

PROGRAM
OF
RESEARCH
AND
SERVICES
FOR
ALASKA'S
COMMERCIAL
FISHERIES

U.S.
BUREAU
OF
COMMERCIAL
FISHERIES
REGION 5
ALASKA

CIRCULAR 171

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UNITED STATES DEPARTMENT OF THE INTERIOR

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Circular 171

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Bureau of Commercial Fisheries Region 5, Juneau, Alaska

Harry L. Rietze, Regional Director

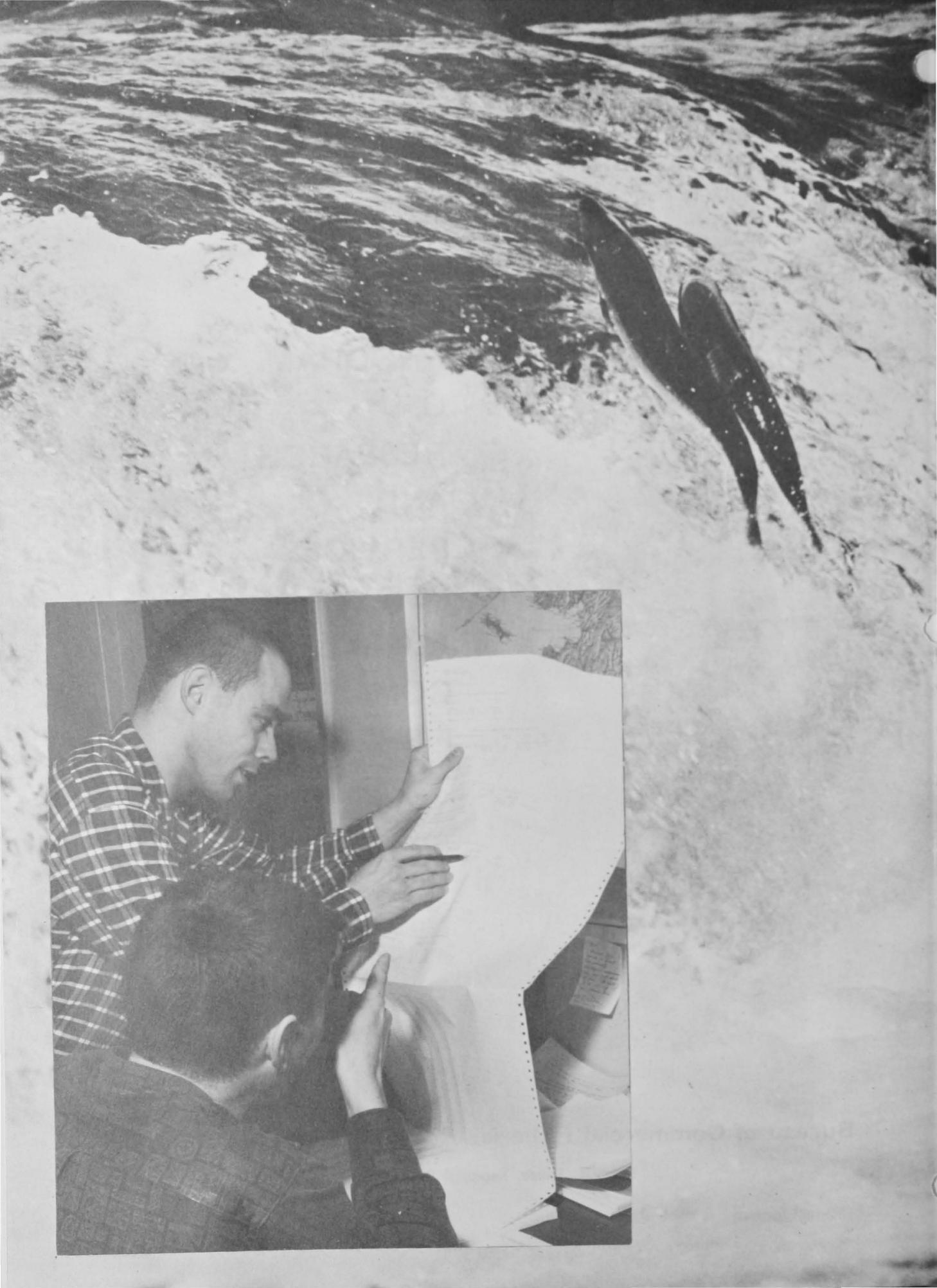


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Opposite: Bureau biologists analyze extensive data to learn the facts about Alaska's fish populations.

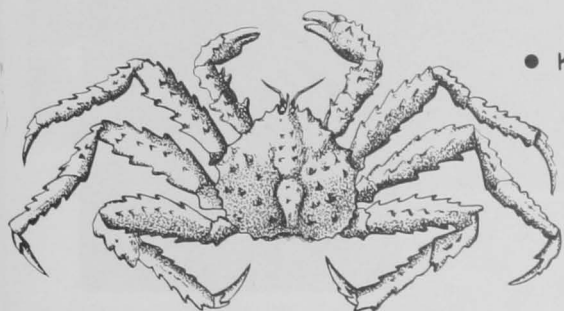
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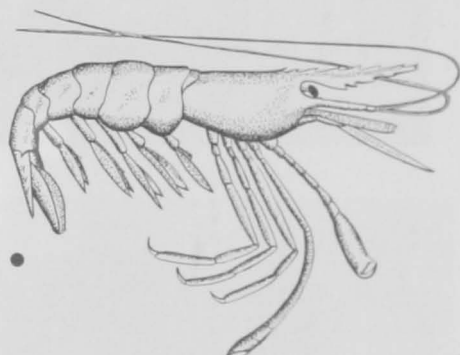
THE FEDERAL ROLE

Until January 1960, control and management of Alaska's fisheries was the responsibility of the Federal Government. With the advent of statehood, the Alaska Department of Fish and Game assumed these responsibilities, but for several reasons Federal fishery programs continue in Alaska. For instance, in the waters off Alaska beyond the 3-mile territorial limit, the Federal Government has the task of enforcing fishery treaties and regulations. For certain stocks in these waters, such as king crab and salmon, the Bureau of Commercial Fisheries, under the International Convention for the High Seas Fisheries of the North Pacific Ocean, acts as a research agency.

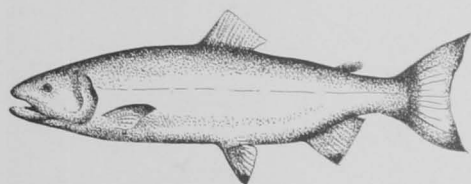
Although the surface area of Alaska is about one-fifth that of the remainder of the United States, its total population is only 226,000, or less than one-half that of Seattle, Wash. Thus, Alaska needs assistance and cooperation from the Federal Government in providing research and services necessary to conserve the diverse and immensely valuable fishery resources. Several programs of the Bureau are aimed primarily at fulfilling these needs. Outlined on the following pages are the major problems, both present and foreseeable, that face Alaska's fisheries and the programs that are designed to ease or solve these problems.



