FAO Yearbook of Fishery Statistics, 1973. Rome, 1974.

6/ Does not include the catch of marine mammals for both USSR and Japan, nor the harvest of marine plants for the U.S.S.R.

7/ Residual.

8/ Includes only countries having high-seas fishery fleets and listed in Lloyd's Register of Shipping Statistical Tables, 1974.

The data for both Japan and the Soviet Union are somewhat misrepresentative because their catch of marine mammals (whales, seals, et cetera) is not included in their 1973 catch data. The Soviet Union's total fisheries catch in 1973 was 9,005,000 metric tons (mt), but that of Japan is not known.[21] The number of Soviet vessels is somewhat larger than in 1975 (when the fleet was estimated at about 4,400 vessels; see table 2 in the chapter "Soviet fisheries fleet; a statistical review") because in 1973 the Soviets had not yet retired several hundred older fishing vessels.

Despite such deficiencies in the statistics, it is immediately evident that the Soviet fisheries are the least productive: only 1.3 mt were caught per gross registered ton (GRT). It is clear that long trips away from Soviet shores and the large number of support vessels are costing Soviet fishermen greatly in productivity. More than one-half of the Soviet fishery tonnage consists of support vessels. In contrast, less than 14 percent of the gross tonnage of the Japanese high-seas fleet is composed of support vessels.

Spain, which also recently expanded its distant-water fleet and deploys more and more large vessels, is the second lowest in productivity per GRT, but still almost twice as productive as the U.S.S.R.

Japan's catch per GRT of 7.1 metric tons is suprisingly high. This country operates its vessels in a manner not too different from that of the Soviet Union. Both send large flotillas of fishing vessels, accompanied by motherships, to distant fishing grounds, and both operate large stern factory trawlers. There are, however, several differences:

1. Japan's fishing industry is more willing to spend abundant foreign currencies for services in foreign ports and needs thus far fewer tankers, water carriers, repair vessels and other support vessels. (Lloyd's Register of Shipping estimates Japan's support fleet at 71 vessels with 217,000 GRT. The Soviet fishery fleet is estimated by Lloyd's at 527 vessels with 2.8 million GRT.) It is easier for the Soviets to pay more for support operations in available and expendable rubles than to pay for foreign-port services in hard-to-get foreign currencies.

2. Japan still maintains traditional coastal fisheries close to its shores. Thousands of small vessels of less than 100 GRT—and therefore excluded from table 4—bring in fish which are included in the 1973 catch figure. Soviet coastal fisheries, in contrast, are becoming less and less important for two reasons: The resources off U.S.S.R. shores have been overfished and young Soviet fishermen prefer to enter high-seas fishing where earnings are greater.

3. There will be those who will maintain that the Japanese fishermen are more successful because they operate under a commercial system intolerant of inefficiency, while the Soviets operate under a state-directed, socialist system. We would not quarrel with that opinion.

Whatever other reasons could be added, the conclusion that Japanese fishermen are exceedingly more productive than those of the Soviet Union is inescapable.

U.S. fishermen are also highly productive. Fishing from their home ports at distances which do not require many support vessels, they

[21] Japan does not give its whale catches in terms of metric tons, nor does it give a total fisheries catch figure like the one given by the Soviets from which the whale catches expressed in metric tons can be inferred. What the Japanese do provide is the total fish and shellfish catch as well as the harvest of marine plants.

bring in 7.5 tons of fish per each gross ton of vessels they privately own. With only 3 percent of the world's gross tonnage, they harvest almost 5 percent of the catch caught by the world's high-seas fleets (table 4). Even more productive are the Norwegian fishermen, who operate in circumstances similar to those of U.S. fishermen, but who have more modern and more efficient vessels and gear.

Hopefully, more complete data will be published by fishery nations in the future so that more definitive productivity analyses can be made.

Education and Training of Soviet Fishermen

The rapid expansion of the Soviet fisheries fleet and the introduction of modern processing technology demand a highly-skilled labor force and high-grade technical specialists. To tap the tight Soviet labor markets, the Ministry of Fisheries transformed what used to be an unskilled trade into a Government recognized profession with a well-developed system of secondary schools and universities. Young sons of fishermen (only males are allowed to enter Soviet secondary fishing schools) can now plan an attractive career leading to the highest positions in the Soviet establishment.

There is no lack of candidates for Soviet fishery schools, in contrast to many Western countries where it is difficult for fishing companies to lure young people into fishery schools, provided they exist.

The enthusiasm of young Soviets to enter the fishermen's profession has several explanations:

1. Salaries paid to Soviet fishermen are often twice—and sometimes three times—as high as those paid to ordinary Soviet workers. The deckhands on a productive Soviet factory freezer trawler earn as much as U.S. $600 a month and captains make over $1,000. The average Soviet worker's salary is below $200.

2. A well-organized system of publicity about developments in Soviet fisheries begins as early as primary school where teachers often organize special field trips or education programs with an emphasis on the fishing industry or fisheries biology.

3. Education in Soviet fisheries schools, as in all Soviet schools is free. Tuition is paid by the Government. In addition, most students are given not only books and other school necessities, but also clothing (uniforms) and a small monthly allowance.

4. The sense of adventure experienced by a Soviet fisherman when he visits a foreign port, which otherwise he would never see, should not be underestimated. The ordinary Soviet citizen does not easily get a passport for travel to foreign countries. Thus, the demand for fishery jobs, in the Soviet Union, especially those jobs which include fishing off foreign shores, has consistently exceeded the available positions.

5. Modern Soviet fishery vessels are not only seaworthy, but are also comfortable, especially when compared with small medium trawlers aboard which Soviet fishermen ventured onto the high-seas thousands of miles from their native shores during the 1950's and early 1960's. Large stern factory trawlers now have separate fishermen's cabins which are comfortable, well-lit, and livable. Vessels fishing in tropical waters are often air-conditioned. The officers' quarters,

especially on larger motherships, are almost luxurious. Each vessel has cooks and waiters or waitresses and although the fishermen's work is hard, vacations are long and well-paid. Aboard each mothership there is a hospital with a surgeon and a dentist in case of emergenices.

FISHERY SCHOOLS

Since the formation of the Soviet State in 1917, a complex educational system for the training of fishery specialists has evolved.

In Tsarist Russia, there was only one such school—the Fisheries Department of the Petrovsk Agricultural Academy with less than 50 students. By comparison, over 60,000 students in more than 30 schools were studying to be fishermen in 1975.

Soviet writers use the above mentioned statistical comparison to document the great improvements over Tsarist Russia. In reality, however, the fisheries in most countries prior to 1917 were small local industries, limited to coastal waters and a primitive—though often effective—technology. In such fisheries, where fathers trained their sons in the arts of the trade, large-scale fisheries training was neither necessary nor practical. In fact, pre-revolutionary Russia was one of the few countries that had a fisheries school at that time.

With the buildup of a large distant-water fleet, a need for qualified fishery experts has developed in the Soviet Union. To operate the technologically highly-advanced stern freezer trawlers, or a modern automated fish-processing plant, well-trained personnel are required.

To meet this demand, dozens of fishery training schools were established as part of broad educational programs developed after World War II and designed to combine technical training with general education on the secondary and higher levels.

Types of Schools

Fisheries education in the U.S.S.R. fits into the general Soviet educational scheme as one of the technical fields in which a student may specialize at various points during his education. There are three different levels of fishery schools in the U.S.S.R. which may be further divided into two different types:

Level of schools (number of schools)	Type of schools (number of schools)
I. Higher Institutes (6)	1. Higher Technical Fisheries Institute (3). (Vysshee Texnicheskoe-Uchebnoe Zavedenie). 2. Higher Engineering Fisheries Institute (2). (Vysshee Inzhenemoe Morskoe Uchilishche). 3. Institute for the Improvement of Qualifications of Fisheries Command Personnel (1).
II. Secondary Schools (25)	4. Secondary Fishery Schools (15). (Morekhodnoe Uchilishche). 5. Secondary Coastal Fishery Schools (10). (Tekhnikum).
III. Trade Schools (7)	6. Fisheries Trade School (6). (Morekhodnaia Shkola). 7. Kothkoz Training School (1).

In addition to the above, there are also departments in many Soviet universities and scientific research institutes where fishery related subjects are taught. The All-Union Scientific Research Institute for Fisheries and Oceanography (VNIRO) in Moscow supervises fishery studies on a post-graduate, doctoral level.

The first type of fishery school a student may enter is the Fishery Trade School (Group III above), available after graduation from the eighth grade. Courses usually last for 1–2 years, but in some trades, 3 years. The courses taught, the length of training, and the admission requirements, are decided upon by the State Committee for Vocational Training. Graduates become skilled workers in the Soviet fishing industry. However, they do not earn a secondary school diploma and thus remain low-paid employees.

Next are the secondary fishery schools (Group II above). These are the fishing industry's specialized secondary schools, the mainstay of Soviet fisheries education. In general, these school are of two types:

(1) the Secondary Fishery School which trains high-seas captains, navaigators, and other officers, and

(2) the Secondary Coastal Fishery School which trains students for the same positions, but only for coastal and inland fisheries. The student may enter after having completed either an 8th- or a 10th-grade education. In either case, he graduates from the school with a secondary diploma, as well as with techncal expertise.

The third type of fisheries educational institutions are the higher institutes (Group I above). These institutes are the equivalent of U.S. universities and colleges, but they specialize in matters related to fisheries. Applicants must have completed secondary school to gain acceptance. Only a few students advance to this level, the admissions procedure is extremely competitive. Institute graduates become the economists, gear designers, planners, and managers of the fishing industry.

The Higher Technical Institutes differ from the Higher Engineering Institutes mainly with regard to curriculum emphasis. The engineering colleges offer general engineering specialties such as vessel mechanics and electrical engineering. The technical institutes, however, offer specialties with emphasis on the fishing industry, such as commercial fishing or technology of fish products.

