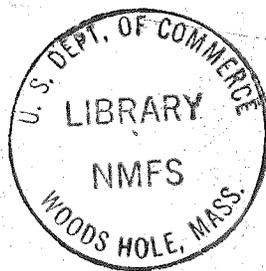


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ON FISHING OPERATIONS, METHODS,  
TECHNIQUES AND GEAR  
1954 - 1971



72-04

Northeast Fisheries Center  
National Marine Fisheries Service  
Woods Hole, Massachusetts 02543

Laboratory Reference No. 72-4

Bowman, Edgar W.  
1970

Recommended practices for vessel sanitation and fish handling. Dept. of Interior; U.S.F.W.S.; B.C.F. Wash. D.C.; Circ. 333, March, 1970.

Current practices aboard commercial fishing vessels have come about largely through trial and error, rather than through the application of research findings. As a result, fishermen have not always kept pace with the increasing demands by consumers for fishery products of higher quality. This report can provide the fishery industry with a measuring stick necessary for self evaluation, while supplying specific recommendations for improving vessel sanitation and fish handling techniques.

Bruce, Robert A.  
1967

North Atlantic trawl nets. Dept. of Interior; U.S.F.S.W.; B.C.F. Wash. D.C.; Fishery leaflet 600, August, 1967.

This leaflet is designed to answer requests for information about otter trawls currently used in the North Atlantic fisheries. Its major emphasis is on trawls used on New England trawlers, but it also includes some of the trawls used by other countries fishing the grounds of the Northwest Atlantic.

Data such as overall size, twines, mesh sizes, rope and wire size, roller and chain gear, floatation, rigging and certain construction details accompany the drawings and texts for each net described. The designs cover trawls for vessels from 55 feet with 22 hp. engines to 250 feet with 2,400 hp. engines.

Bruce, Robert A.  
1970

The New England shrimp fishery. Federal-Provincial Atlantic Fisheries Committee of Canada, St. John, N.B., Canada; In: Canadian Fisheries Reports, No. 17, pp. 257-274, May, 1971.

The New England shrimp fishery is active in the northeast section of New England from the Canadian border down to Gloucester. The impetus of the introduction of a foreign market for these shrimp (*Pandalus borealis*) has generated a marked increase in effort and production since 1965. Current production is 28 million pounds. There have been no large scale developments of gear other than the local development of a shrimp pot or construction of many specialized craft. Vessels have been purchased from outside the region to supplement the existing fleet and small locally built boats converted to shrimp trawling. Trawls to separate the shrimp from other species and larger vessels equipped for prolonged periods at sea to catch, prepare, package and store shrimp are being contemplated.

Corbett, Michael G.  
1970

Machine for separating northern shrimp, *Pandalus borealis*, from fish and trash in the catch. Dept. of Interior; U.S.F.W.S.; B.C.F. Wash. D.C.; F.I.R. Vol. 6 No. 2, pp. 53-62, May, 1970.

A machine was developed to separate shrimp from the bulk of groundfish and other species taken in trawl catches. Its use eliminates sorting by hand. About 95 percent of the shrimp are recovered by this means while about 90 percent of the trash is removed.

Corbett, Michael G.  
1970

A removable deck-block mounting pad. Dept. of the Interior; U.S.F.W.S., B.C.F., Wash., D. C.; C.F.R. Vol. 32 Nos. 8-9, Reprint No. 886, Aug.-Sept., 1970.

A deck-block mounting pad was intermittently required on deck for specialized fishing operations. Rather than welding a pad to the deck and then burning it off each time, a pad was needed. A quickly removable mounting pad was designed. Details of its construction are given.

Corbett, Michael G.  
1970

Quick release branchline clip developed for longlining. Dept. of the Interior; U.S.F.W.S., B.C.F., Wash., D. C.; C.F.R. Vol. 32 Nos. 8-9, Reprint No. 885, pp. 50-53, Aug.-Sept., 1970.

A clip suitable for automatically or semi-automatically attaching the droplines (gangions) to the mainline of longline gear has been developed. Use of this clip helps to reduce and with further development of anillary systems may eliminate manual handling of longline gear. The clip was developed to help improve safety aboard vessels, reduce labor requirements and increase speed and efficiency of the fishing operation.

Crossen, James M.  
1970

Results of sea testing a device for recording fishing effort data. Proceedings at the 1970 annual meeting, St. John's, Newfoundland. In: The International Commission of Northwest Atlantic Fisheries, Doc. No. 70-84, Ser. No. 2433, 1970.

Sea tests were conducted of the Fishnet Bathymograph (FBK) aboard commercial otter trawlers and Bureau of Commercial

Fisheries research vessels, during the period of November 1969 through March 1970. The FBK, attached to an otter trawl headrope, recorded the number of tows and the duration and depth of each during a fishing trip. Test methods and results are described.