● KING CRAB

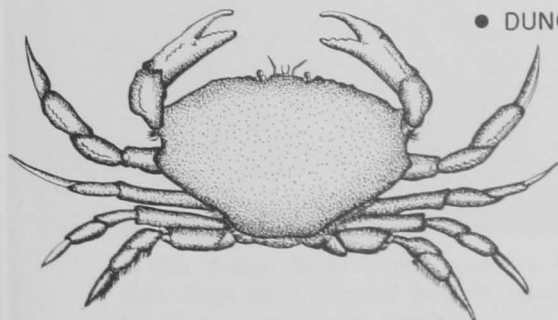


SHRIMP ●

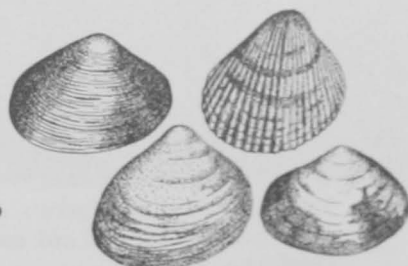


● SALMON

HERRING ●



● DUNGENESS CRAB



CLAMS ●

COMMERCIAL FISHING IN ALASKA

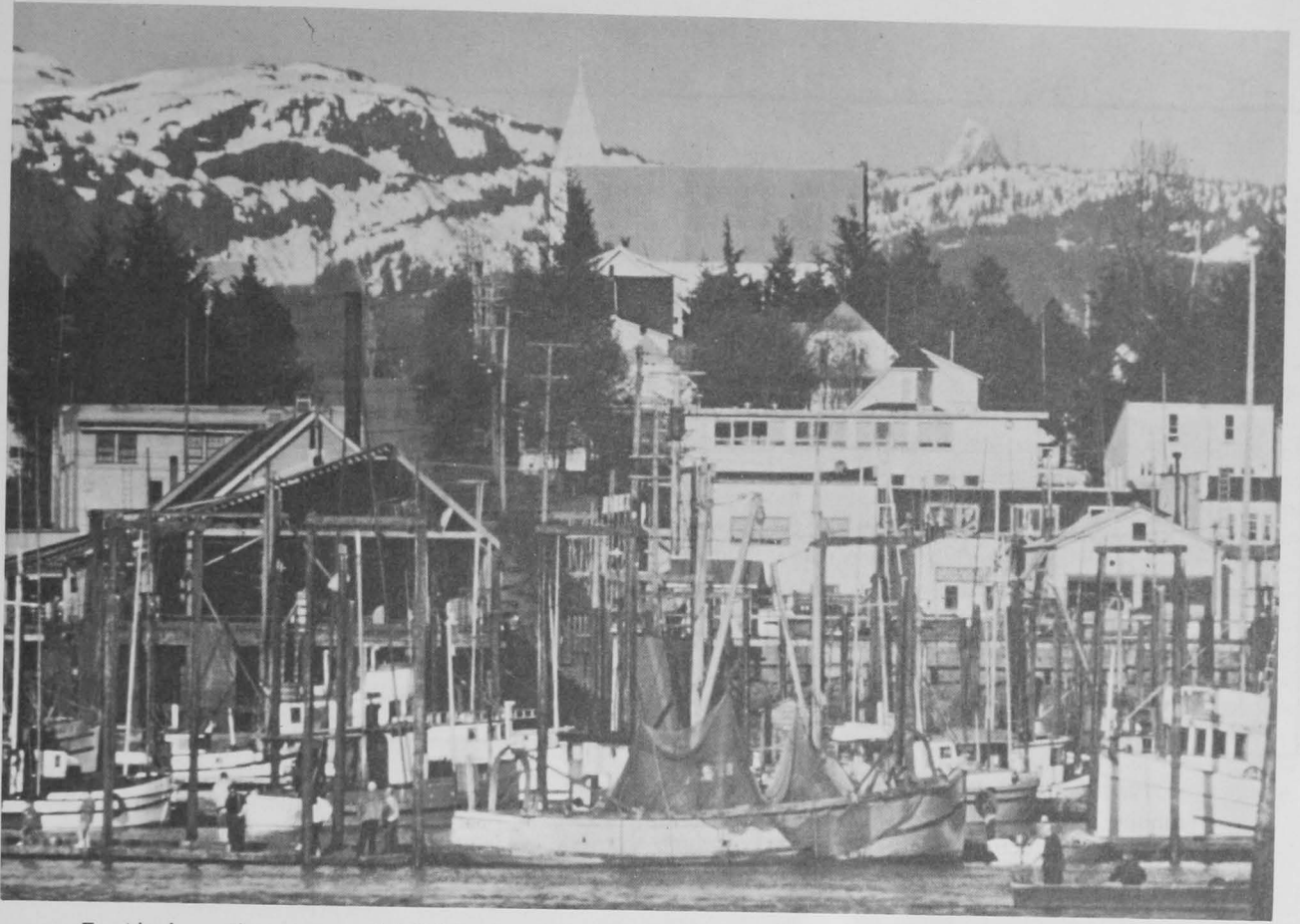
Commercial fishing began in Alaska in about 1840 when a few small whaling and salmon-salting stations were established. Isolation prevented further development of the fisheries until the United States bought Alaska from Russia in 1867. The revolutionary process of canning soon brought solutions to the problems of preservation and transportation and set the stage for commercial exploitation of the vast Alaskan salmon resources. Two canneries produced a pack worth \$16,000 (first wholesale price) in 1878, and the industry expanded steadily until the mid-1940's when more than 100 plants produced average annual packs valued at nearly \$90 million. The number of canneries declined after World War II, and in 1960, 71 produced a pack worth more than \$76 million.

Although salmon have remained foremost in the fisheries, other varieties of fish and shellfish, including shrimp, king and Dungeness crab, herring, and halibut, now support valuable commercial enterprises.

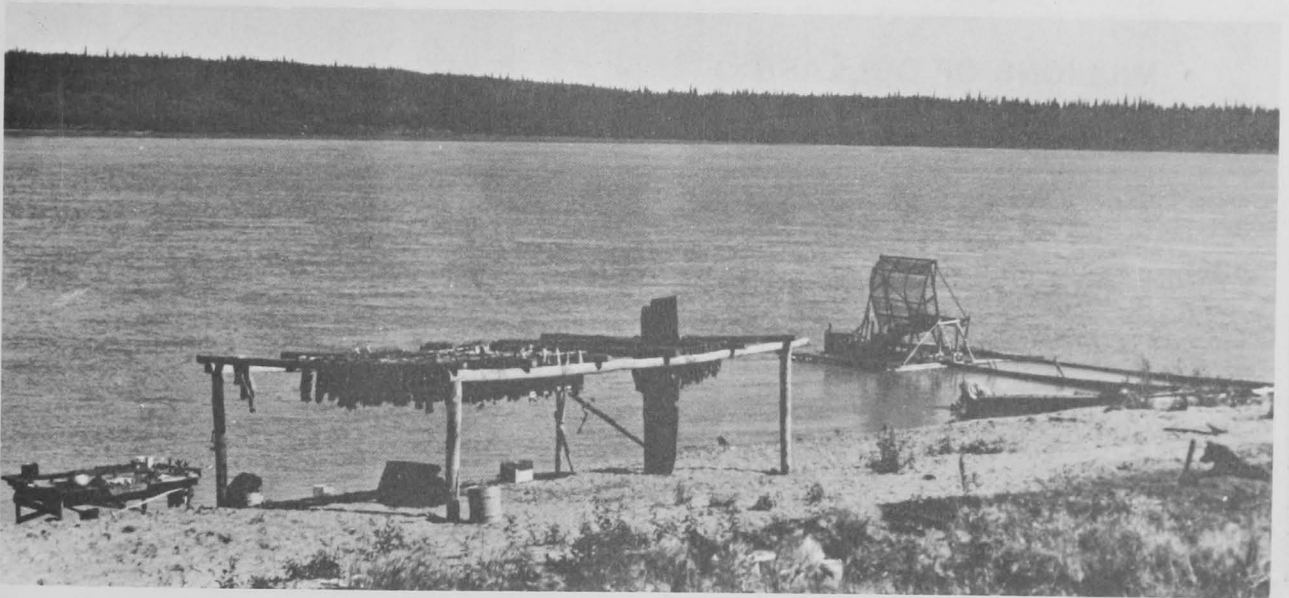
The harvest of shrimp is becoming increasingly important to Alaska.



The early days of Alaska's commercial fisheries — a three-master near the old cannery at Loring, north of Ketchikan.