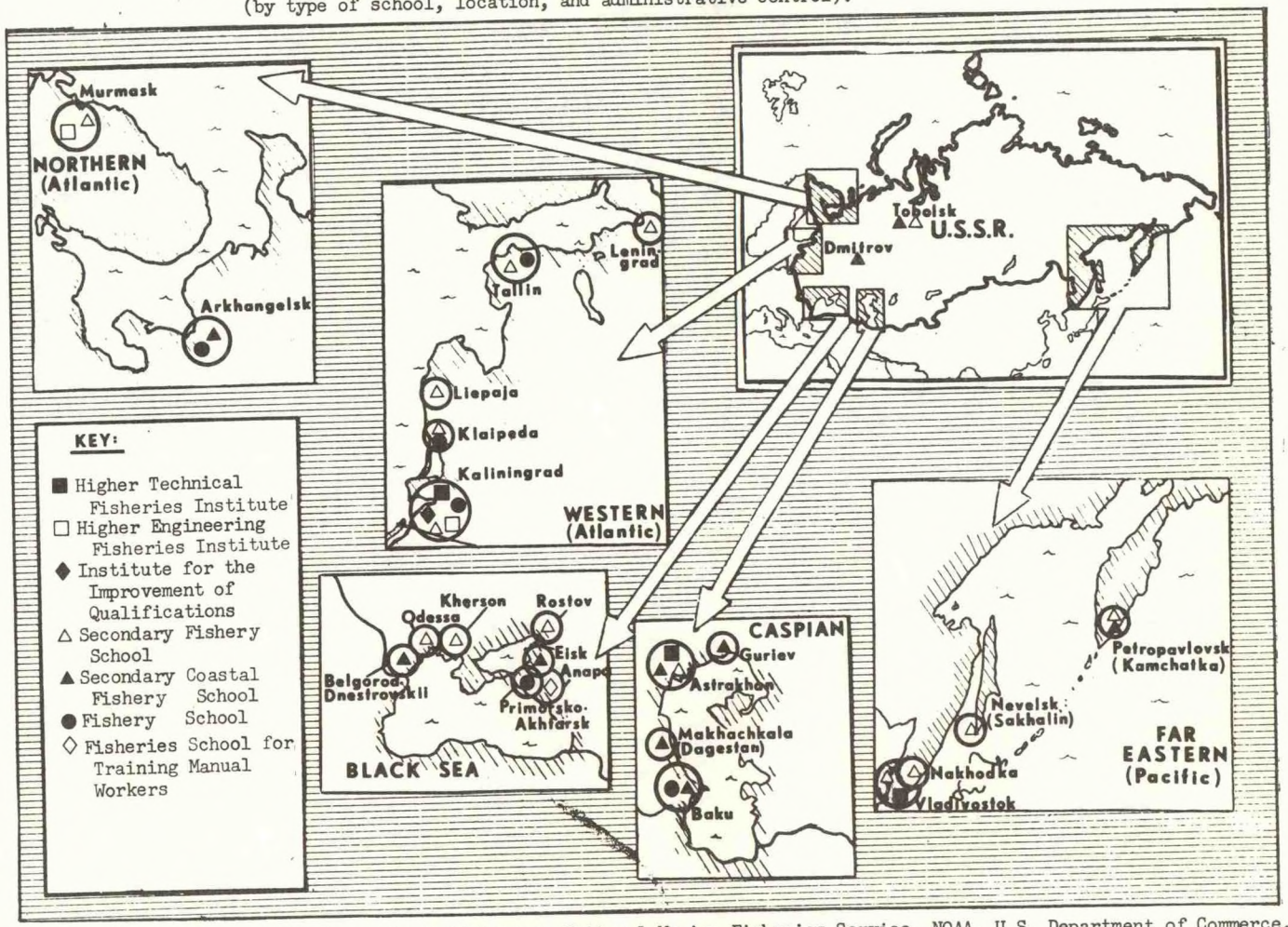
Furthermore, full-time students at the Higher Engineering Colleges live in dormitories and are provided with uniforms, meals, and a monthly stipend. Students at the Technical Institutes, on the other hand, do not as a rule receive such "boarding school" benefits unless they are graduate students. They do, however, receive a stipend sufficient for living expenses which is linked to their academic achievement. High achievers receive more, average students less. As with the Soviet educational system in general, all tuition is paid by the State.

The Schools for Improving the Qualifications of Fisheries Personnel represent the third category of higher fishery educational institutions. These "schools" are actually education programs devoted to upgrading and updating the skills of the upper echelon among fishery personnel: medium-level technicans, captains, mates, and other high-level engineering personnel. Courses are usually given at enterprise training

centers, specialized secondary schools, or higher schools. One higher fisheries school which is entirely devoted to upgrading skills is the Kaliningrad Institute for the Improvement of Qualifications (*Institut povysheniia kvalifikatsii*). This school is only for the training of top-level administrative and engineering personnel. Other secondary and higher schools may have a department devoted to such an "improvement" program among their regular courses. Enterprise courses for improving qualifications are available to medium-level technical personnel as well as to high-level managers and engineers.

The geographic distribution of Soviet fishery schools is shown in figure 1 and in the list below.

Fig. 1. Soviet Fishery Educational and Training Institutions as of 1974,
(by type of school, location, and administrative control).



Prepared by the Office of International Fisheries, National Marine Fisheries Service, NOAA, U.S. Department of Commerce.

Fishery Schools in the Soviet Union

I. HIGHER FISHERY INSTITUTES

A. Higher Technical Fishery Institutes (Tekhnicheskie instituty rybnoi promyshlennosti i khoziaistva

1. Kaliningrad (Branch in Riga)
2. Astrakhan
3. Vladivostok (Branch in Petropavlovsk-Kamchatskii)

B. Higher Engineering Fishery Institutes (Vysshie inzhenernye morskie uchilishcha)

1. Murmansk
2. Kaliningrad

C. Other Higher Institutes

1. Kaliningrad (Institute for Improving the Qualifications) (Institute povysheniia kvalifikatsii) (Branch in Dmitrov, Moscow Oblast')

II. SECONDARY FISHERY SCHOOLS

A. Secondary Fishery Schools (Srednie morekhodnye uchilishcha)

1. Murmansk
2. Kaliningrad
3. Leningrad
4. Liepaja
5. Tallin
6. Klajpeda
7. Odessa
8. Kherson
9. Rostov-na-Donu
10. Astrakhan (Kaspiskoe)
11. Nevelsk (Sakhalinskoe)
12. Nakhodka (Dal'nevostochnoe)
13. Petropavlovsk-Kamchatskii
14. Vladivostok
15. Tobolsk

B. Secondary Coastal Fishery Schools (Rybopromyshlennye tekhnikumy)

1. Astrakhan
2. Arkhangelsk
3. Eisk (Krasnodar)
4. Belgorod-Dnestrovskii
5. Guriev
6. Dagestan (Makhachkala) (F)
7. Baku
8. Dmitrov (Moscow oblast') (F)
9. Petropavlovsk-Kamchatskii
10. Tobolsk (F)

III. PRE-SECONDARY FISHERY SCHOOLS

A. Fishery Trade Schools (Morekhodnye shkoly)

1. Arkhangelsk
2. Kaliningrad
3. Tallin
4. Primorsko-Akhtarsk
5. Baku
6. Klajpeda

B. Training School for Leading Workers of Fishery Kolkhozes (Shkola po podgotovke rukovodiashchikh rabotnikov rybolovetskikh kolkhozov)

1. Anapa

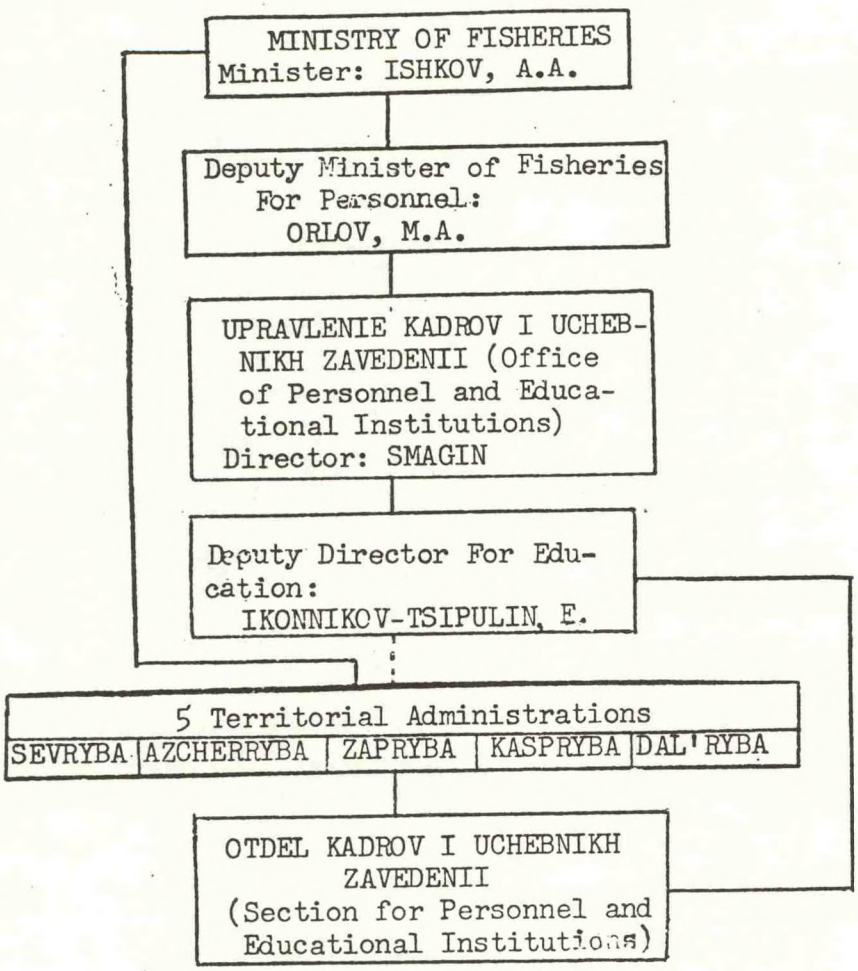
(F) - Secondary schools specializing in training of inland fishermen.

Administrative Organization

The Soviet fisheries education institutes and fisheries training vessels are administered centrally by the Ministry of Fisheries of the U.S.S.R. in Moscow. The overall responsibility for all policies of the Ministry is in the hands of the Soviet Fisheries Minister, Mr. A. A. Ishkov.

Under Ishkov there are 6 Deputy Ministers of Fisheries, each responsible for several specialized fields of the Ministry's activity. One of them, the Deputy Minister for Personnel, also handles the overall administration of the Soviet fishery schools and fishery training vessels. At the present time, Mr. Mikhail Anatolevich Orlov [22] occupies this position. He was appointed in 1971, replacing Mr. Eliseev who retired.

Fisheries Education in the Soviet Ministry of Fisheries



[22] Retired in late 1975. On April 13, 1976 he was replaced by Mr. Nikolai P. Kudriavtsev who was formerly the Second Secretary of the Arkhangelsk Regional Committee of the Soviet Communist Party.

To facilitate the day-to-day administration of Soviet fishery educational policies, an Office of Personnel and Educational Institutions under Director Smagin has been formed.

Routine attention to the problems of running the Soviet fishery educational institutions, of establishing new policies, and of executing the policies already set, is the responsibility of Mr. Evgenii Ikonnikov-Tsipulin who is Mr. Smagin's Deputy.

Mr. Ikonnikov has been the Deputy Director of the Office of Personnel and Educational Institutions at least since 1969, but probably for much longer. Little is known about the day-to-day functioning of his office, nor are the names of his assistants known. He is nevertheless the best informed Soviet official on fishery education and training and it is mainly due to his unceasing and enlightened efforts that so much progress has been made.

From the central Office of Personnel and Educational Institutions in Moscow, the line of direct authority goes to the sections of Personnel and Educational Institutions within each of the 5 territorial administrations of the Soviet Ministry of Fisheries. The Soviet Union has territorial administrations in Murmansk (Sevryba), Riga (Zapryba), Kerch (Azcheryba), Astrakhan (Kaspryba), and Vladivostok (Dalryba). Each of these has under its immediate authority a section for Personnel and Educational Institutions with the same daily responsibilities for their territory that Mr. Ikonnikov in Moscow has for the central apparatus.