Crossen, James M.  
1970

A device for automatically recording fishing effort aboard fishing trawlers. Int. Comm. Northwest Atlantic Fish., Research Bulletin No. 7, 1970, pp. 46-51.

The Fishnet Bathykymograph (FBK) was developed to measure fishing effort aboard commercial trawlers for the Bureau of Commercial Fisheries. The system employs a shock isolated, 14-day time-depth recorder, and Dockside-Support Equipment (DSE) for instrument calibration and retrieval of data. Effort data are recorded on magnetic tape which, with additional processing, is computer compatible. The FBK attached to an otter-trawl headrope records the number of tows and the duration and depth of each during a fishing trip. (En. en)

Crossen, James M.  
1969

A fishing effort data aquisition system. International Commission of Northwest Atlantic Fisheries, Doc. No. 69-88, Ser. No. 2254.

An instrumented headrope float, the Fishnet Bathykymograph (FBK) has been developed to provide an accurate measure of fishing effort. The FBK is a part of a data aquisition system for providing information on fish population dynamics for use by the U. S. Bureau of Commercial Fisheries and possibly the International Commission for the Northwest Atlantic Fisheries.

The system employs a shock isolated, 14-day time-depth recorder, and Dockside Support Equipment (DSE) for calibration and retrieval of data. The recording format is coded pulse on magnetic tape and is computer compatible.

The FBK is attached to the net aboard commercial trawlers and automatically records the number, duration, and depth of each tow.

Crossen, James M.,  
John R. Clark, and  
Robert Livingstone, Jr.  
1959

Development and operations of television for fish behavior in otter trawls. Dept. of the Interior, U.S.F.W.S., B.C.F.; Wash., D. C., S.S.R. 320, December, 1959.

Underwater television equipment (Image Orthicon) used for studying the behavior of fish in otter trawls is described. Development of the equipment, including the television chain itself and the accessory power source, lights, etc., plus some methods of using the equipment are explained. Considerable attention is devoted to problems of operation, particularly to the difficulties in handling the camera cable.

An extensive appendix gives in some detail the specifications of the television equipment used.

Crossen, James M.  
1960

Instrumentation. Dept. of the Interior, U.S.F.W.S., B.C.F., Wash., D.C.; Circular 99, pp. 47-49.

A list of cruises made during 1959-60 including vessel area and operation.

Method used in making underwater television observation of electrofishing. Including diagrams of apparatus.

Crossen, James .  
1961

Instrumentation. Dept. of the Interior,  
U.S.F.W.S.: B.C.F., Wash., D.C.; Annual  
Report 1961, Circ. 137, pp. 82-84.

An electronic fish egg counter - a  
description of the equipment and its  
operation.

Underwater television - methods used in  
making observation of trawl doors in action.

Fahlen, Lars A.  
1967

Deck equipment layout on the R/V Delaware  
for surf clam survey. Dept. of the Interior,  
U.S.F.W.S.; C.F.R., Wash., D.C.; Separate  
No. 800.

Arrangements for utilizing a side trawler  
for surf clam operations are discussed.

Fahlen, Lars A.  
1968

Special small-clam retainer and bottom  
sampler designed. Dept. of the Interior,  
C.F.R., Washington, D.C.; Separate No.  
907, February, 1968.

A simple device for collecting biological  
samples for a commercial sized hydrolic clam  
dredge is described.

French, Leon E., Jr.  
1968

Echo reflection for sonic measuring system  
on an otter trawl. Dept. of the Interior,  
U.S.F.W.S.; B.C.F., Wash, D.C.; In: F.I.R.  
Vol. 14, No. 3.

Material deals with sonically measuring  
distance between points in an otter trawl  
during operation by use of transducers  
and an echograph records.

French, Leon E., Jr.  
1968

Sonic reflector for sonic measuring system on an otter trawl. Dept. of the Interior, U.S.F.W.S., B.C.F., Wash., D. C.; In: F.I.R. Vol. 4, No. 3.

Sonically measuring distances between points in an otter trawl during operation by use of transducers and an echograph recorder presents problems. For example, when the headrope height of an otter trawl is about one-half the wing-end spread, the headrope and wing-end measurement traces appear at the same location upon the recording paper. The simultaneous overlay of signals can be corrected by use of a sonic echo reflector to replace one of the wing-positioned transducers in the measuring system and by use of the echo-signal method instead of the direct-signal method. The echo signals, however, are weaker than the direct signals.

This paper reports on a test of three reflectors: plain wood, aluminum sheet, and checkered aluminum. All three reflectors gave usably strong echo signals. The best quality signal was given, however, by the aluminum reflector.

Handwork, Warren  
1967

How Lake Superior gill net vessel was converted to a trawler. Dept. of the Interior, U.S.F.W.S., B.C.F., Wash., D. C.; Sep. No. 812, Vol. 30, No. 4, pp. 30-35.