To Alaskans the commercial fisheries are of the utmost importance. Failure of a fishery "crop" would spell economic chaos to many small villages where the fishing fleet and village life are intimately related.



In the Yukon River Basin an entire family and their sled dogs may depend largely upon the fish wheel for their year's food supply.

1961

MILLIONS OF DOLLARS

\$ 128.7

FISHERIES

\$ 5.4

AGRICULTURE

\$ 4.5

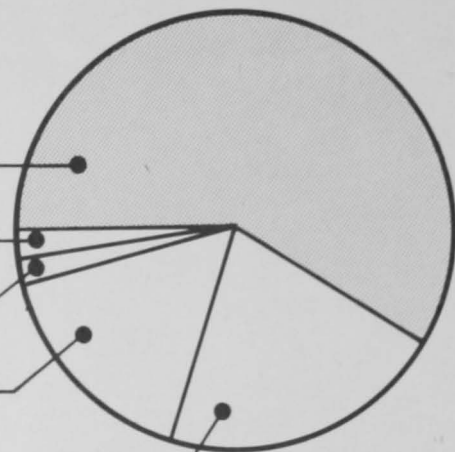
FURS

\$ 34.7

MINERALS

\$ 44.9

FOREST PRODUCTS



TOTAL VALUE \$218.2 MILLION

In 1961 the fisheries remained in number one position among resource-based industries in Alaska for gross value of products. Mineral and forest products showed substantial gains over past years.

1961

MILLIONS OF DOLLARS

\$ 35.7

SALMON

\$ 1.4

OTHER

\$ 0.6

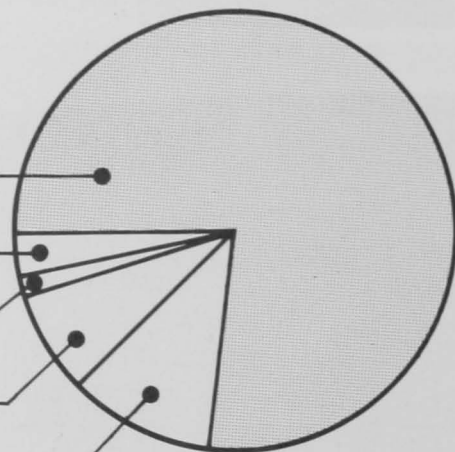
HERRING

\$ 3.9

KING CRAB

\$ 4.9

HALIBUT



TOTAL VALUE \$46.5 MILLION

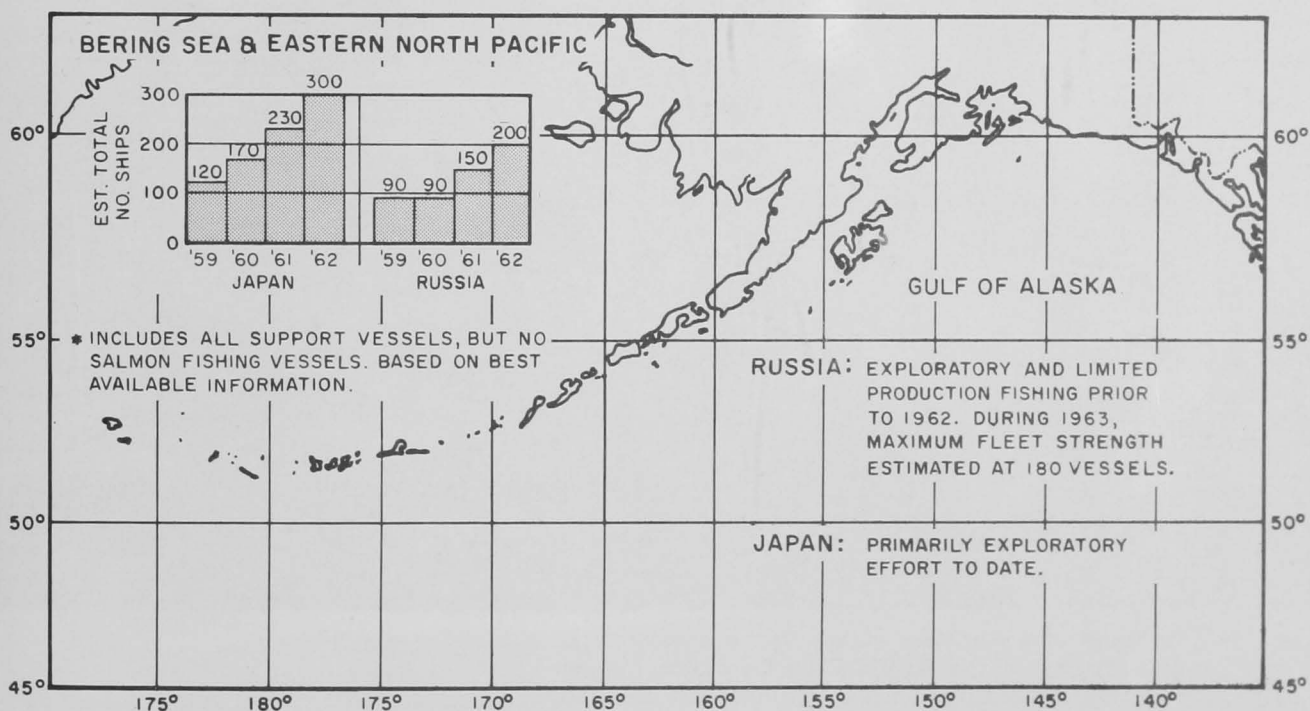
Salmon were still the mainstay of the fishing industry in 1961, but the catches of other fishery products were rapidly increasing.

IMMEDIATE PROBLEMS OF ALASKA'S FISHERIES

THE INTERNATIONAL SITUATION

Several commercial fishery stocks inhabit the international waters and are harvested both by Americans and nationals of foreign countries. To conserve these resources; in 1953 the United States, Canada, and Japan entered into the International Convention for the High Seas Fisheries of the North Pacific Ocean. The treaty specified that appropriate parties of the convention shall abstain from fishing those stocks of fish which (a) are being fully utilized, (b) are being harvested under regulations based on scientific research, or (c) are under extensive scientific study. The protocol to the convention specifies a provisional line, east of which the Japanese will not fish anywhere for salmon, and east of which the Canadians will not fish in the Bering Sea for salmon. The provisional line was based on prevailing opinion that salmon spend the marine portion of their life in Continental Shelf waters. Later

research has shown that this is not the case; salmon of both American and Asian origin mingle over a wide area. Further, the high seas gill net fishery of Japan west of the provisional line takes large quantities of both. The United States Section of the Commission has sought to have the provisional line moved to the west so as to avoid Japanese harvest of American salmon, which are produced primarily in streams entering Bristol Bay, Alaska. So far this effort has not been successful. The minimum 10-year period of the convention will end during 1963. At that time one of the parties may give notice to terminate or may request revision of the convention. The effectiveness of the United States efforts to protect this country's interest will hinge largely on the availability of full factual scientific information on the stocks that come under the convention's purview.



Japanese and Russian fishing vessels were a common sight in the international waters off the coast of Alaska from 1959 to 1962.

Several of the fisheries in international waters did not qualify for abstention under convention criteria. These included king crab, shrimp, bottomfish, and whales. In 1960 it was decided that herring stocks off the coast of Alaska did not meet all of the criteria; in 1962, the same determination was made for halibut of the Bering Sea. Both were removed from the abstention list. In 1961 the immense Russian and Japanese fishing fleets operating on stocks of bottomfish in the Bering Sea harvested more than 2 billion pounds. Their efforts were so intense that local stocks were often depleted within 3 days, and motherships had to shift their areas of operation. The Japanese operated five

factory ships for king crab, three motherships for shrimp, and two factory ships for whales in this area during 1962. Russian efforts in these waters during 1962 included two mothership operations on king crab and at least one on whales. All indications point to increasing foreign fishing in the near future, with further expansion in Gulf of Alaska waters. It is of the utmost importance that our knowledge of the biology and abundance of the stocks fished by these countries be greatly expanded, not only to encourage American operations in this area but also to gain full understanding of the effects of foreign fishing on North Pacific stocks.