Statistical Review

a. Students

The number of students in Soviet secondary fishery schools and higher institutes expanded continuously after World War II from a few thousand in the mid-1940's to about 56,000 in 1966. To provide for this increasing number of students, at least 15 fishery schools were established during those years. The number of students has increased less rapidly since then to about 61,000 in 1973 [23] and has remained constant through 1975. About 40 percent of all students (an estimated 24,400) attend the 6 higher fishery institutes, while 60 percent (an estimated 36,600) are students in the 25 secondary fishery schools.

Approximately one-half, or about 30,000 Soviet fishery students, are taking correspondence courses; they work fulltime in the fishing industry and only travel to schools for examinations and laboratory work.[24]

Each higher institute has between 2,000 and 5,000 students, while the secondary fishery school students range from a few hundred to over 4,000 per school.

At the present time, about 10,000 students graduate each year from Soviet secondary and higher fishery schools.[25] As a result of this continual influx of skilled employees, the number of trained specialists working in the fishing industry has increased steadily. In 1965, the Soviet fishing industry employed about 47,000 graduates of higher and secondary fishery schools, and by 1968, this figure had grown

[23] Rybnoe Khoziaistvo, May 1973.
[24] Vodnii Transport, February 5, 1970.
[25] Rybnoe Khoziaistvo, April 1971 and May 1973.

to 70,000.[25] About 90,000 graduates were employed in the fishing industry in 1971[25] and, by 1975, their number has probably grown to 130,000 persons.

Of the 90,000 graduates of secondary and higher fisheries schools in 1971, slightly fewer than 50 percent (42,000) were employed aboard vessels of the fishing fleet.[25] (This compares to 30,000 out of 70,000 graduates in 1968.[26]) They serve as captains, mechanics, and navigators of the fleet.

About 50 percent of the specialists with a higher education, and 70 percent of those with a secondary education, work in the Northern, Far Eastern, and Western Fisheries Administrations. Over 90 percent of all captains of large Soviet fishing and fishery support vessels are either secondary or higher school graduates. The Soviets, however, admit that there are still many positions requiring high technical skills which are held by persons without formal fisheries education.

b. Professors.

There is no figure available on the total number of professors in Soviet secondary and higher fisheries schools, but it can be estimated.

In the Western Fisheries Administration (Zapryba), there are 220 full-time professors for approximately 4,000 students in the 5 secondary fishery schools.[27] This is a faculty-student ratio of about 19:1. The "tekhnikum" in Astrakhan employs 95 full-time professors for about 2,500 students. This represents a faculty-student ratio of 26:1.

Based on the above data and the fact that class sizes vary from 20 to 30 students, an estimated faculty-student ratio of 20–25:1 is probably realistic. This would mean that about 2,500–3,000 full-time faculty members teach in Soviet fishery schools and that as many as 7,000 assistants are part-time instructors.

It is interesting to note that of the 220 professors in Zapryba, 110 belong to the Communist Party.[27] This is an unusually high percentage[28] and, if it holds true in the other Administrations, it would indicate that the Fisheries Ministry wants strong party leanings instilled in the future officers of its high-seas fishing fleet. With the large investments in fishing vessels, and the fact that they are far away, off foreign shores, for long periods of time, this is not surprising.

c. Budget.

Very little is known about the budgetary allocations for fisheries education in the U.S.S.R. One visitor reported that the Fisheries Ministry budgeted about 22 million rubles for its fishery schools in 1966.

The budget of the Nakhodka Secondary Fishery School was over 2 million rubles in 1973. Administrators of the school estimated that the cost of a year of education for one full-time secondary fishery school student was about 1,000 rubles. The Astrakhan Secondary Coastal Fishery School had about 1,000 full-time students and an annual budget of over 8 million rubles in mid-1966. This would give an expenditure of about 800 rubles per student per year.

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[25] Rybnoe Khoziaistvo, April 1971 and May 1973.

[26] Rybnoe Khoziaistvo, January 1968, p. 86.

[27] Rybnoe Khoziaistvo, June 1974.

[28] In the entire U.S.S.R. there were 14.8 million Communist Party members in 1973, or 6 percent of the population.

The costs of educating a student in the Soviet higher fisheries institutes appear to vary more widely. With 2,500 students (1,000 full-time), the Murmansk Higher Marine Engineering Institute had, in 1966, a budget of over $10 million, or about $4,000 per student, including correspondence students. On the other hand, the Astrakhan Higher Technical Fisheries Institute had 4,800 students (1,700 full-time) and yet had an estimated budget of only about $2 million. The explanation for this variation is that the Murmansk Institute trains navigators, radio operators, etc. These fields require expensive electronic equipment and intense technical supervision. The Astrakhan Institute concentrates on less expensive fields of training such as engine mechanics and gear handling.

In 1973, the Soviet Fisheries Ministry budgeted a reported 48 million rubles for its fishery schools, or a little less than 5 percent of its entire budgetary allocations. The average cost per fisheries student would thus amount to about 800 rubles (U.S. $1,050) per year.

FISHERIES TRAINING FLEET

Introduction.

The Soviet Union's fisheries expanded into a major industry during the 1950's and 1960's. Along with this expansion, the need for qualified fishermen, fleet officers, and seamen increased rapidly. The lure of the sea and the opportunity to see foreign lands attracted many young recruits. However, the newer, larger, and more complex fishery vessels demanded greater expertise in many technical fields.

The growth of the Soviet fishing fleet and its continued modernization were not reflected in Soviet fisheries training. In the 1950's, the Soviet Union had only two fishery training vessels. A rather primitive program of education was provided either in classrooms on the secondary or higher levels, or at sea with various correspondence courses in such marine specialties as navigation, engine mechanics, radio communications, gear technology, and safety at sea. As a result, even the honor graduates from these courses often lacked the practical experience necessary to make efficient high-sea navigators, fishermen, and processors. Indeed, some graduates were simply not cut out for sea-going life, though they had mastered the academics of the field in fishery schools ashore. The results were stagnant productivity at sea, inefficient use of funds earmarked for fisheries training, and dissatisfaction of the more experienced, though less-educated, fishermen with their younger, more educated but less proficient, comrades.

The Ministry of Fisheries responded by providing practical, on-board training to supplement the classroom studies. By grading each student's performance at sea as well as in the classroom, a more accurate ranking of the students and more experienced graduates could be obtained. Thus, in the early 1960's the Ministry began to organize a training fleet for each of the five major fishery administrations: Sevryba, Zapryba, Azcherryba, Kaspryba, and Dal'ryba. [29]

The first step in establishing a fishery training fleet was to requisition suitable vessels. During a period when the Soviets had assigned highest

[29] The Soviet fishery administrations are divided geographically. Four are in European Russia, one is in the Far East. Their names are a composite of the geographic location and the suffix "ryba" which means fish in Russian. Zapryba for instance is the Zapadnaia Fisheries Administration, located in western (European) Russia. On the other hand, the Dalryba is located in the Soviet Far East.

priority to increasing the fisheries catch, it was a foregone conclusion that only the least productive vessels could be spared. Only old fishing vessels were fitted out for training. In addition, obsolete vessels from the naval and the oceanographic research fleet were turned over to the Fisheries Ministry rather than to the scrap heap.

Later, in the 1960's and 1970's, the acquisition of training vessels was to become a priority. Specially equipped training vessels were ordered abroad by SUDOIMPORT and the Soviets also began domestic construction of training vessels.

The Rise from the Ashes.

Today, the Soviet Fisheries Ministry has at its disposal 22 training vessels, 16 of which were built less than 7 years ago and are equipped with every modern device. Table 1 is a list of these vessels giving a few basic data on each, including their names and tonnage. The total gross registered tonnage of the training fleet is 67,054 tons, the largest in the world and greater than the gross tonnage of the entire fishing fleet in such traditional fishing countries as Belgium, Denmark and Ireland put together.[30]

[30] Only vessels over 100 GRT are counted.

Table 1. U.S.S.R. Fishery training vessels (as of January 1, 1975)

NAME	VESSEL			BUILT		SERVICE AS TRAINING VESSEL		
	GRT	Class	Type	Year	Country	Since	With	Homeport
Barograf	2,600	Atlantik	TP	1973	GDR	1973	Azch.	Sevastopol'
Bataisk	3,728	Vorkuta	T	1955	Poland	1965	Sev.	Murmansk
Diplot	2,600	Atlantik	TP	1973	GDR	1973	Zap.	Riga
Ekholot	3,813	Grumant	TP	1969	Denmark	1969	Zap.	Riga
Geliograf	2,600	Atlantik	TP	1973	GDR	1973	Dal.	Vladivostok
Grif	239	SRT	T	1950	GDR	1950	Zap.	Riga
Kommissar Polukhin	6,008	Sevastopol'	TP	1968	USSR	1968	Sev.	Murmansk
Kompas	4,734	Grumant	TP	1968	Denmark	1968	Sev.	Murmansk
Kruzenshtern	3,257	Sail	T	1926	Germany	1966	Zap.	Riga
Kurgan	239	SRT	T	1949	GDR	1963	Zap.	Riga
Kurs	3,813	Grumant	TP	1969	Denmark	1969	Azch.	Sevastopol'
Kursograf	2,600	Atlantik	TP	1973	GDR	1973	Zap.	Riga
Kvadrant	2,600	Atlantik	TP	1973	GDR	1973	Dal.	Vladivostok
Lokator	3,813	Grumant	TP	1970	Denmark	1970	Dal.	Vladivostok
Mikhail Korsunov	873	Zelenodolsk	T	1970	USSR	1970	Kasp.	Astrakhan
Navigator	239	SRT	T	1950	GDR	1964	Zap.	Riga
Nikolai Zytsar	6,008	Sevastopol'	TP	1968	USSR	1968	Zap.	Riga
Pelengator	4,734	Grumant	TP	1968	Denmark	1968	Dal.	Vladivostok
Ruslan	239	SRT	T	1951	GDR	1951	Azch.	Sevastopol'
Sedov	3,709	Sail	T	1921	Germany	1966	Zap.	Riga
Volnomer	2,600	Atlantik	TP	1973	GDR	1973	Dal.	Vladivostok
Zabaikal'e	6,008	Sevastopol'	TP	1969	USSR	1969	Dal.	Vladivostok

Azch. = Azcherryba (Azov - Black Sea Fisheries Administration)

Sev. = Sevryba (Northern Fisheries Administration)

Zap. = Zapryba (Western Fisheries Administration)

Dal. = Dalryba (Far Eastern Fisheries Administration)

Kasp. = Kaspryba (Caspian Fisheries Administration)

TP = Training and production vessel. T = Training vessel.

Source: Personal communication to M. Kravanja, Office of International Fisheries, NMFS, NOAA from Mr. E. Ikonnikov-Tsipulin, Deputy Director for Education, Soviet Ministry of Fisheries.