This publication illustrates and describes how a 45 foot, 120 horsepower gill net vessel was converted to a trawler. The conversion features a minimum of structural alterations but allows the vessel to function either as a stern trawler or gill netter.

Knake, Boris O.  
1958

Operation of North Atlantic type otter trawl gear. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Fishery Leaflet 445, May 1958.

A report on fishing North Atlantic type otter trawl from a typical New England side-trawler. Fishing procedures of setting, shooting, the trawl, hauling and landing the catch are described.

Knake, Boris O.,  
James F. Murdock and  
James P. Cating  
1958

Double-rig shrimp trawling in the Gulf of Mexico. Dept. of the Interior, U.S.F.W.S., B.C.F., Wash., D. C.; Fishery Leaflet 470, September, 1958.

The purpose of this leaflet to provide owners of conventionally rigged shrimp trawlers with basic information required for conversion to double-rig trawling.

Knake, Boris O.  
1956

Assembly methods for otter trawl nets. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Fishery Leaflet 437, December, 1956.

Efficient fishing performance of the trawl net is contingent on proper and precise assembly of the web sections and net rigging. This leaflet gives step by step illustrations and descriptions of the proper method of assembly.

Knake, Boris O.,  
C. Butler and  
J. F. Puncohar  
1952

Freezing fish at sea - New England part 3. The experimental trawler, Delaware and shore facilities. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Sep. No. 306, Vol. 14(6): February, 1952.

A description of the experimental trawler Delaware is presented, including the general characteristics of the vessel, alteration of the fish hold, and the refrigeration system. Also described are the shore facilities, which consist of the pier for moorage of the vessel and freezing facilities, and handling of the fish ashore are discussed.

Knake, Boris O.  
1950

Atlantic coast mackerel purse seine. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Fishery Leaflet 373, July, 1950.

Describes and illustrates a New England purse seining operation for mackerel.

Knake, Boris O.  
1950

New England sink gill net. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Fishery leaflet 379, August, 1950.

This paper deals primarily with the "Sink Gill Net" used in New England and designed to catch codfish, haddock, and pollock. Illustrations demonstrates the construction, setting and hauling operations, and maintenance of gill nets.

Knake, Boris O.  
1947

Methods of net mending - New England. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Fishery Leaflet 241, May, 1947.

This publication describes the method of net mending as practiced by the New England otter trawl fishermen. Net mending procedures and various knots are illustrated.

Martin, Charles E.  
and John W. Ropes  
1960

The abundance and distribution of hard clams in Nantucket Sound, Massachusetts, 1958. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; S.S.R.F. No. 354, July, 1960.

A survey was made during the summer of 1958 to assess the abundance of hard clams in Nantucket Sound, Massachusetts. A jet (hydraulic) dredge was used as the principal sampling gear. Data from 214 samples stations compared with other Atlantic coast areas indicated that the abundance of hard clams in Nantucket Sound was extremely low. The survey revealed no new general areas of commercial abundance. No clam less than 60 millimeters (2 3/8 inches) were caught. The future for any significant fishery for hard clams in this area is uncertain.

McRae, Ernest D., Jr.  
and Phillip S. Parker  
1970

The ocean quahog, *Arctica Islandica*, resource of the Northwestern Atlantic. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; F.I.R. Vol. 6(4): pp. 185-194, September, 1970.

The ocean quahog is a species of marine clam. Some of the anatomical differences between it and the hard clam, *Mercenaria mercenaria*, are discussed. The range and population density of the ocean quahog in Continental Shelf areas off the Atlantic seaboard vary considerably with changes in water depths and bottom sediments.

Much of the basic information for this article was gathered during the survey of the surf clam, *Spisula solidissima*, by the Bureau of Commercial Fisheries. The gear, method used, procedure, and results of the survey pertinent to ocean quahogs are presented.

The ocean quahog resource is generally unused. It is waiting for anyone willing to reap the harvest.

McRae, Ernest D., Jr. Pollock. Resource Report No. 1, Northwest  
1970 Atlantic Fisheries, U. S. Dept. of Commerce,  
N.O.A.A., N.M.F.S.

The harvest of marine fishery resources becomes more complex as new, and often unfamiliar, kinds of gear become available to fishermen and as competition for the world's fishery resources grows. United States fishermen need key information on the fish species sought - water temperature, grounds, seasons, gear, market potential, etc. - to plan future operations intelligently. This is of special interest when a fisherman considers entering a new or different fishery. The aim of this Resource Report series is to get this key information where known, into the hands of those in the fishing industry in some concise form. Emphasis is on underutilized and potential fishery resources.

This report on pollock is the first in this series. The contents were assembled by National Marine Fisheries Service<sup>1</sup> personnel. Their work covers the areas of information discussed. Their objective was to make this pamphlet useful to the industry for planning fishing strategy. We invite the suggestions of readers for improving future pamphlets.