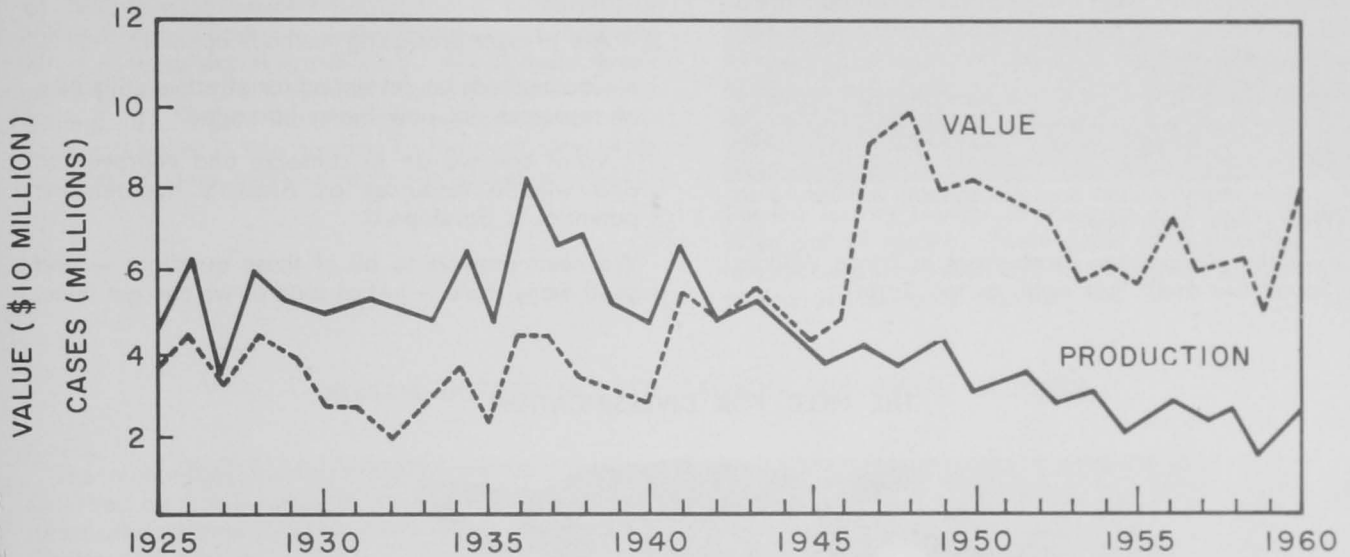


The deck of a Japanese factory ship is covered to a depth of several feet with flounders and soles caught in Bristol Bay. A million pounds of fish are reduced to meal within a few hours and packed for shipment to Japan.

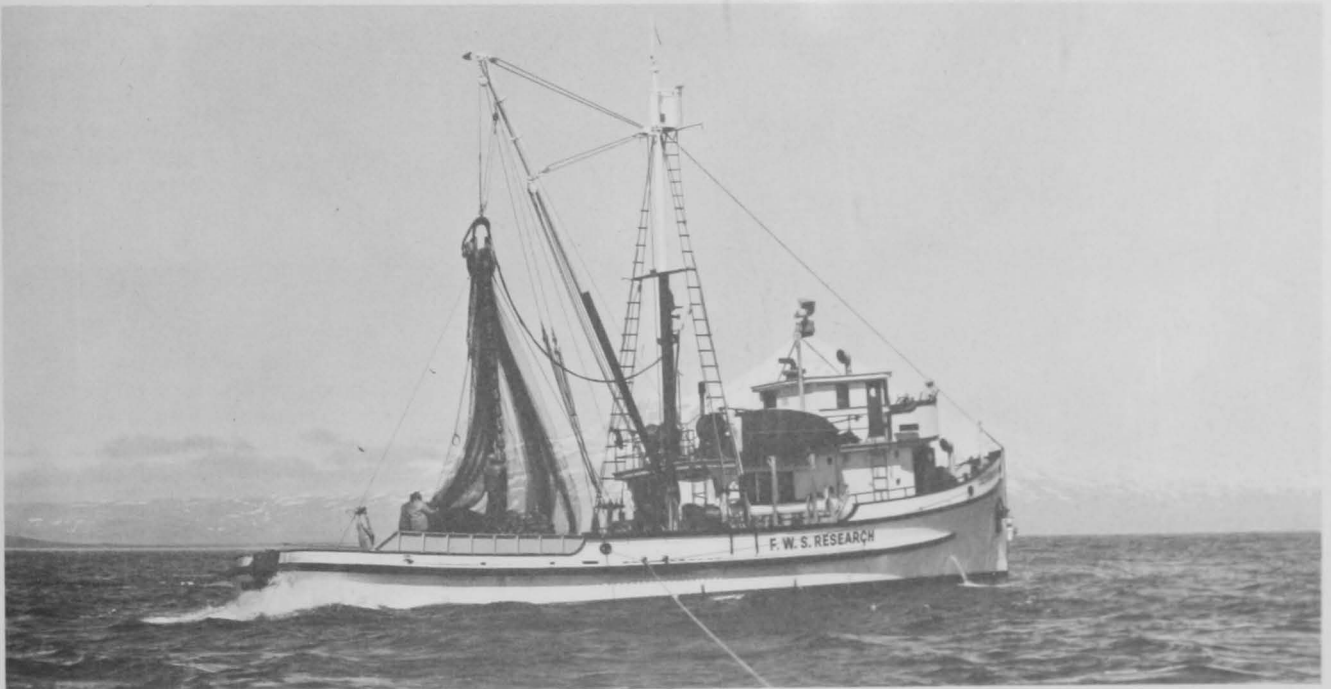
THE DECLINING SALMON RUNS

After reaching a peak in the decade prior to 1943, production of Alaskan canned salmon, the mainstay of the industry, has declined. The reasons for this decline are not clear. During World War II, the need for protein was so great that all resources were exploited to the fullest possible extent. Lack of enforcement personnel and equipment, both diverted to the

war effort, precluded adequate supervision of the fishing operations. Quite possibly, unrestricted fishing practices raised havoc with certain valuable runs of salmon. How to arrest the decline and thus bring production back up to optimum level is a major problem facing the fishing industry of Alaska.



Because of rising prices the value of Alaskan salmon has increased, even though production has declined.



Pursing the seine aboard a vessel chartered by the Bureau of Commercial Fisheries to study salmon migration patterns and distribution of Asiatic and North American stocks on the high seas. Research is directed toward determining why many Alaskan salmon runs are producing at levels well below their known potential.

THE NEED FOR FACTS

Decisions concerning the fisheries usually cannot be founded on complete and accurate information because of several broad gaps in the available facts. The field of international fishery relations, in particular, demands comprehensive factual information. When problems between countries are being arbitrated, and treaties are drawn up for negotiation nothing less will suffice. Some of the major problems in North Pacific fishing could have been avoided had more information been available when the North Pacific Treaty was drawn up in 1953.

Here are a few of the questions of both regional and international significance which urgently need answers.

How many million sockeye salmon will return to Bristol Bay each year?

Is the pink salmon escapement in Prince William Sound too small, just right, or too large?

Are the king crabs caught in Cook Inlet members of a large stock that is known to occur offshore, or are there two separate and distinct populations?

How many foreign fishing craft operate off Alaska, and what are they catching?

Are we overlooking valuable shrimp stocks in our waters?

Are present processing methods optimal?

Can methods be developed for effective utilization of resources not now being harvested?