Most of the newer vessels have large tonnage (over 2,600 tons). The older vessels are all small, except two sailing training vessels which were built in Germany soon after World War I. All newer and larger vessels also engage in fishing and are therefore called "training and production" vessels. Any new additions to the fleet will without doubt be training and fishing vessels, so deeply engrained is the study-work approach in Soviet fisheries education.

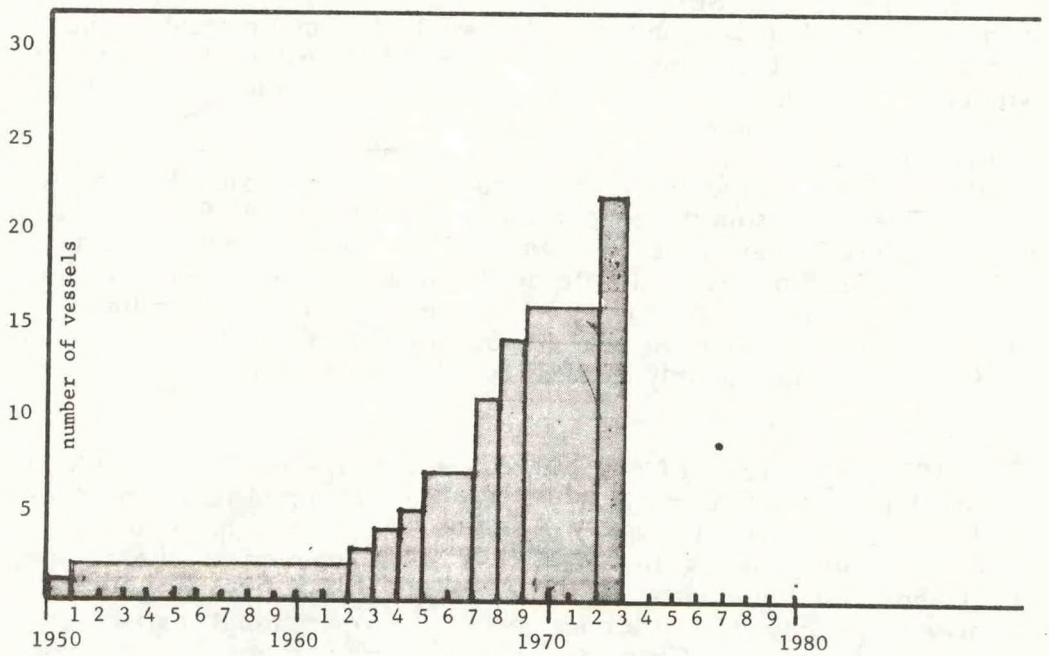
Almost one-half (10) of all vessels was constructed in East German shipyards. Denmark delivered five during 1968–70, one was obtained from Poland and the remaining four vessels were built in Soviet shipyards. The already-mentioned sailing vessels were taken from Germany as war reparations.

Most newer vessels were assigned to the training fleet of the Soviet Fisheries Ministry the year they were built, but it took 40 years for the ex-German sailing craft to land in that Ministry.

Figure 1 shows how precipitous the phoenix-like rise of the training fleet was. It would appear that the basic decision to build it was first taken during the 1961–65 5 Year Plan. Once the Directorate for Personnel and Education of the Fisheries Ministry convinced the "Kollegium[31]" of the usefulness of on-the-job training aboard operational fishing vessels, funds flowed easily.

[31] Kollegium is the Executive Board of a Soviet Ministry. It is composed of the Minister, all Deputy Ministers, a few of the top executives, a total of 10–15 persons.

Fig. 1. The growth of the Soviet fisheries training fleet.



Prepared by: Division of International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA, Commerce.

Who Pays the Bill?

Fishery training vessels are legally the property of the various regional fishery administrations, which reportedly have to pay for their costs out of their own operating funds. Whether this includes paying the original purchase price has not been determined. What, if any, portion of their upkeep is contributed by the Fisheries Ministry is also unclear. It would appear that the regional administrations have assumed the entire operational expense of their respective training fleets and that they use the catches obtained by the training fleet to defray part of such expenses.

The annual operational costs of all 22 training vessels are estimated at 20–30 million rubles. What percentage of this amount is covered by the sale of the catch is not known, but it is possible that most expenses are recovered.

In March 1974, a Soviet source [32] reported that in 1973 the nine training vessels of the Zapryba (page 6) had made a "profit" of 2.4 million rubles from the sale of landed fish. Since the cost of student training was not given, we cannot even speculate on the proportion of recovered expenses.

More than 10,000 Student-Trainees a Year.

Three vessel classes are prevalent in the training fleet, *Grumant*, *Sevastopol*, and *Atlantik*. The *Grumant* class vessels have been equipped with accommodations for 110 students (in addition to a crew of about 70), the other two classes can take on 85 and 90 students respectively.

From the list of Soviet fishery training vessels on page 3, one can calculate that as many as 1,250 students can be trained aboard these vessels at the same time as follows: aboard 6 *Atlantiks*—530 students; aboard 5 *Grumants*—550 students; aboard 2 *Sevastopols*—170 students.

Each of the sailing schooners can accommodate at least 200 students, the rest of the training vessels can accept probably 200–300 more. The total simultaneous trainee capacity of all Soviet fishery training vessels can thus be estimated at about 2,000 students at any one time. Since several different "courses" are given aboard these vessels throughout the year it is believed that the total number of fishery students who make use of such on-the-job training is at least 10,000 a year and possibly as great as 15,000 students.

Global Deployment

In 1975, a majority of the Soviet training vessels (12) is deployed in the Atlantic Ocean and is administratively attached to the Northern and Western Regional Fishery Administrations. The list below gives vessels' names, classes, the year they were assigned to the training fleet and their homeports. In the Azov and Black Seas Fisheries Administration, only three training vessels are operational, two of them of recent vintage. The Caspian Fisheries Administration has one vessel of medium gross tonnage.

[32] Radio Moscow, in a broadcast "For Seamen" of March 27, 1974.

U.S.S.R. Fishery training vessels of the Soviet Ministry of Fisheries listed by regional fishery administrations, name and class. (data as of January 1, 1975)

SEVRYBA (3)
- Bataisk (Vorkuta-1965 - Murmansk)
- Komissar Polukhin (Sevastopol'-1968 - Murmansk)
- Kompas (Grumant-1968 - Murmansk)

ZAPRYBA (9)
- Nikolai Zitsar (Sevastopol'-1968 - Riga)
- Ekholot (Grumant-1969 - Riga)
- Diplot (Atlantik-1973 - Riga)
- Kursograf (Atlantik-1973 - Riga)
- Kruzenshtern (Sail-1966 - Riga)
- Sedov (Sail-1966 - Riga)
- Grif (SRT-1950 - Riga)
- Kurgan (SRT-1963 - Riga)
- Navigator (SRT-1964 - Riga)

AZCHERRYBA (3)
- Kurs (Grumant-1969 - Sevastopol')
- Barograf (Atlantik-1973 - Sevastopol')
- Ruslan (SRT-1951 - Sevastopol')

KASPRYBA (1)
- Mikhail Korsunov (Zelenodolsk-1970 - Astrakhan)

DALRYBA (7)
- Zabaikal'e (Sevastopol'-1969 - Vladivostok)
- Pelengator (Grumant-1968 - Vladivostok)
- Lokator (Grumant-1970 - Vladivostok)
- Volnomer (Atlantik-1973 - Vladivostok)
- Geliograf (Atlantik-1973 - Vladivostok)
- Kvadrant (Atlantik-1973 - Vladivostok)
- Kallisto (Tropik-1970 - only part-time - Vladivostok)

Source: Personal communication to M. Kravanja, Office of International Fisheries, NMFS, NOAA by Mr. E. Ikonnikov-Tsipulin, Deputy Director for Education, Soviet Ministry of Fisheries.

Note: The year in parenthesis indicates when the vessel was assigned to the training fleet.

The Far Eastern Fisheries Administration in Vladivostok was long neglected and did not have any fishery training craft at all. In recent years, however, and after many bitter complaints from Vladivostok, Moscow finally came through: seven modern training vessels were assigned to the Far East, of which one is used for training only part-time. The total gross tonnage of the Soviet training vessels operating in the Pacific is now slightly below 25,000 tons. This tonnage constitutes more than one-third of the total training vessel tonnage, or about the same percentage contributed to the total Soviet fisheries catch by Far Eastern fishermen.

Regional Training Fleets

A short historical summary of the development of the fishery training fleets in each of the five Regional Fisheries Administrations follows:

A. The Northern Fisheries Administration (SEVRYBA):

The Northern Fisheries Administration currently operates three training vessels. Another sailing vessel of Finnish manufacture, *Georgii Ratmanov*, constructed in 1950, was retired.

The remaining three vessels are modern. *Kommissar Polukhin*, (originally the *Karel*), a refrigerated transport, was constructed in the U.S.S.R. in 1968. It serves the dual role of transporting frozen products and training young seamen. The vessel, stationed at Murmansk, is equipped with extra charthouses, a navigational classroom with the latest radio-navigational equipment, and a mechanics training shop. On its first cruise, it took students from the Tobolsk' Navigational School to Iceland and Greenland.

The *Kompas*, a Danish-built stern trawler of the *Grumant* class, was delivered in 1968. Its captain is L. G. Lozhkin. Its students apparently spend the year in classes ashore, but during the summer, when the Barents Sea is free of ice, take a 3-month training cruise.

B. The Western Fisheries Administration (Zapryba)

The Western Fisheries Administration was the first to receive a fleet of training vessels: In 1963, seven small vessels were delivered. Three of these, the *Meridian*, the *Tropik*, and the *Mendeleyev*, were sailing vessels retired from the Soviet Hydrographic Service. They were constructed in Finland between 1948 and 1951 and were adequate only for initial student orientation. The remaining four vessels, the *Kurgan*, the *Grif*, the *Navigator*, and the *Kustanai*, were all medium-sized fishing trawlers (SRT) constructed in the early 1950's. The first three of these were built in East Germany, while the *Kustanai* was of Finnish manufacture.

These vessels, dubbed the "Baltic Fishery Training Squadron" were intended to ply the North and Baltic Seas with crews of about 20 trainees each. This number represented only a small proportion of the total number of students enrolled in the Zapryba fishery training schools. This disadvantage was offset by the fact that the trainee cruises lasted only about a month so that, in good weather, several cruises could be mounted during the year. The number of trainees during 1963–65 increased from 142 to approximately 1,000.

The training fleet was expanded in December 1965 with the addition of two more sailing vessels: The *Georgii Sedov* and the *Kruzenshtern*. Both were built in Germany in 1921 and 1926, as part of prewar World War II Germany's clipper fleet,[33] and were incorporated into the Soviet hydrographic fleet after 1945 as war booty.

Shortly thereafter, three additional old sailing vessels were acquired: the *Ivan Mesiatsev*, the *Kondor*, and the *Professor Rudovits*. These vessels, built in Finland during 1950–51 to pay Soviet war reparation claims, were much smaller (about 120 feet long) than those seized from Germany.