<sup>1</sup>Formerly Bureau of Commercial Fisheries

McRae, Ernest D., Jr. The West German research vessel Walther Herwig.  
1967 Dept. of the Interior, U.S.F.W.S.; B.C.F.,  
Wash., D. C.; Circular 266, September, 1967.

The Walther Herwig is a modern fishery research vessel built for the West German Government and launched in 1963. The vessel was primarily designed as a stern trawler for use in high sea fisheries investigations with emphasis on mid-water

and bottom trawling. Pertinent features of design, equipment, appurtenances, arrangement, and location are described in some detail for the benefit of interested groups or organizations who may be planning to build or outfit vessels of their own for similar use.

McRae, Ernest D., Jr.  
and Leon E. French,  
Jr.

1965

An experiment in electrical fishing with an electric field used as an adjunct to an otter trawl net. Dept. of the Interior, U.S.F.W.S.; C.F.R., Separate No. 734, Vol. 27, No. 6, June, 1965.

Electrical fishing is not a new fishing method; however, problems with application in a marine environment have limited its successful use to date. As part of cooperative research with the Smith Research and Development Company (SRD), the U. S. Bureau of Commercial Fisheries test-fished electrical fishing equipment (developed by SRD) which was designed to overcome these problems.

The tests were conducted on New England commercial fishing grounds and used an electric field as an adjunct to an otter trawl (net) of commercial design. To determine the fishing effectiveness of the electric field, a comparative method of towing was employed. This consisted of a series of as nearly identical tows as possible with the electric field used on alternate tows.

The test results indicate that for overall fishing, the net with the electric field fishing over 2.3 times as effective as the net alone. The fishing effectiveness of the net with the electric field was 1.5 times that of the net alone for taking cod and haddock. For flatfish, the net with the electric field was twice as effective

as the net without the field. The catch rate for taking whiting with use of the electric field was 4.4 times the catch rate of the net alone.

Plans for future work include specific testing to determine the answers to some of the questions unresolved by these tests.

McRae, Ernest D., Jr.  
1961

Red crab exploration off the Northeastern coast of the United States. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. No. 619, Vol. 23(5): pp. 5-10, May, 1961.

Limited explorations for the deep-water red crab (Geryon quinquedens) were conducted by the U. S. Bureau of Commercial Fisheries during the 12 months beginning July 1959. A total of 121 drags were made with commercial trawling gear in areas between the Gulf of Maine and Cape Hatteras. Depths investigated ranged from 50 to 1,040 fathoms and red crabs were taken between 60 and 800 fathoms. The best fishing was between 200 and 300 fathoms.

Results of tests indicate that both yield and quality of the red-crab meat is good, but the quantities of crabs taken are considered insufficient to support profitable commercial-scale fishing for red crabs alone at the depths where the largest concentrations of crabs were found.

McRae, Ernest D., Jr.  
1960

Lobster exploration on continental shelf and slope off Northeastern coast of the United States. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 598, Vol. 22(9): September, 1960.

Commercial quantities of American lobsters (Homarus americanus) were found in deep water as a result of explorations conducted by the U. S. Bureau of Commercial Fisheries on the continental shelf and slope off the northeastern portion of the United States in depths of 50 to 600 fathoms. Two areas were defined by the Bureau's exploratory research vessel Delaware in which sufficient numbers of lobsters were taken to indicate the feasibility of commercial-scale exploration. Standard commercial trawling gear was used at all of the 211 stations covered in the investigation.

Medico, Ernest S.  
1958

Certification and after use measurement of manila otter trawl cod ends. Dept. of the Interior, U.S.F.W.S.; Wash., D. C.; C.F.R. Separate 531, Vol. 20, No. 12, December, 1958.

Describes the development and summarizes some results of the program for certifying manila twine cod ends used by the United States trawling fleet in the fishery for haddock, Melanogrammus aeglefinus (Linnaeus), in Northwest Atlantic Fishery Convention Subarea 5. To implement international treaty agreements concerning this fishery and to assist the industry in complying with mesh-size regulations, a program was developed for certifying new dry cod ends, which met certain tests, as having meshes equivalent to  $4\frac{1}{2}$  inches when wet after use. Measurements were made of these manila cod ends, after varying amounts to use in the haddock fishery, to determine changes in after-use mesh size.

In June 1953 when regulations implemented the use of meshes for otter trawls fishing in Subarea 5, a mesh size of  $5\frac{5}{8}$  inches (dry, knot center to knot center) was recommended for new before-use cod ends. Upon further study the before-use mesh size was lowered to  $5\frac{5}{8}$  inches, because the meshes stretched after use to a greater degree than anticipated.

Murray, John J.  
1955

Gulf of Maine bluefin tuna exploration - 1954. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Sep. 403, pp. 17-21. June, 1955.