What can we do to conserve and improve fish and wildlife resources as Alaska's hydroelectric potential is developed?

We need answers to all of these questions — and a good many more — just as soon as we can get them.

THE NEED FOR DIVERSIFICATION



Tanner crabs are just one of a host of little-used fish and shellfish in Alaskan waters. Some species, such as the tanner, require technological work before they can be marketed in quantity. Exploratory fishing is needed to determine the abundance of sea scallops, and marketing and economic studies are needed on such species as abalone, true cod, octopus, whitefish, and lingcod. Today all of these resources have only a potential value, yet the promise they hold for Alaska is enormous.

Industries need to diversify and make use of stocks that are now taken in only small quantities or not at all. By fishing additional species of fish and shellfish, the industry can extend its operating season. Fleets can spend more time fishing and less time dockside.



FORESEEABLE FUTURE PROBLEMS OF ALASKA'S FISHERIES

INTERNATIONAL COMPLICATIONS

International problems of the North Pacific fisheries will certainly increase in complexity during the next few years. Both Russia and Japan have made exploratory cruises into the Gulf of Alaska, and in the spring of 1962 Russian trawlers began fishing in earnest in the Gulf waters east of Kodiak. Expansion of Japanese effort in these waters is imminent. All of these developments point to an eventful future in North Pacific fishing. It is urgent that this country consider all possible courses of action leading to the protection of its interests in these offshore waters adjacent to Alaska.



Russian factory trawler of the type commonly fishing in waters off Alaska. These sleek, self-supporting fish factories are more than 275 feet long and can remain at sea as long as 2 months.

HUMAN DISTURBANCE OF SALMON SPAWNING GROUNDS

The number of Alaska's salmon-producing streams disturbed by man's activities increases each year. The forest product industry is mushrooming in Southeastern Alaska, with two pulp mills and several large sawmills in operation. Aside from the direct effects of logging on the watersheds, another aspect of the forest management program — insecticide spraying — may be detrimental to salmon production. Indications are that considerable development of Alaska's tremendous hydroelectric potential will be undertaken within the next few years. Experience in the Pacific Northwest has shown how extensively such projects can damage salmon spawning grounds.



The Blue Lake Dam near Sitka is the forerunner of many large dams that will be constructed on Alaska's lakes and streams.



Within the next decade much of Southeastern Alaska's over-age timber will be harvested in logging operations like the one that has been carried on at Katlian Bay the past few years.

BUREAU ACTIVITIES IN ALASKA

The Bureau of Commercial Fisheries is assigned the mission of properly developing the fishery resources and of strengthening, stimulating, and maintaining a vigorous fishing industry. As specified in the Fish and Wildlife Act of 1956, this mission shall be accomplished in partnership with the States. The attack on prob-

lems outlined in the previous pages is being mounted in just such a partnership. Frequent meetings and full coordination assure that the efforts of the Bureau and the Alaska Department of Fish and Game will be highly effective and will avoid wasteful repetition.

REGION 5, JUNEAU

- **BIOLOGICAL RESEARCH**—To shed light on the nature of the fishery resources.
- **TECHNOLOGICAL RESEARCH**—To provide information on how best to handle and process the catch.
- **RIVER BASIN STUDIES**—To conserve and improve the resources as human activities expand in Alaska.
- **EXPLORATORY FISHING AND GEAR RESEARCH**—To define the location of commercial stocks and how to harvest them.
- **RESOURCE MANAGEMENT**—To assure that terms of international treaties and conventions are rigidly observed.
- **LOANS AND GRANTS**—To provide financial assistance to qualified members of the fishing industry.
- **STATISTICS**—To maintain and publish accurate catch and production data for the fisheries.



Biological Research Laboratory, Auke Bay, Alaska.

BIOLOGICAL RESEARCH

The laboratory pictured above serves as biological research headquarters for the Bureau in Alaska. Located 12 miles north of Juneau, the laboratory provides facilities for controlled experiments on the biology and physiology of fish and shellfish in fresh and salt water, houses a growing reference collection of fresh- and salt-water fishes native to Alaska waters, and includes a comprehensive scientific library, which is

available to other agencies as well as Bureau biologists. The building also provides office and laboratory space for about 30 scientists and 12 supporting personnel, including a statistical section with IBM card-processing equipment. Completed in 1960, this modern facility also serves as a base of operations for marine finfish and oceanographic research.

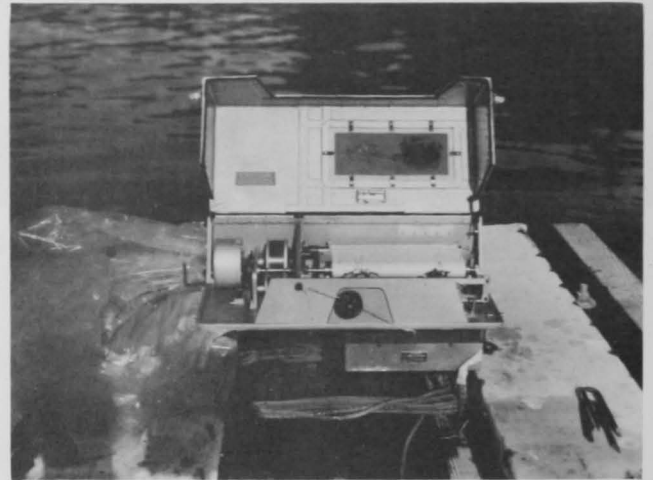
A basic step in biological research is a study of the environment inhabited by fish and shellfish. The environment consists of a complex interaction of physical, chemical, and biological factors. Both seasonal and long-term fluctuations of these factors may markedly affect the survival, growth, and distribution of commercially important species as well as the organisms they feed upon. The scientific conservation of a fishery requires a thorough knowledge of such factors. We must be able to separate the effects of fishing from changes due to natural causes before we can predict the size of future runs and population levels and develop sound conservation measures that will enable us to increase our harvest.



Glass vials filled with water and capped tightly are enclosed in plastic standpipes and inserted in the spawning gravels at various depths in the fall. The following spring these vials are removed and the depth of freezing determined by the presence of broken vials. Standpipes also enable biologists to remove subgravel water samples for oxygen determinations. The extent of freezing, drying, and low oxygen levels caused by reduced waterflows and their effect on the survival of salmon eggs and young are determined by this technique.



A biologist checks recordings of temperatures of the water in the gravel of the riverbed to evaluate the rate of development of eggs and larvae.



A constant-recording water level and temperature instrument provides a continuous record of environmental fluctuations which biologists may correlate with variations in the numbers, distribution, and behavior of the fish species under study.

Our understanding of basic life history and population fluctuations of commercially harvested fish and shellfish depends heavily on knowledge of marine con-

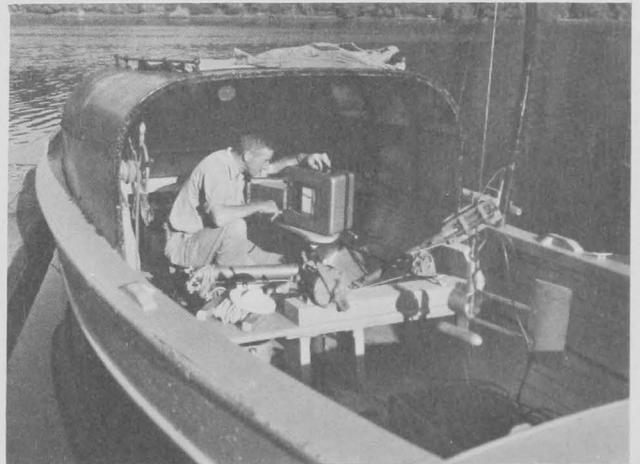
ditions and their effects. A wide variety of biological, chemical, and physical factors is involved, and each requires detailed study.