By 1966, the entire Zapryba fishery training fleet (12 vessels) was composed of four medium-side trawlers and eight sailing vessels. Trainees from the secondary and higher fishery schools in Leningrad, Riga, and Tallin thus received some at-sea experience, but had not been trained in the more practical aspects of high seas navigation and fishing. The obvious answer was to supply the training fleet with modern vessels of the same type that the students would operate after their graduation.

In 1968, the large refrigerated transport, *Nikolai Zytsar*, was launched from Riga shipyards in Latvia. The vessel was delivered to the Zapryba to serve as both a transport and a training vessel. Her equipment included an extra charthouse and several laboratories to train the students in navigation, fish-processing, and mechanics. This was the first training fish carrier in the U.S.S.R. The idea of combining a productive vessel with training facilities soon became the rule in the Soviet training fleets.

The largest step in the modernization of the training fleet took place in May 1969 when Zapryba took delivery of the *Ekholot*,[34] a stern factory trawler constructed by the Burmeister and Wain shipyards in Denmark. The vessel was specially fitted out as a training vessel, but retained all of the catching and processing capacity of regular factory stern trawlers. The *Ekholot* was one of five identical production-training vessels built by this Danish manufacturer. The *Ekholot* is a stern trawler that can process fish into finished products, including fishmeal and oil. The vessel also has deep-freeze and refrigerated holds and is an ideal training vessel. Navigators, radio operators, technicians, mechanics, fishermen, and processors can all be trained aboard her. There is a classroom for instruction, a library, and a seminar room with equipment for the training of navigators. The vessel is 102.7 meters long and 16 meters wide and is now based in Riga, captained by R. L. Danilov.

In May 1973, East German shipyards completed the construction of another trawler-training vessel, the *Kursograf*, which was delivered to Zapryba. This vessel is basically a variation of the *Atlantik* class stern trawler. It is now based at Riga and has training facilities similar to the *Ekholot*. A third vessel of this type, the *Diplot*, joined the Zapryba fleet shortly thereafter.

One other vessel, the *Zenit*, deserves mention. Although it is officially a training vessel for merchant seamen, fishery trainees apparently also take part in her cruises for training as navigators and

[33] Each was 376 feet long

[34] The word means "echosounder" in Russian.

radio operators. The vessel is more than 300 meters long with a capacity of 120 students and is fitted out for both research and training.

The Zapryba training fleet is presently made up of nine vessels. A major public debate has raged concerning whether the old sailing vessels should be retired, and those favoring retirement are succeeding. Of the original eight sailing vessels, all but two have been retired the *Kruzenshtern* and the *Georgii Sedov*. The old SRT s, *Kurgan*, *Grif*, and *Navigator*, are still operating in the Baltic, but were reportedly to be retired in 1975. The *Kustanai* has apparently already been retired.

C. Azov-Black Sea Fisheries Administration (Azcheryba).

This relatively small administration operates three training vessels.

The first is a medium side trawler (SRT) named *Ruslan* which was detached from the fishing fleet for training purposes in 1951, the year it was built.

The second vessel, the *Kurs*, another of the Danish-built trainers of the *Grumant* class, was delivered in 1969. Students of the Kherson Navigational School make use of this vessel. In early 1974, the vessel, with students aboard, paid a friendship visit to Cuba.

The third vessel, the *Barograf*, was delivered in 1973 from East Germany.

Two older sailing vessels, the *Kropotkii* and the *Meteor*, constructed in the late 1950's, used to serve the fishery schools located at Sevastopol and Odessa, but reportedly have been retired.

D. The Far Eastern Fisheries Administration (Dal'ryba).

Commensurate with the rapid growth of the Far Eastern fisheries in general, Dal'ryba has recently rapidly expanded its training fleet. Prior to 1968, Dal'ryba operated only two training vessels. The first, the *Gogol*, was an old sailing vessel constructed in Germany in 1922. The other was a retired cargo vessel, the *Meridian*, which operated out of Vladivostok and was attached to the Admiral Nevel'skii Far Eastern Higher Nautical Engineering School. It is believed that both of these vessels were phased out of the Dal'ryba training roster in the late 1960's.

In 1968, the Fisheries Ministry moved to update the Far Eastern fisheries training fleet with the delivery of the *Pelengator*. This was the first production-training vessel. An identical vessel, the *Lokator*, was delivered 2 years later. In addition, the Dal'ryba received the *Zabaikal'e*, a large factory baseship of the *Iantarnii* class constructed in the U.S.S.R. This vessel, together with the *Pelengator*, was deployed to Nakhodka, which demonstrates the special priority given to the development of this expanding new fishing port.

In 1970, the stern factory trawler *Kallisto* of the *Tropik* class was delivered from the shipyards in East Germany. It currently serves as a short-term training vessel. Students come aboard for 10-day "mini-courses," after which they take an examination.

In 1973, the Far Eastern training fleet became the most modern in the U.S.S.R. with the delivery of the first three of a series of identical training vessels on order from East Germany. The *Geliograf*, *Volnomer*, and *Kvadrant* are all super trawlers of the *Atlantik* class specially outfitted to serve as training vessels.

Thus, the number of full-time Dal'ryba fishery training vessels has grown to six. All have been constructed since 1968 in contrast to the much older fleet of Zapryba. This indicates that the fisheries training fleet is no longer considered a depot for obsolete vessels, but is becoming a major segment of the Soviet fishing fleet.

Conclusion.

The Soviet Union has committed itself to the maintenance of a modern fisheries training fleet to prepare its students in all aspects of the fisheries profession. The cost of this type of training is high, but the Soviet Government obviously feels it is a useful investment. However, the training vessels are advanced, productive fishery vessels in their own right. They travel to faraway fishing grounds and catch and sell fish to the state thereby partially returning some funds spent on their crew's education.

There have been suggestions that a more realistic way to train new fishermen would be to place one or two trainees on the actual fishing vessels for a trip with other fishermen. As far as it is known, this kind of apprenticeship is not currently practiced, though the production-and-training vessel idea is certainly a step in that direction.

Photo 1. Fisheries training vessel Kurs was constructed in Danish shipyards. It can accommodate 182 persons, including about 110 student trainees.

Photo 2. Fisheries training vessel Pelengator was launched in Denmark in 1968 for Soviet Pacific fishermen. This 102-meter long stern freezer trawler is used to train young students in the use of modern fishing gear.

Photo 3. Crew Messroom aboard the training stern trawler *Pelengator*. Cabins and messrooms are decorated in tasteful, contemporary style and are equipped with modern and practical furniture.

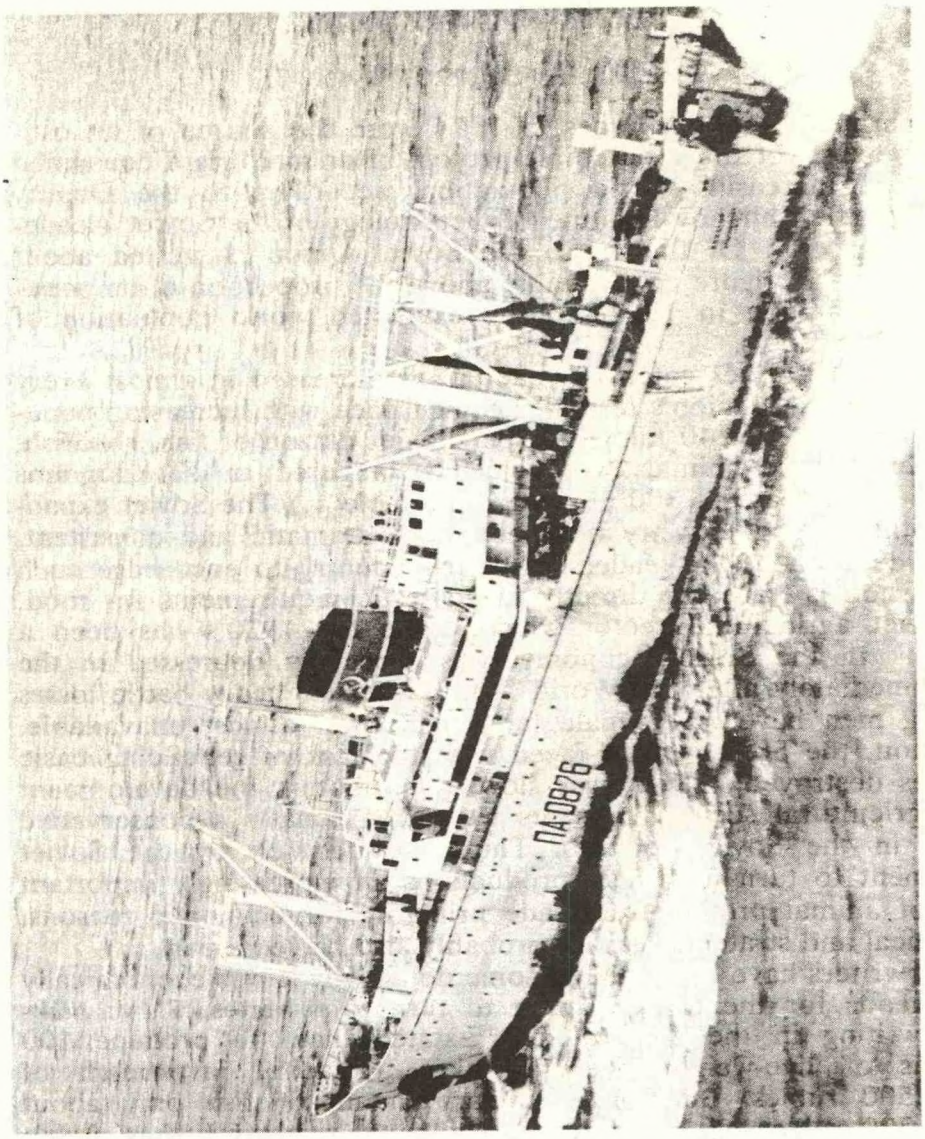


Photo 4. The Soviet stern trawler Lokator, built in Denmark in 1970 was sighted off Alaska in December of that year by fishery enforcement officers of the National Marine Fisheries Service.

CONSUMPTION OF FISHERY PRODUCTS

WHY MORE FISH PROTEINS?

The marine fishery resources in 1974 were the source of an estimated one sixth of the total edible protein of animal origin consumed by the ever-increasing world population, according to the Deputy Director of the Shirshov Institute of Oceanology of the Soviet Academy of Sciences.[35] Of this total, the Soviet Union harvested about 12–13 percent, a figure considerably above the proportion of its population (251 million in 1974) to the estimated world population of about 3 billion souls.