The California purse seiner Western Pride operated in the New England bluefin-tuna fishery from July 28 to September 9, 1954, under a cooperative agreement with the U. S. Fish and Wildlife Service. Fishing activities were conducted in the Cape Cod-South Channel area. Best fishing areas were found 40 nautical miles east southeast of Buoy "R6" of Chatham, Mass., and 10 nautical miles northeast of Race Point, Mass. This report discusses the vessel and fishing equipment and scouting and fishing results.

Murray, John J.  
1954

Gulf of Maine bluefin tuna exploration - 1953. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; Sep. 374, Vol. 16, No. 7, pp. 10-19, July, 1954.

The third successive season of exploratory fishing for Gulf of Maine bluefin tuna was conducted from July 15 to October 15, 1963. Long-line gear was used as the principal fishing method, with surface trolling lines, floating gill nets, and trammel nets as secondary gear. The long-line catch of tuna was much smaller than in the preceding years -- only 38 tuna weighing 2,000 pounds (round weight) as compared to 12,000 pounds in 1952, and 190,000 pounds caught by purse seine in the 1951 exploration. This report discusses the fishing results, gear performance and presents a condensed log of fishing trips.

Murray, John S.  
1953

Gulf of Maine bluefin tuna exploration - 1952. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 353, Vol. 15(7): pp. 1-17., July, 1953.

Exploratory fishing for bluefin tuna, using Japanese-style long-line gear, was conducted from June through October, 1952 in offshore waters from Maine to New Jersey. Gill nets, trammel nets, surface-trolling gear, and hand lines were also tested to a lesser extent. All available evidence suggests that the 1952 run of tuna in New England was far below normal. In spite of the low total catch, some aspects of this season's long-line fishing were encouraging. Potentially valuable tuna grounds producing excellent individual catches were found within 30 miles of land.

Murray, John S.  
1952

Report on 1951 exploratory bluefin - tuna fishing in the Gulf of Maine. Dept of the Interior, U.S.F.W.S.; B.C.F., Wash. D. C.; Sep. 309, Vol. 14(3): pp. 1-20, March, 1952.

The development of a Gulf of Maine commercial tuna fishery has long seemed to be a definite possibility. Successful establishment of such a fishery would substantially contribute to year-round employment in the sardine industry which is now operating on a seasonal basis. This report discusses such topics as (1) the extent and range of bluefin-tuna concentrations in New England coastal waters during the summer and fall seasons, (2) the availability of bluefin-tuna in quantities sufficient to warrant an expanded fishing operation, and (3) the testing of various fishing methods and equipment to determine the most efficient methods for capturing tuna in commercial quantities.

Parker, Phillip S.,  
J. M. Mendelsohn,  
E. D. McRae, Jr.,  
F. S. King and  
A. H. Joyce

1970

The ocean quahog - a bountiful clam. Food Product Development, November, 1970, Arlington Pub., Co., 2N. Riverside Plaza, Chicago, Ill.

The Bureau of Commercial Fisheries (BCF) has considered the potential of the ocean quahog and has undertaken preliminary resource development work. Investigations have been conducted to establish the extent of the resource by extensive exploratory surveys. Efforts have been made to promote the acceptance of ocean quahogs as a food item on a near par with other marine clams; this has been done by developing new recipes and usages. Such topics as resource location and yield, past use of the quahog, factors affecting quahog utilization, and new products made with ocean quahogs are discussed.

Parker, Phillip S.  
1968

Clam survey off Virginia (Cape Charles to False Cape). Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 804, pp. 25-38, January, 1968.

The third in a series of surf clam surveys being made by the Bureau of Commercial Fisheries was completed off the coast of Virginia between May 1965 and May 1966. Its purpose was to explore for populations of surf clam; to determine the abundance and distribution of clams in this area; and factors affecting the populations; and to collect data on other species of shellfish. During the survey 1,367 stations were occupied and catches ranged from 0 to 9 bushels of surf clams per tow. Areas surveyed and the results of the survey are described.

Parker, Phillip S.  
1971

History and development of surf clam harvesting gear. Dept. of Commerce, N.O.A.A., Tech. Report, Circ. 364, October, 1971.

The development of harvesting gear for surf clams, Spisula solidissima, along the eastern coast of the United States is reviewed from early times up to the present. Most gear development work has been the result of the surf clam industry itself. However, the Federal Government, in cooperation with industry, has developed several pieces of equipment for adaptation to clamming gear.

Parker, Phillip S.  
1970

The ocean quahog, "Arctica islandica", resource of the Northwestern Atlantic. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; F.I.R. Vol. 6(4): pp. 185-195, September 1970.

The ocean quahog is a species of marine clam. Means for sight-keying this clam and separating it from the similar hard clam, Mercenaria mercanaria, are discussed. The range and population density of the ocean quahog in Continental Shelf areas off the Atlantic seaboard vary considerably with changes in water depths and bottom sediments. The gear, method used, procedure, and results of a survey pertinent to ocean quahogs are presented.