A Bureau oceanographer removes a reversing thermometer aboard the oceanographic research vessel, the *Murre II*.



In studying limnology in a sockeye salmon nursery lake, a biologist prepares sample bottles inoculated with carbon 14. Uptake of radioactive carbon by microscopic plants in the water sample can be measured to determine the production rate of algae, the basic food for all aquatic life.



A biologist prepares a recording fathometer used to map a salt-water rearing area.

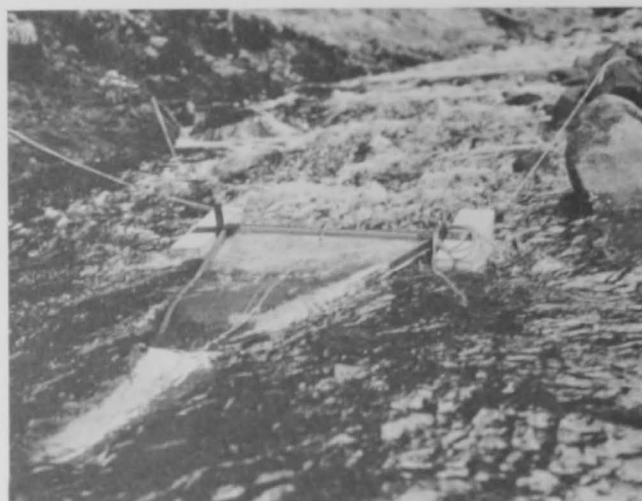
Knowledge gained from the study of environmental changes must be correlated with the life histories and fluctuations in numbers of the fish or shellfish under investigation. We know, for example, that all five species of Pacific salmon spend a portion of their early life in fresh water, migrate to sea, and return as adults to spawn and die in the same stream or lake where they were hatched. But these facts alone do not provide the answers vital to sound conservation.

Before we can understand the effects of environmental factors and population densities on the survival of salmon, we must know how many fish spawn in each area after they pass through a fishery, how many eggs they deposit in the gravels, how many fry hatch out, and how many juvenile salmon migrate to the ocean. The answers to these questions will give us a basis on which we can build an understanding of how many fish can be harvested and how many must escape to the spawning grounds from each stock.

Biologists of the Bureau are also seeking the answers to similar basic questions for other commercially important fish and shellfish now being harvested in waters off the Alaskan coast. Current life history studies of king crab and shrimp will add to our knowledge of the growth, abundance, and movements of both these species. Crab and shrimp population dynamics must be thoroughly understood before we can arrive at optimum levels of harvest and avoid the dangers of overfishing.



Biologists operate a hydraulic egg sampler to wash and collect pink salmon eggs from a known area of spawning gravel. The percentage of eggs surviving the winter provides a necessary figure for piecing together the details of salmon life history and helps to determine optimum levels of harvest and escapement.



Electronic counters are used to estimate the number of young salmon leaving fresh water for the ocean. Such estimates are necessary for computing survival in fresh water and predicting adult returns.



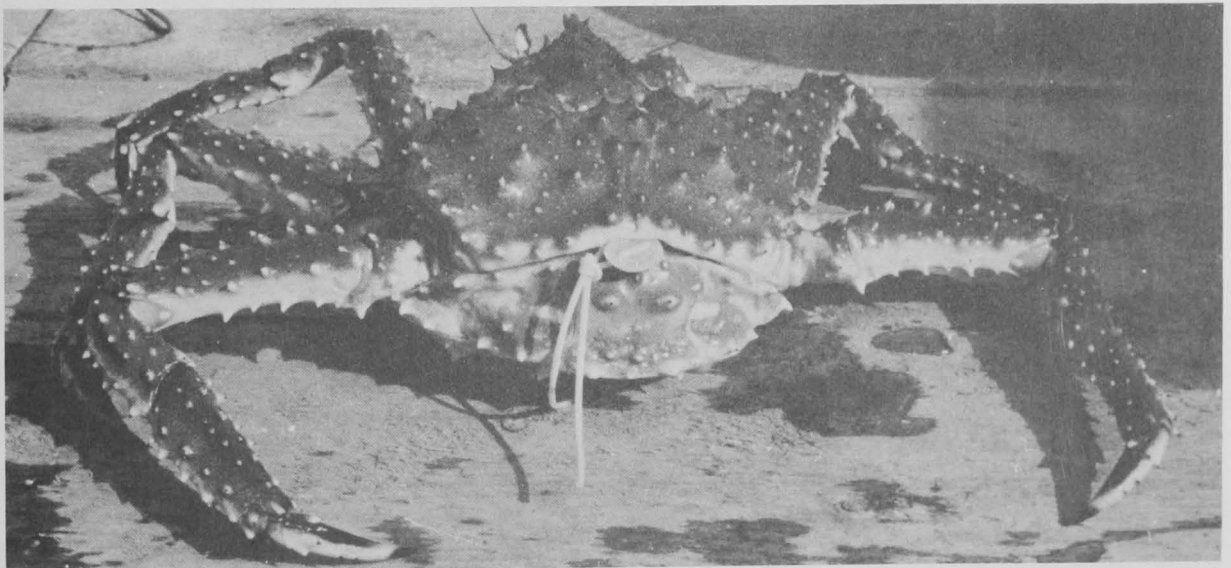
Biologists are measuring, tagging, and taking a scale sample from an adult sockeye salmon. Sampling adult fish provides a host of reliable life history information vital to wise fishery conservation. The number of eggs a female produces is proportional to her length; thus, lengths and the number of females in a run give estimates of potential egg deposition on the spawning grounds. Recaptures of tagged fish yield information about high-seas movement, migration routes, and size of spawning escapements. The year the fish was hatched, its growth in fresh water before it migrated to the sea, and its size at the beginning of each year of life can all be determined from the scale sample.



Biologists collect blood samples from a sockeye salmon for antigen preparation to study methods of identifying separate races by blood agglutination techniques.

In general each species of fish or shellfish is composed of a large number of closely associated groups of individuals called populations or races. The members of such races may spend a large portion or all of their life cycle separated from other populations of the same species. On the other hand, populations may be segregated during only part of the life cycle, as salmon are.

The survival of each population is naturally adjusted to the particular set of environmental conditions met by that population throughout its range. If stocks or population aggregates of fish or shellfish containing a mixture of these individual populations are harvested without regard to the proportion of each population in the exploited stock, certain populations may well be overharvested while others are being undercropped. Wise fishery management calls for harvesting each population at the level yielding a maximum return to the fishery over a sustained period of time without reducing the reproductive capacity of the population. Before harvests can be regulated on a population basis, however, the populations must be separately identified and their distributions, movements, and extent of intermingling thoroughly understood. Research projects designed to yield such information are now being carried on by the Bureau for several commercially important species of fish and shellfish, including salmon, king crab, herring, and shrimp.



Information gained from recaptures of king crabs marked with a "spaghetti" tag threaded through the vertical muscle between the carapace and telson is used to plot crab movements and to study the extent of intermingling between offshore and inshore populations.