The Soviet fisheries catch per capita has increased in almost every year of the Soviet Union's history, keeping pace with increasing population. In 1975, over 40 kilograms per Soviet citizen of fish, shellfish, and other aquatic animals were caught compared to 10 kilograms in 1950, an increase of 300 percent. (See table 1.) The Soviet expansion of the fishing industry has been both dramatic and consistent, and the decision of the leadership of the country to encourage such an expansion is traceable directly to domestic requirements for food. The Soviet agricultural sector which, since the 1930's has been a weak link in the Soviet economy, was especially depressed in the years immediately after the World War II because heavy battle losses of young men have made male farm manpower almost unavailable. In addition, the Soviet Party, faced with the task of rebuilding basic industries destroyed in war, was slow in promoting the development of its agricultural sector (peasants were traditionally a conservative element in the Soviet society). Thus, the decision by the Soviet Government to turn to fishery products as an increasingly important source of animal protein was made primarily for economic reasons, but political and strategic reasons probably also played a part.

Soviet writers have explained in some detail why it was economically advantageous for the Soviet Union to turn to fisheries. S. V. Mikhailov, writing in the *Okeanologiia*,[36] stated that "to produce 100 kilograms of live-weight beef, it takes a capital investment of 2,000–2,500 rubles. But for a similar amount of fish only about 1,500–1,700 rubles are necessary." One must remember that arable land is a relatively modest proportion of the total surface area of the U.S.S.R., a country where permafrost, deserts and dense forests extend for thousands of miles. The growing season is subject to severe climactic extremes, and, in drought or flood years, crops may be severely damaged.

[35] Dr. A. A. Aksenov writing in Vodnii Transport of June 18, 1974.
[36] Okeanologiia (1962), pp. 385–7.

Table 1. Soviet Union. Consumption of Fishery Products, 1913-1975.

YEAR	Soviet population (in million)	Fisheries catch (in million metric tons	Fisheries catch per capita (in kg.)	Consumption of fishery products (in kg/capita)	Consumption as a % of catch (kg/capita)
1913	159.2	1.051	6.6	6.7	101.5
1917	163.0	.893	5.5	n.a.	n.a.
1920	n.a.	.257	n.a.	n.a.	n.a.
1925	n.a.	.721	n.a.	n.a.	n.a.
1930	n.a.	1.283	n.a.	n.a.	n.a.
1935	n.a.	1.520	n.a.	n.a.	n.a.
1940	194.1	1.404	7.2	n.a.	n.a.
1945	n.a.	1.125	n.a.	n.a.	n.a.
1950	178.5	1.755	9.8	7.0	71.4
1955	194.4	2.737	14.1	8.7	61.7
1960	212.4	3.541	16.7	9.9	59.3
1965	229.6	5.774	25.1	12.6	50.2
1966	232.2	6.093	26.2	12.9	49.2
1967	234.8	6.538	27.8	13.2	47.5
1968	237.2	6.784	28.6	14.0	49.0
1969	239.5	7.082	29.6	15.8	53.4
1970	241.7	7.828	32.4	15.4	47.5
1971	243.9	7.785	31.9	15.2	47.6
1972	246.3	8.209	33.3	15.1	45.3
1973	248.6	9.005	36.2	16.1	44.5
1974	250.9	9.600	38.3	16.5	43.1
1975	253.3	10.300	40.7	(est)17.0	
1976	256				
1977	258				
1978	261				
1979	263				
1980	266				

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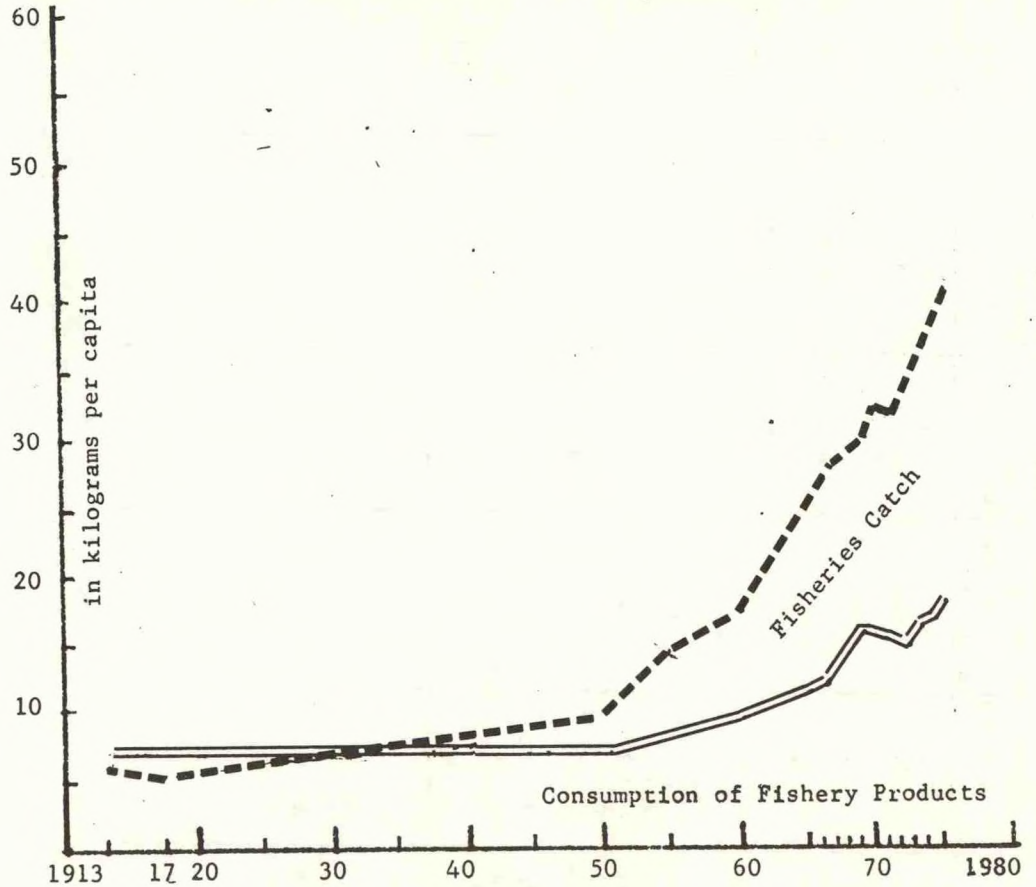
Fig. 1. U.S.S.R. Fisheries catch and human consumption of fishery products per capita, 1913-1980 (in kg.).



Prepared by: Division of International Fisheries Analysis, Office of International Fisheries, NMFS, NOAA, Commerce.

In the labor-scarce Soviet economy of the post-war era there was another comparative advantage the fishing industry had. In the same article, Mr. Mikhailov explained: "To produce one head of beef requires 20 man-days, but the production of a similar amount of protein from fishery products would take only about 5-man-days."

It was thus clear to the Soviet planners that the fishing industry would provide animal protein with greater efficiency and more of it than if an equivalent amount of investment would be channeled into other food-producing sectors of the Soviet economy.

The political and economic reasons for expanding the fishing industry have also been buttressed by the data of the nutritional scientists. The Soviet Institute of Nutrition of the Soviet Academy of Medical Sciences calculated that each Soviet citizen should consume on the average about 18.2 kilograms of fishery products per year to maintain the optimal nutritional balance.

AN HISTORICAL PERSPECTIVE

The consumption of edible fishery products in the Soviet Union, stationary during the first 30 years of Soviet rule, has kept pace with the increasing population ever since the early 1950's (fig. 1), except when Soviet fishermen encountered an exceedingly difficult fishing season in 1971. That year their total catch was smaller than the year before and the average consumption, which had peaked in 1969 to 15.8 kg per inhabitant per year, began a 4-year decline. This unfavorable trend was reversed in 1973 when the upward curve of fishery products consumption resumed its vigorous pace.

Table 1 gives the per capita consumption in figures furnished by the Soviet annual statistical yearbook, the *Narodnoe Khoziaistvo* (National Economy). It is one of the few sets of fishery statistical data regularly furnished by the Soviet Government.[37] Most of the early figures are not available. They must have been unimpressive: in 1950, the Soviet per capita consumption of fishery products was about the same as it was in 1913. From 1950 on, however, the increase was sustained with a short interruption during 1970–72. By 1974, almost 17 kg of fish and other fishery products were consumed by the average Soviet citizen. In 1975, an important milestone in Soviet nutrition will be attained: the estimated consumption of over 18 kg per person will have reached the level of 18.2 kg which the Soviet Institute of Nutrition proclaimed as the optimal level in balanced nutrition.

The Soviet Government has encouraged the upward trend in the consumption of fishery products by writing it into the 5 Year Plans. In 1975, per capita consumption will lag considerably behind the planned amount. When the Ninth 5 Year Plan (1971–75) was first published, Soviet fishery planners projected a consumption of 21.7 kg per person by 1975. The same figure was repeated in 1972 in an editorial published in the official publication of the Fisheries Ministry[38] as well as a year later by the Soviet Minister of Fisheries Ishkov himself. Mr. Ishkov wrote that the consumer demand in the Soviet Union, which apparently is somewhat above the optimal nutritional

[37] The others are: catch data and production of fishery commodities furnished to FAO in Rome, and truncated trade statistics available in the Soviet Foreign Trade annual.

[38] Rybnoe Khoziaistvo, February 1972, pp. 3–5. The anonymous writer stated unequivocally: ". . . by 1975, the edible fisheries consumption must reach 22 kg."

level determined by the Institute of Nutrition, will be completely satisfied when the consumption of fishery products will reach "20–22 kilograms in 1975." [39]

In July 1975, however, Mr. Ishkov as much as admitted that the original planned goal will not be reached. Writing in honor of the annual Fishermen's Day, he casually mentioned that in 1975 the per capita fisheries consumption will reach the levels determined by the nutritionists, or 18.2 kg per year.[40] He also predicted that the 20 kg level will be reached in a few years.

The question remains: what will the Soviet Government and the Fisheries Ministry do after the estimated domestic demand of 20–22 kg of fishery products per capita will be fully satisfied? This will most likely occur by 1977–78 if an expected fisheries catch of 11–12 million metric tons can be obtained. Will the Ministry allow the catches to stabilize and level off? Current plans for the construction of new fishery vessels seem to indicate that the future years will see a continuing increase in the fisheries catch, provided the world maximum sustainable yield (MSY) of fishery stocks is not reached too soon and the extension of fishery limits to 200 miles does not deprive the Soviet fishermen of their most important fishing grounds.

Catches larger than 12 million tons will probably induce the Soviet traders to increase exports of fishery products even more than in the past. In 1959, the U.S.S.R. reversed its former position as a net importer of such products and became a net exporter. By 1970, Soviet fishery exports exceeded the imports by $76 million; by 1974 the difference amounted to $142 million.

There is some evidence that the Soviet Union is now gearing for a major fishery export campaign of which the International Fisheries Exhibition in Leningrad was one of the first steps. Other initiatives are being taken throughout the world to increase contacts between Soviet fishery attaches and other trade and diplomatic representatives to secure additional export opportunities in developing and developed countries.