Parker, Phillip S.  
1967

Development of a submersible pumping system for a hydraulic surf clam dredge. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 793, Vol. 29(6); pp. 50-55, June, 1967.

An electrically driven submersible pump was tested as a means of supplying water to a hydraulic surf clam dredge. The

pump used supplied 2,000 gallons per minute directly to the jet manifold of the dredge. The submersible pump operated satisfactorily and gave results comparable to the vessel-mounted system. Advantages of the new system are ease of handling and greater efficiency in power transmission.

Parker, Phillip S.  
1967

Sleeve for clam jetting hose connection. Dept. of the Interior, U.S.F.W.S., B.C.F., Wash., D. C.; C.F.R. Sep. 790, pp. 67, April, 1967.

A steel sleeve similar to those now frequently used in the commercial sea clam industry to connect two sections of clam jetting hose is described. This device is quick and easy to use and has proven to be highly effective and serviceable.

Parker, Phillip S.  
1967

A clam measuring board. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 789, Vol. 29(4):, pp. 66-67, April, 1967.

A new type of measuring board was developed to make rapid measurements of surf clams aboard vessels at sea and under rough sea conditions more easily possible. This board can be built by almost anyone handy with tools. Sufficient details are given to guide in the construction of functional measuring boards.

Parker, Phillip S.  
1966

Ocean clam survey off U. S. Middle Atlantic Coast - 1963. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 756, Vol. 28, No. 3, March, 1966.

A cooperative clam survey was conducted during the summer of 1963 by the Eastern Sea Clam Packers Committee of the Oyster

Institute of North America and the U. S. Bureau of Commercial Fisheries. The purpose was to locate an assess clam resource in the area adjacent to those commercially fished. Operations are described and results discussed.

Parker, Phillip S.  
1965

Clam survey Ocean City, Maryland to Cape Charles, Virginia. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Sep. 791, Vol. 27(5): pp. 56-64.

During the summer of 1964 and the fall and winter of 1965, the BCF conducted a clam survey off the coasts of Maryland and Virginia. The purpose of this survey was to gather information on abundance, distribution, and size of surf clams. Operations and results are described.

Rathjen, Warren F.  
and Benny C. C. Hsu  
1970

Sea bob fishery of the Guianas. Dept. of the Interior, U.S.F.W.S.; B.C.F., Wash., D. C.; C.F.R. Reprint 889, Vol. 32(10); pp. 38-44.

Describes traditional fishing techniques for a variety of estuarine shrimp.

Rathjen, Warren F.  
and J. Sullivan  
1970

Whaling in the West Indies. Sea Frontiers, Vol. 16, No. 3, pp. 130-139; The International Oceanographic Foundation, 10 Rickenbacker Causeway, Virginia Key, Miami, Florida.

Describes whaling from open boats in the Midward Islands of the West Indies.

Rathjen, Warren F.,  
M. Yesak  
and B. Hsu  
1969

Trawlfishing potential off Northeastern South America. Proceedings of the Gulf and Caribbean Fisheries Institute, 21st Annual Session, November, 1968, 86-110; FAO of the United Nations.

More than 10 independent trawl fishing investigations have been conducted along the continental shelf of northeastern South America during the last 25 years. The results of these investigations are reviewed.

The government of Surinam has operated the trawler COQUETTE for exploratory and production fishing programs along its coast for over 10 years. Fishing logs of the COQUETTE for the years 1963 to 1965, comprising a total of 2,717 drags, were examined.

The UNDP/FAO Caribbean Fishery Development Project vessel CALAMAR conducted trawl fishing explorations from off the coast French Guiana to Venezuela. During 1967 and 1968, more than 400 trawl drags were completed by the CALAMAR.

The data collected by the COQUETTE and CALAMAR were analysed for catch per unit effort to determine differences by area, year, season, depth and time of day. Differences in species composition of the catch with the above variables also were noted. The results of the COQUETTE and CALAMAR operations are compared.

With the trawl fishing explorations conducted to date as a background, the fishes potential of the northeastern coast of South America is discussed.

Rathjen, Warren F.  
1965-1968

Exploratory fishing activities - UNDP/FAO Caribbean fisheries development project; symposium on investigations and resources of the Caribbean Sea and adjacent regions. Food and Agriculture Organization of the United Nations, Rome. FAO, Fisheries Report.No. 71-72, pp. 237-248.

Describes the exploratory fishing problems of the UN/FAO sponsored Caribbean Fisheries Development Program, 1965-1968.

Rathjen, Warren F.  
and S. H. Rogers  
1965

TV eye scans sea bottom for new resources. Fishing Gazette (2 pp., March 1965), 461 Eighth Avenue, New York, N. Y. 10001.

Describes the use of underwater television in underwater surveying.