Although only a comparatively few of Alaska's salmon producing streams have been affected by man's activities, the number increases each year. The effects of logging operations, timber management activities,



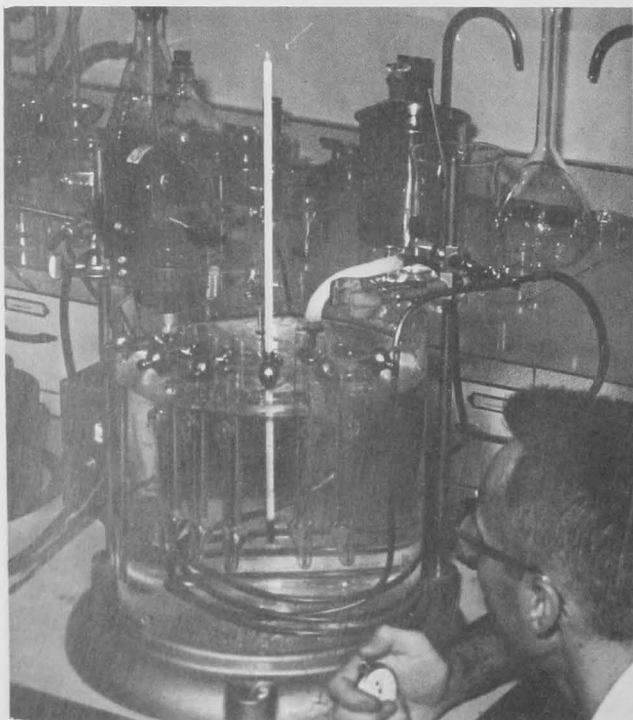
Studies underway at Hollis on Prince of Wales Island are conducted by FRI. A biologist checks for changes in the amount of silt and sand present in stream bottom materials after the watershed has been logged. A nearby unlogged watershed provides a "control" for comparison.

and insecticide spraying are being studied by the Bureau in conjunction with the U. S. Forest Service and the Fisheries Research Institute (FRI) of the University of Washington, under contract to the Bureau.



A biologist analyzes stream water for its chemical content. Information is also gathered concerning the numbers of fish and other organisms present in the stream. The surrounding forest will then be sprayed with insecticide, and changes in the stream and its aquatic life will be recorded. A nearby watershed will be left unsprayed for comparison.

TECHNOLOGICAL RESEARCH



A biochemist uses a controlled temperature bath in making viscosity determinations on fish flesh proteins.

The technological research program of the Alaska Region is aimed at solving practical problems in the handling and processing of chilled, frozen, cured, and canned fishery products and in developing new commercial items. The decline in stocks of salmon has forced industry to diversify its operations, and the discovery of substantial new stocks of shrimp and king crab has largely sustained these diversified operations of existing firms. In addition, the great demand for these shellfish products, coupled with a recent decline in Gulf of Mexico shrimp, has stimulated new entries into the field.

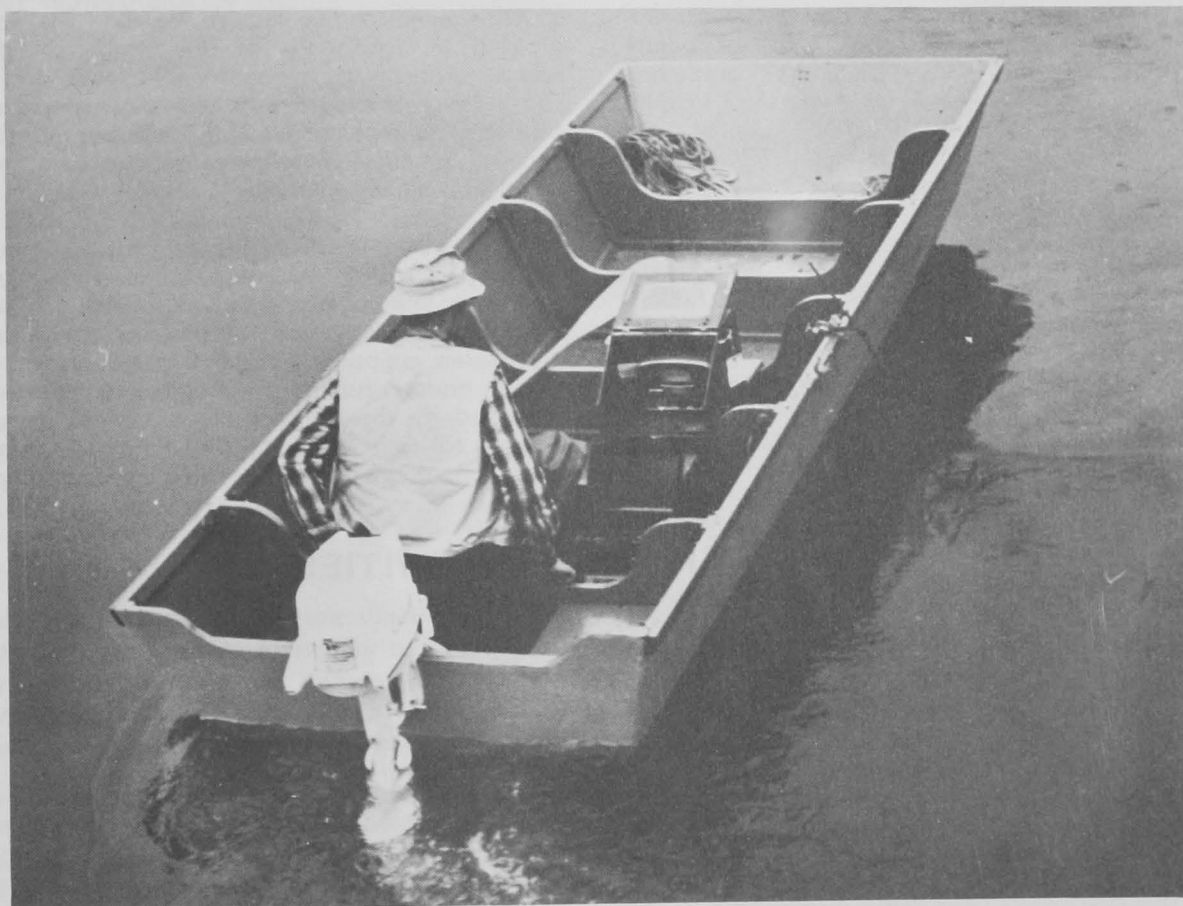


A fishery technologist tests refrigerated sea water as an improved method of holding Alaska's fish on board ship.

The River Basin Studies unit of the Alaska Region of the Bureau of Commercial Fisheries is assigned to determine the effects of various water resource development programs on fish and wildlife. The unit works closely with the Alaska Department of Fish and Game and the Bureau of Sport Fisheries and Wildlife. Close liaison is maintained with the Federal Power Commission, Corps of Engineers, Bureau of Reclamation, and other Federal agencies concerned with water use programs. When projects such as hydroelectric dams, harbors, and dredging are proposed, the plans are reviewed and field studies conducted as needed. Recommendations to protect the fish and wildlife resources are formulated and submitted for consideration to the responsible Federal agency for possible application during the project development and operation. Major losses may be prevented or mitigated by these procedures, and in some cases the fish and wildlife resources may be enhanced.

Much of the recent effort of River Basin Studies

has been devoted to determining the effects of proposed Rampart Canyon Dam on fish and wildlife. This project, on which studies of the Army Corps of Engineers began in 1960, may be considered another step in the accelerated movement to harness the immense hydroelectric potential of Alaska. The project would have a dam 525 feet high on the Yukon River about 100 miles northwest of the city of Fairbanks. The reservoir created (10,500 square miles) would exceed Lake Erie in surface area. Large runs of salmon would be blocked, and a vast area of waterfowl breeding grounds, the Yukon Flats, would be inundated. Habitat of big game and fur animals and fresh-water fish would be replaced by an immense lake in which fish populations of as yet undetermined value would develop. To develop means of minimizing losses to the fish and wildlife resources if the dam is to be constructed, an intensive diversified program of field research will be needed.



A River Basin Studies biologist uses a depth recorder to determine depth contours of a lake that is under consideration as a powersite by the Bureau of Reclamation.

The purposes of the exploratory fishing and gear research program are to locate and define new fishing grounds capable of providing commercial quantities of marketable fish and to design, test, and develop more efficient types of fishing gear and equipment. Such assistance will provide the impetus needed by industry to harvest Alaskan stocks on a basis competitive with foreign operations. With the possibility of expanding the shrimp and crab fisheries in the face of foreign exploitation of Bering Sea and Gulf of Alaska waters, detailed exploratory fishing surveys are needed to define the extent of the resources and to provide information whereby our fishermen can establish themselves in new promising fishery operations.