The most recent figures on fisheries consumption in the U.S.S.R. were announced by Deputy Minister of Fisheries for Research Sergei Studenetskii in early 1976.[41] According to his data, which are not as yet official government statistics, the 1975 per capita consumption of fish in the Soviet Union was 16.9 kg. This figure is well below the 18.2 kg mentioned by Mr. Ishkov in July 1975, and seems to indicate a serious problem in getting fish to the table of the Soviet consumer. For example, if this 16.9 kg figure is correct, then only 41.5 percent of the total live weight of the Soviet catch in 1975 (10.3 million metric tons) was consumed by the Soviet public. The remaining 58.5 percent was either exported, stored, used for nonedible products (fishmeal, oil, etc.), or else went to waste. Mr. Studenetskii, in his announcement, gave no explanation for the failure to reach in 1975 the 18.2 kg per capita consumption of fishery products so

[39] Rybnoe Khoziaistvo, May 1973, pp. 3–5.

[40] "It was scientifically determined that 18.2 kilograms of fishery products is the optimal yearly requirement for the average Soviet citizen. This year the fishing industry will meet this requirement and in the next 2 or 3 years will reach an amount in excess of 20 kilograms (of fishery products per capita)." In: Vodnii Transport, July 12, 1975.

[41] Moscow Radio, Jan. 14, 1976.

prominently announced by his boss, Minister Ishkov, only a few months earlier. In fact, his statement was made without any comment except to mention that the Soviet consumption of fishery products had increased to 16.9 kg from 15.4 kg in 1970.

WHICH MINISTRY WILL SELL THE FISH?

The consumption of edible fishery products has increased at a much slower pace than the per capita fisheries catch, indicating that much of the catch in recent years was either processed into fishmeal, or filleted with a resulting loss of offal. This, aboard Soviet vessels, is always reduced to fish meal. What percentage of the unused fisheries catch is due to spoilage is not known.

Soviet writers frequently point out that while the Soviet Ministry of Fisheries is responsible for Soviet catches until they are brought to shore and processed, the Soviet Ministry of Domestic Trade is responsible for the marketing of finished fishery products. Whatever little direct information is available on the Soviet marketing net, it all seems to indicate that the system is poorly managed and that much of the fisheries production is not being handled according to the latest technological and marketing practices. The fishery wares, which have been seen by various U.S. fishery delegations and other U.S. citizens traveling throughout the Soviet Union, indicate that the Soviets are much more successful in harvesting and processing the catch than in marketing it. There is but little doubt that the Soviet fisheries hierarchy is painfully aware of the fact that the Ministry of Domestic Trade is apparently unable to insure a rapid and universal distribution of wholesome fishery products. More than one-half of the finished products are sold frozen. Quick-frozen fish requires a much higher level of distribution and marketing technology than other, more traditional commodities (salted fish) which the Soviet fish-processing workers produced in the past. The Trade Ministry is ill-equipped in providing it.

The debate between the Ministry of Domestic Trade and the Ministry of Fisheries has been going on for years. It is difficult for the outsiders to penetrate the curtains of Soviet bureaucratic jockeying, but every so often one or the other Ministries obtains sufficient support within the system (most often through Party connections) to vent their gripes in public. The Ministry of Fisheries has done so repeatedly.

In late 1970, the Izvestiia correspondent Demidov described the controversy in the following terms.[42]

> During one of my recent visits to the Ministry of Fisheries, I was a witness to a talk between the Chief of the Administration for Resources, Deliveries, and Sale of Fisheries Production (Glavrybsbyt) E. Gromov and the Deputy Chief of Glavprodtorg of the U.S.S.R. Ministry of (Domestic) Trade, N. Ratushnii. It went about as follows:
>
> Gromov. The fleet is standing idle, the entire capacity is filled with fish, but your organizations do not give orders for the acceptance of output.
>
> Ratushnii. You don't give (us the data on) the right output. They don't take the fish you offer; for example, some kind of hake . . .
>
> The contracting parties agreed that the Trade (Ministry) nevertheless would take "some kind of hake." I left the Ministry with perplexed feeling. I remembered,

[42] Izvestiia, December 20, 1970 (Demidov, P.: "Fish shortages in stores deplored").

how in Vladivostok we had to discuss no less important problems, but there was no division into mine and yours, everything was ours. . . .

The Soviet fisheries catch in 1970 increased by 10.5 percent over that of the previous year and it would take a superb marketing and sales organization to absorb it in its trading network for delivery to consumers in a wholesome state. The Soviet Ministry of Domestic Trade obviously was unable to perform that service and, as the polemics continued, an important Soviet fisheries official called for the transfer of the wholesale fish marketing function to Minrybkhoz.[43]

The article, one of the best and most informative ever written on this subject, was authored by the Chief of the Fish Marketing Administration of the Northern Regional Fisheries Administration (Sevryba), Mr. P. Efimov. It is given in appendix 1 in its entirety. Efimov accuses the Ministry of Domestic Trade of simply distributing rather than promoting fishery products, of an inability to make available a wide assortment of such wares, of not having expanded its wholesale facilities to the degree the population increases demanded, and of shipping fishery products across the entire U.S.S.R. rather than selling them in nearby population centers at lower cost. The publication of the article in the *Ekonomicheskaia Gazeta*, the organ of the Central Committee of the Soviet Communist Party must have caused shudders in the Ministry of Domestic Trade.

Nothing happened, however, and when in August 1973, the redoubtable Soviet Fisheries Minister, Mr. Ishkov, used an interview with a prestigious Soviet trade publication[44] to discuss his Ministry's trials and tribulations with other Soviet bureaucracies, he was much more restrained in his statement:

> It is even worse when a fish product obtained . . . from the depths of the Indian Ocean, is poorly stored and time is allowed to pass (before) the organization sells it. . . . The Ministry of (Domestic) Trade and the Central Union of Consumers' Societies must think about this. They must also help us in advertising marine products to inform the buyers that fish is healthful and contains protein and many other useful substances.

The marketing problems, however, did not abate and in June 1974, the Secretary of the Klajpeda[45] City Committee, Mr. D. Rozhnov wrote:

> There are large stocks of frozen fish that can't be sold until they've been processed (like sardines). But nobody has organized their processing; for several years there have been negotiations between MinFish and MinTrade as to who should organize processing, but nothing has been decided.[46]

Another glaring example of the inefficiences in the fish-marketing system appeared, again in *Ekonomicheskaia Gazeta*, in December 1974. The author is picturing one day in the life of the Ukrainian Fishery Marketing enterprises. He alludes to the fact that there are two ministries which have "complete and unconditional control" over fishery

[43] Ministerstvo Rybnogo Khoziaistva, abbreviated Minrybkhoz, is the Russian term for the Soviet Fisheries Ministry (often improperly translated as the "Ministry of Fish Economy").

[44] Interview with U.S.S.R. Minister of Fisheries Aleksandr Akimovich Ishkov: "The Soviet People and the Riches of the Seas and Internal Waters." In: Kommercheskii Vestnik, No. 8, August 1973.

[45] A major fishing port in Lithuania.

[46] Vodnii Transport, June 18, 1974.

catches. The Fisheries Ministry catches the fish, freezes it, and delivers it to Soviet ports, where the (Domestic) Trade Ministry takes over and sells it. However, a funny thing happens to fish on the way to consumers: it gets waylaid by the "esteemed trading agencies," as the author points out sarcastically. (Additional details can be found in appendix 2).

The infighting continues. There is no doubt that Soviet marketing practices will improve as Soviet managers become more familiar with the advanced packaging and distributing techniques of the West. Whether wholesale fishery marketing will improve greatly unless and until the Ministry of Fisheries achieves a greater marketing role—if not "complete control"—is problematic.

The simplest solution would be to give the MinFish full and undisputed control of all fishery processing and wholesale distribution. The retail distribution would remain the province of the Ministry of Domestic Trade if it would provide modern stores equipped with cold-storage and refrigeration facilities. Such stores, called *Okean* (Ocean) have been seen in Moscow. They were constructed recently and can compete with anything available in capitalist countries. However, Moscow is not the Soviet Union: its population is only 2 percent of the total. The fish marketing practices in the rest of the U.S.S.R., with the exception of the largest cities, remain appalling.

The fact that such a major bureaucratic infighter as is the present Fisheries Minister, Mr. Ishkov, was unable to achieve a satisfactory solution of the problem does not bode well for the future of Soviet fisheries. After all, Ishkov has been the Fisheries Minister since 1935 and has survived Stalin, Malenkov, and Khrushchev not to speak of lesser lights like Bulganin, Beria, Molotov, etc. They were all disgraced, but Ishkov remained in his position and expanded his fisheries "empire" tenfold. He is an alternate member of the Central Committee, knows Premier Kosygin well from the days when the latter was the Minister of Food Industries, has friends in the Planning Commission[47] as well as throughout Moscow and its bureaucratic layers.

The probable reason for MinFish's inability to achieve a reasonable solution is a political fact: the Soviet Minister of Domestic Trade, Mr. Aleksandr Ivanovich Struev, is a full member of the Central Committee, while Mr. Ishkov is only an alternate member. In other words, Struev outranks Ishkov in the party hierarchy. That is a distinction of crucial importance in the Soviet Union.

Fishery Exhibitions in Leningrad

Inspired by glistening examples of the marketing techniques practiced at trade fairs in Western Europe, the Soviet Fisheries Ministry requested the government to be allowed to hold a major commercial exhibition in Leningrad on the 50th anniversary of the Bolshevik Revolution, which began in that city in 1917.

The Ministry hoped to attract foreign companies to exhibit advanced fisheries technology and also to introduce its own executive and administrative personnel to foreign machinery, gear, and equipment. This was especially desirable in the field of fish processing, where the

[47] The Soviet Planning Commission has a "Fishing Industry Section" which coordinates planning for the development of fisheries.

Soviets lagged far behind the technologically advanced countries of Western Europe.

At the same time, the Ministry lavishly showed off some of its own achievements, including a spirited display of fishery support vessels in the nearby port area of Vasilevskii Island in the Gulf of Finland. The Soviet Minister of Fisheries also succeeded in having Mr. Kiril Mazurov, a member of the Politbureau of the Soviet Communist Party and one of the most important strategists of Soviet ocean policies, attend and give the opening speech.

Once the first "Inrybprom" exhibition was successfully held in 1968, it was relatively easy to obtain the government's support for a second exhibition 7 years later.

The Second International Fisheries Exhibition, or Inrybprom–75 for short, was held in Leningrad from August 6 to 20, 1975. The exhibition was aimed at furthering the U.S.S.R.'s international commercial relations, and specifically, at continuing the drive to increase exports of Soviet fishery products, fishing vessels, and other fishing equipment. The latest achievements in the Soviet fishing industry and increased Soviet emphasis on foreign relations in fisheries were again very much in evidence at the exhibition and provided a capsule illustration of the industry's trends.

Attendance figures show that about 700,000 visitors, of whom 250,000 were specialists from various Soviet ministries and companies, visited or participated in the exhibition. The attendance at the 1975 exhibition was lower than in 1968, when 1.5 million visitors were registered, but this may be due to the fact that Inrybprom–68 was part of the year-long celebration of the 50th anniversary of the October Revolution.