Rathjen, Warren F.  
and M. Yesaki  
1966

Alaska shrimp explorations, 1962-1964. Dept. of the Interior, U.S.F.W.S.; B.C.F., C.F.R., Wash., D. C., Sep. 701, Vol. 28(4): pp. 1-14, April, 1966.

Recognizing the need for more detailed knowledge of potential Alaska shrimp resources, the U. S. Bureau of Commercial Fisheries conducted intensive exploratory fishing with shrimp trawls during the summers of 1962, 1963, and 1964. Waters explored during the 3 years included those of the northern Gulf of Alaska between Cape Sudkling (lat. 60°N., long. 144°W.) and Unalaska Island (lat. 54°N., long. 167°W.). Some preliminary explorations were made in portions of the Bering Sea. During the studies, 539 trawl drags (ranging from 30 to 60 minutes each) captured over 100,000 pounds of shrimp. Pink shrimp (Pandalus borealis) made up 72 percent of the total catch, and averaged 90 shrimp per pound. A larger species, side-stripe shrimp (Pandalopsis dispar), made up 18 percent of the catch. Smaller amounts of other species were taken.

The highest average catch rates were made in the general vicinity of the Shumagin Islands where 82 trawl drags of about 30 minutes averaged over 650 pounds per drag.

Observations were made on the occurrence of other species including king, Dungeness, and tanner crabs. During 1963 and 1964, 56 percent of the fish species caught incidently included various types of flatfish; pollock, rockfish, and other species were important in the remainder.

Hirtz, Charles R  
Warren F. Rathjen  
1965

Bottom trawling surveys of the Northeastern Gulf of Alaska. Dept. of the Interior, U.S.F.W.S.; B.C.F., C.F.R., Wash., D. C.; Sep. 741, Vol. 27(9): pp. 1-15, September, 1965.

The U. S. Bureau of Commercial Fisheries in cooperation with the International Pacific Halibut Commission used otter trawls to survey bottomfish and shellfish on the Continental Shelf and upper continental slope in the Gulf of Alaska. Much of the area surveyed was judged to be untrawlable with conventional bottom trawls used in the surveys. Flatfish made up 43 percent of the total catch of fish and invertebrates. The arrow-tooth flounder or turbot was dominant species at all depths, comprising 60 percent of the flatfish catch and 26 percent of the combined fish and invertebrate catch.

Rathjen, Warren F.  
and Joquim B. Rivers  
1964

Gulf of Alaska scallop explorations - 1963. Dept. of the Interior, U.S.F.W.S.; C.F.R., Wash., D. C.; Sep. 701, Vol. 26(3): pp. 1-7, March, 1964.

Exploratory fishing for scallops (Patinopecten caurinus) was conducted in the waters of the Gulf of Alaska during 1963. The objective of this survey was to determine the practicality of more detailed explorations for scallops in that area. Catches of scallops were made in amounts as high as 7 bushels per 30-minute drags with an 8-foot dredge. The individual scallops ranged up to 7 inches in diameter and yielded approximately 4-6 pounds of shucked meats per bushel measure. Good catches of scallops were taken at several locations including: off Cape Fairweather at depths from 34-42 fathoms, off Icy Bay from 39-44 fathoms, and east of Cape Saint Elias where catches were taken between 54 and 56 fathoms. It is not expected that this potential resource will receive significant exploitation until (1) the range and abundance are better defined and (2) thorough consideration is given to all aspects of the economic including production, processing, and marketing.

Rathjen, Warren F.  
and L. A. Fahlen  
1962

Progress Report on midwater trawling studies carried out off the New England coast in 1961 by the M/V Delaware. Dept. of the Interior, U.S.F.W.S.; B.C.F., C.F.R., Wash., D. C.; Sep. 659, Vol. 24(11): pp. 1-11, November, 1962.

Experiments with midwater trawling gear were conducted in 1961 by the U. S. Bureau of Commercial Fisheries with the research vessel Delaware. The principal objective of work in 1961 was to modify midwater trawling gear so that it could be controlled accurately. A depth-sounder transducer was mounted on the headrope of a trawl to allow a constant check to be made on the relation of the net to the bottom and to fish schools. In limited fishing trials, carried out with the

transducer-equipped net, over 25 species of marine animals were sampled. Atlantic herring were caught in amounts up to 4,5000 pounds per tow. Other commercially-desirable species taken included whiting (silver hake), mackerel, and butterfish. The midwater gear experiments and explorations are scheduled to continue.

Rathjen, Warren F.  
and Peter C. Wilson  
1961

Russian gill netter docks in Boston, Massachusetts. Dept. of the Interior, U.S.F.W.S., B.C.F., C.F.R., Wash., D. C.; Sep. 629, Vol. 23(9): pp. 41-43.

Tells of visit aboard Russian vessel fishing for herring with gill nets.