RESOURCE MANAGEMENT

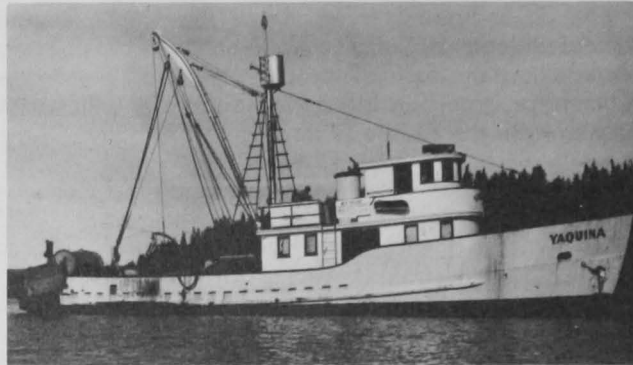
Resource management in Alaska involves the following items: (1) enforcement of the international fishery treaties and implementing statutes and regulations, (2) surveillance of extra-treaty foreign fishing activities in adjacent waters, and (3) enforcement of Department of the Interior regulations for the control of Indian fishing. Included under item 1 are the Convention for the Preservation of the Northern Pacific Halibut, the International Convention for the High Seas Fisheries of the North Pacific Ocean, the Interim Convention on Conservation of the North Pacific Fur Seals, and the International Convention for the Regulation of Whaling. The Bureau and the U. S. Coast Guard share the primary responsibility for enforcing international fishery regulations. The expanding fishing effort by Japan and Russia in the Bering Sea and Gulf of Alaska has been followed and observed by enforcement personnel who have accompanied Coast Guard flights and surface cruises. Also, the vessel *John R. Manning* cruised the pertinent area of the Bering Sea and Gulf of Alaska during 1962.

PLANNED FUTURE ACTIVITIES

Review of today's fishing problems in Alaska points to a need for work in several areas not now included in the Bureau's programs:

1. **Marketing Economics.** — Studies are urgently needed to clarify economic features of production, processing, distribution, and marketing of Alaskan fishery products. This information would be used to speed up expansion of the shrimp and crab industries and to boost the start of new businesses on unused stocks, such as the groundfish.

2. **Information and Education.** — In the past, almost no effort has gone toward explaining what our programs are trying to do and how the results of research are needed for wise management of the fisheries. Be-



West Coast trawler chartered by the Bureau for exploratory fishing in the Gulf of Alaska during 1962.

LOANS AND GRANTS

The major work of the Loans and Grants office is to arrange loans to owners of fishing vessels and gear for maintaining and replacing equipment and to the fishing industry for financing construction and reconstruction or reconditioning of vessels. The work is growing in importance as the number of private sources of financing on reasonable terms decreases. The industry is expected to seek increased financial assistance to replace old and inefficient vessels and engines, to add more efficient gear, and to improve handling methods.

STATISTICS

Data on the value and volume of fish caught and of products manufactured, on the numbers of workers and vessels engaged in the fishing industries, and on foreign trade in fishery commodities are collected and published by the statistics office. Such information is of great importance to the industry in planning fishing operations and in estimating demand and prices.

cause of misunderstanding, some excellent scientific work produced in past years by fishery experts has not been put to use. This proposed activity would strive to foster active support of fishery conservation efforts in Alaska by informing the public of objectives and progress of the Bureau's programs.

3. **Market News Service.** — In the "Lower 48," the Bureau's Market News Service promotes the orderly marketing of fishery products by daily publication of landings, prices, stocks, and market conditions. Establishing the Service in Alaska would provide more flexibility in reporting, expanded coverage, and better insight into the needs of the industry.

THE TOOLS TO DO THE JOB

The Ketchikan Technological Laboratory provides work and laboratory space for Bureau scientists. Facilities are available for high-caliber research on handling and processing problems and on developing new fishery items. Included is a modern kitchen for dieticians to perfect new recipes and uses for fishery products. After a period of limited activity at the laboratory in recent years, Bureau plans call for increases in the research staff and greater emphasis on practical processing problems.

The expanding importance of shrimp and king crab has shown the need for a field technological laboratory as near as possible to the center of processing operations for these species. The Bureau hopes to construct such a facility within the next few years.

The Alaska Region's newest major building is the laboratory at Auke Bay (picture on page 11). Its location next to a small stream and lake system offers excellent opportunities for close observation and experimentation. Several additions, including a service building, garage, and an auxiliary power generator, are now being added. This facility is a great asset to Alaska fishery science.

Because of fishery science's increasing need for accurate numerical data, special instruments and measurement apparatus of many kinds are necessary. In the laboratory, effort is shifting from the superficial observation by "cook-book" methods to the thorough probing of physical and chemical problems using highly refined and expensive equipment. Computers are being used to solve mathematical equations that were beyond consideration a few years ago. In field work, more and more use is being made of automatic recording and counting instruments, sonar apparatus, and portable instruments for water analyses. Such space-age devices multiply the value and reliability of fishery research efforts, just as they have boosted productivity in so many other fields. The Bureau's research staff will remain abreast of latest developments in technical apparatus.

Year-round studies of king crab are carried on at the field station at Kasitsna Bay. In addition to the Kasitsna Bay Station, the Bureau has field stations at King Salmon, Brooks Lake, and Karluk Lake for sockeye salmon studies; at Olsen Bay and Little Port Walter for pink salmon studies; and at Traitors Cove for chum salmon work. Adequate laboratory and living space close to areas where the species studied occur in abundance are necessary for effective field research.



Bureau of Commercial Fisheries Technological Laboratory at Ketchikan.



The Bureau's support dock and vessel maintenance facility are in Juneau. Storm and tidal damage during 1961 forced closure and condemnation of the buildings. Reconstruction of a damaged fill-retaining bulkhead is now complete. The dock and finger floats will be replaced and new buildings constructed on this site in the future to provide adequate vessel maintenance, warehouse, and storage areas.



The scope of our oceanographic and marine fisheries research is limited because the vessels available, such as the *Sablefish*, are not adequate for deep water research. For the Alaska Region's oceanographic program to contribute as it should to the developing national oceanographic effort, additional vessels and replacement of outmoded, inefficient vessels are essential.



WHAT THE BUREAU'S ALASKA PROGRAM WILL YIELD

The programs and facilities described in the preceding pages are specifically designed to produce the following:

1. Facts needed to protect U. S. interests in negotiations with foreign countries on North Pacific fishery problems.
2. Basic information on the life histories and populations of major fishery stocks — data urgently needed by the Alaska Department of Fish and Game for sound management of our fisheries.
3. Better and more efficient methods for handling, processing, and preserving fishery products and for developing new fishery operations on presently unused resources.
4. Detailed attention to the welfare of fish and wildlife as man's varied activities expand in Alaska.
5. Reliable information on where unfished stocks occur and how large a catch they may be expected to offer.
6. A free flow of information — not only of the results of research but of markets, stocks, production, and prices of fishery commodities.
7. Financial assistance to fishermen who want to upgrade their boats or outfit for new fishing ventures.

8. Patrol effort in areas outside the 3-mile territorial limit to assure that provisions of several international agreements are not violated.

To sum up, Bureau efforts will go far to secure the greatest benefits from our fishery resources — for Alaska and for the United States, for the present, and for the future.



A cannery scow load of Alaskan sockeye salmon bound for the dinner tables of the world.

SHARKS OF THE GENUS *Carcharhinus*

Associated with the Tuna Fishery

in the Eastern Tropical Pacific Ocean



Circular 172

UNITED STATES DEPARTMENT OF
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

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