While attendance was down, the 1975 exhibition in physical terms was larger than in 1968. Representing the U.S.S.R. were 400 organizations and 40 ministries and departments. A total of 284 foreign firms staged separate exhibits and displayed products manufactured by over 600 firms. The Soviet Ministry of Foreign Trade operated a commercial center, and 50 "production associations" (Soviet State-owned companies) sent representatives to examine foreign products and to conclude contracts. Preliminary Soviet reports indicate that 150 million rubles (U.S. $202.7 million) in contracts were signed, twice as much as in 1968, when final contracts totaled 75 million rubles (U.S. $83.3 million).[48] Inrybprom–75 proved to be more business than show.

The principal theme of Inrybprom–75 was the preservation and restoration of marine resources. However, the emphasis of the U.S.S.R.'s exhibits, over 4,000 items and pieces of equipment, was on the exploitation of fishery resources and the automation of fishing operations. The U.S.S.R. strove to demonstrate in various exhibits that she holds a leading position in fisheries production, vessel construction, and fishery sciences. Fish farming and transplantation of fish stocks were also given special emphasis. Prominently displayed were Soviet-made underwater fishery research vehicles of the Tinro and Atlant classes. The largest foreign contingent of exhibitors was from the Federal Republic of Germany. The Polish exhibits were next in size, represented prominently by a number of fishing vessels

[48] The exchange rate in 1968 was $1.11 equals 1 ruble; the exchange rate in 1975 was $1.35 equals 1 ruble and in 1976 1 ruble is worth $1.32.

built by Polish shipyards for the Soviet fishing fleet and displayed at the site of the exhibition. The German Democratic Republic also had a large exhibit. Soviet visitors to the exhibition could not avoid the clear evidence of dominant German participation. Taken together, the Federal Republic of Germany and German Democratic Republic exhibits occupied practically half of the total exhibition space. Displays of other nations included a wide range of standard gear and equipment.

The United States' participation in Inrybprom–75 was minimal. The United States was represented by a single firm from Rhode Island, the Xodar Corporation, which deals in aquaculture and filtration systems, industrial aeration, ultra-violet sterilization, and pollution testing and consulting. The example of Xodar Corporation should serve as encouragement to other U.S. firms engaged in the manufacture of fishing industry-related products. Although trade with the Soviet Union may seem like a complicated proposition, the Soviet fishing industry is becoming more accessible to foreign companies through such activities as Inrybprom–75.

Appendix 1

AN ACUTE PROBLEM

The development of fisheries in the Far East and the organization of fish marketing were described in the article "The Results of One Year." Because Murmansk fishermen, as is true for Sakhalin fishermen, are troubled by the problems of satisfying the public's demand for fish products more fully, we will continue the discussion.

We agree with the author of that article that fish marketing is not being managed satisfactorily. The wholesale centers of the Ministry of Trade's Myasorybtorg Trust view their task simplistically. Having received fresh, frozen, or salted fish, all they need to do is distribute it to the stores, and their problems are over.

But in reality the responsibilities of the wholesale centers have an entirely different nature. They are supposed to process a substantial part of the fish they receive and offer a wide assortment of products to the consumers.

When there was not enough fish and it was sold immediately at the stores, no special attention was given to the fact that the wholesale centers were acting only as a transferring link. But the situation has changed. The amount of fish to be sold is getting greater, and thought must be given to assortment diversity. With this purpose, new processing enterprises must be set up under wholesale center administration at the points of consumption, and existing ones must be enlarged.

Ministry of Trade organizations have been involved with wholesale fish marketing for many years, but the situation in fish processing at the places of consumption has not changed for the better. Let us look at Leningrad as an example. Back in the 1930's, the Leningrad wholesale marketing center possessed two enterprises, a fish combine and a fish curing plant. These two enterprises exist to this day. Their output has been increased through renovation by 15–20 percent, while the city's population has doubled in this period. Thus it is not surprising that there are not more than 5–6 types of culinary products

on the counters of even the large stores of Leningrad. The situation is the same in Kiev and other cities.

This is why employees of the fishing industry propose transferring wholesale fish marketing to the Soviet Fisheries Ministry.

There is a second problem of no little importance. Definite, permanent areas for marketing the products must be assigned to each regional fisheries administration. Such a measure would prevent crossed shipments which cost the state dearly. Today it is not infrequent that, for example, silver hake is sent to the Ukraine from Vladivostok, and into Siberia from Black Sea ports.

If specific marketing zones are assigned, we would eliminate shipments of fish products to one point simultaneously from different regions. Fishery regional managers would have a better possibility to study consumer demand and the market situation, and organize advertising for marine fish. And, finally, contracts could be made firmer.

As long ago as 1964 the author* of this article raised the question on the pages of *Ekonomicheskaia Gazeta* of eliminating crossed shipments of fish and assigning specific areas to the fishery basins for marketing fish products. At that time the Ministry of Trade was able to convince us that such actions would not have been expedient. It may be that such a solution was premature. However, regionalization of the shipments is necessary now.

Appendix 2

"*Fish*" *Suffering* ("*Rybnye*" *stradaniia*) from *Ekonomicheskaia gazeta* No. 49, December 1974.

The fate of fish catch while on board vessels or during the unloading from the vessels is placed, as is well known, under the complete and unconditional control of the Ministry of Fisheries of the U.S.S.R. At the Il'ichevsk fishing port *Chernomorrybpromsbyt* (Black Sea Fishery Marketing Organization), under the same ministry receives the caught and frozen fish and transfers it, again in complete unconditional control, to another agency. So as not to burden the readers with superfluous details, let us name only a few of the esteemed trading agencies engaged in this tedious work: *Glavprodtorg Mintorga U.S.S.R.* (Main Administration for Commercial Products Trade of the U.S.S.R. Ministry of Trade), *Ukrmiasorybtorg Mintorga U.S.S.R.* (Ukrainian Meat and Fish Trade Administration of the Ukrainian Ministry of Trade), regional (oblast') meat and fish markets, and stores.

Everything would be fine, if only something bad didn't happen. For example, a train barely departs from Vinnitsa with marine fish when thunder and lightning resound from there—a telegram "Please do not send the frozen scad—we can't accept or pay for it—overstocked!"—signed *Miasotorg Aza*.

A train hadn't even succeeded in getting up speed toward Dnepropetrovsk when a humble request flies from there: "Don't load the hake, scad, mackerel or canned fish for the Dnepropetrovsk combine. We can't pay. Babentsov."

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* Source: Efimov, P. "An Acute Problem", Ekonomicheskaia Gazeta No. 23 (June 1972) p. 14. Translated from Russian by JPRS. P. Efimov is Chief of the Fish Marketing Administration of the Northern Fisheries Administration (Sevrybsbyt) in Murmansk.

An so on . . . from Voroshilovgrad "We won't accept or pay for this fish"—from Lutsk "We refuse the fish supplies"—from Kramatorsk "Don't load the scad, mackerel, herring, sardines, hake and capelin—we won't pay for it."

But from the sea the vessels loaded with fish send disaster signals: "Unload!" "Take away the fish! We're incurring losses!"

The Ministry of Fisheries of the U.S.S.R. devised a plan according to which *Chernomorrybpromsbyt* was supposed to send to Ukrainian cities in the second quarter of the year 1,800 tons of scad and mackerel and 6,500 tons of hake. However, *Glavprodtorg* of the U.S.S.R. Ministry of Trade devised a plan for the same period and for the same cities by which they were supposed to receive 8,000 tons of hake and 800 tons of scad and mackerel!

The U.S.S.R. Ministry of Fisheries devises a production plan for fish canned in oil. *Glavprodtorg* distributes them. But *Ukrmiasorybtorg* sends out directive No. T–60–154 with the signature of the assistant director L. Solonichenko with the following: "Don't send the mackerel and scad canned in oil. We're overstocked."

In the document No. T–60–530 Comrade Solonichenko was even more laconic: "Don't send fish canned in oil."

Questions arise: Why is it like this? Why should fish be sent to those who don't need it? Perhaps instead of sending it to Zhitomir and Chernigov, why not send the fish to Cheliabinsk and Magnitogorsk? Or to Perm' or to Dushanbe?

Incidentally, this very same *Chernomorrybpromsbyt* did not return even one centner[49] of fish back to the ocean and in the end found buyers. Obviously the suppliers of trading organizations need to look more often at the interior, at the rural localities and should organize the sale of fish from special trucks.

N. Kvitko.

Translated by T. Sanz, National Marine Fisheries Service, NOAA.

APPENDIX 3

SOVIET VIEWS ON LAW OF THE SEA ISSUES

The United Nation's Law of the Sea (LOS) Conference convened its third substantive session in New York City on March 15, 1976. Many of the major issues of this conference were presented prior to its opening in the Soviet daily *Pravda* in an article entitled "Détente and the World's Oceans" by S. Pavlov. According to Pavlov's article, the Soviet Union's official policy in regard to international law of the sea stems from the increasing use of the oceans by all countries of the world. The development of international cooperation on the high seas depends largely on the procedure for law and order that is established to control the world ocean environment. To establish such a procedure is the main task of the United Nations Law of the Sea Conference.

Among the most important LOS issues is the problem of extension of the Territorial Sea. The Soviet Union, according to the *Pravda* article, advocates a 12-mile territorial sea for every country. Worldwide claims of a 200-mile territorial sea would result in 40 percent

[49] Centner equals 100 kg.

of the total ocean area being removed from general use by all countries. However, the Soviet Union does support the concept of the so-called "200-mile economic zone" under which the coastal states have sovereign rights to all living and mineral resources within their respective zones. By supporting this concept, the Soviets hope to show their concern for the developing nations of the world. On the other hand, they are also concerned about the future of their high-seas fishing fleet, which takes the largest percentage of its catch off foreign shores. To reconcile these two concerns, the Soviet Union supports the idea that if a coastal state fishes only part of the resources within its 200-mile economic zone (EZ), then fishermen from other countries should be allowed to fish the unutilized portion. "Developing" coastal states, *Pravda* declares, should receive compensation for allowing foreign vessels to fish in their economic zones.

Concerning the 50 countries of the world which have limited access to the ocean (no coastline or very short coastline), Mr. Pavlov states that the Soviet Union advocates that these countries be granted certain rights regarding the use of the resources within the 200-mile economic zones.

Another extremely important LOS issue concerns the right of unhindered navigation by vessels of all flags through international straits. According to Pavlov, the Soviet Union views the right of free passage through these straits as vital in giving "aid to young independent states which . . . become the targets of aggressive intrigues by the imperialistic forces." Special care should be taken to preserve the internal security of countries bordering on the straits.

Other important issues discussed in the *Pravda* article include pollution, marine research, and the use of the seabed beyond the Continental Shelf. The Soviet Union has expressed concern that if individual countries are allowed to establish pollution standards and regulations stricter than international controls, the developing nations may find it hard to pay the high costs of meeting such standards. This, according to the Soviet Union, would make it more difficult for these countries to create their own merchant fleets and fishing industries. (Source: S. Pavlov, "Detente and the World's Oceans"; Moscow: *Pravda*, February 12, 1976.)