Rathjen, Warren F.  
1960

Sink gill net fishing in New England. Dept. of the Interior, U.S.F.W.S., B.C.F., C.F.R., Wash., D. C.; Sep. 604, Vol. 22(11): pp. 16-19.

Sink gill net fishing as practiced out of Gloucester described.

Rathjen, Warren F.  
1959

Experimental trawling for red snapper. Proceedings of the Gulf and Caribbean Fisheries Institute, 11th annual session, F.A.O. of the United Nations, pp. 128-132.

Use of New England type heavy duty fish trawls on coral bottom described. Work completed on Campeche Bank and in other portions of the Gulf of Mexico.

Bullis, Harvey R., Jr.  
and Warren F. Rathjen  
1959

Shrimp explorations off the southeastern coast of the United States (1956-1958). Dept. of the Interior, U.S.F.W.S., B.C.F., C.F.R., Wash., D. C.; Sep. 551, Vol. 21(6): pp. 1-20, June, 1959.

Explorations between Cape Hatteras and Florida Straights. Principal findings quantities of royal red shrimp and calico scallops.

Rathjen, Warren F.  
1955

The haul seiners. The New York State Conservationist. April-May. p. 7, State Campus, Albany, N. Y.

Short description of beach haul seining off Long Island, N. Y. with photograph.

Ruggiero, Michael  
1961

The surf-clam fishery of New Jersey - Equipment Note, No. 9, Dept. of the Interior, U.S.F.W.S., B.C.F., C.F.R., Wash., D. C.; Sep. 626, Vol. 23, No. 8, pp. 11-13, August, 1961.

The surf-clam fishery of New Jersey as of 1961 is briefly discussed. Utilization and location of the fishery are covered with an emphasis on the fishing gear used. Descriptive photographs accompany the text.

Ruggiero, Michael  
1960

Braided synthetic twines and their use in the New England trawl fishery. Dept. of the Interior, U.S.F.W.S., B.C.F., C.F.R., Wash., D. C.; Sep. 582, Vol. 22, No. 3, pp. 6-11, March, 1960.

The history of the use of braided synthetic twine by the fishing industry is traced. The construction of twine and the characteristics of braided twine are discussed. The advantages of synthetic twine in the New England trawl fishery are described.

Smith, Keith A.  
1955

Use of an electrical attracting and guiding device in experiments with a "fish pump". C.F.R., Vol. 17(2):, February, 1955 (C.F.R. Sep. 392), pp. 7, U.S.F.W.S., B.C.F., Wash., D. C., February, 1955.

Results of fishing experiments using gear designed for pumping fish in combination with an electrical-guiding device and an automatic light dimmer show that, in calm waters, small herring (and probably other small phototropic fish) can be attracted and caught in a pump by use of a light for attracting them and a direct-current pulsating electric field for guiding them. These fish are not repelled at the outer fringe of the electric field. Instead, when attracted by the light they enter the field to a point where they involuntarily swim to the anode and are swept into the pump by the flow of water.

The gear took fish most successfully when both the underwater light and pulsating field were in operation. Small catches, however, were made using light alone. Sudden movement of the light and electrode assembly frightened the herring away. Thus, movement such as that caused by the rolling of the vessel prevented the herring from approaching the gear closely. Dimming the light did not cause herring to approach closer. The best catches were invariably made in the early morning during the approach of daylight.

Further work in attracting and guiding fish to a point of capture in the seas might be implemented by the use of light of the proper wave length and by sounds of proper pitch and intensity. More effective use of white light and an electrical field can be made by use of a better electrode design and a more stable support for the attracting and guiding assembly.

Smith, Keith A.  
1960

Air-bubble and electrical-field barriers as aids to fishing. Proc. Gulf & Caribbean Fish. Inst., 13th Ann. Sess., November, 1960, pp. 73-86.

This article reviews the conventional types of fishing gear and methods and points out some of their inadequacies. Special types of gear were tried to improve catches during these special conditions. The gear and methods used is described as well as trial fishing and the results.

Smith, Keith A.  
1961

Air-curtain fishing for Maine sardines. C.F.R., Vol. 23(3);, March, 1961 (C.F.R. Sep. 614), pp. 14.

Since its initiation, nearly a century ago, the Maine sardine industry has been dependent upon passive types of gear -- weirs and stop seines -- for the capture of its basic raw material, the Atlantic herring (Clupea harengus harengus). Such gear, although effective in capturing inshore schools and in incorporating the necessary provision for holding the live fish for several days, is not effective in coping with the schools when, as often happens, they remain in deeper water offshore. Failure of the herring to move inshore has often resulted in cannery supply shortages.

Realizing the need for a more active and far-reaching type of gear, the U. S. Bureau of Commercial Fisheries began, in 1955, to experiment with other types of gear. Research activities were largely based on the premise that, since the herring are easily-frightened fish, a device that would frighten them might also be used to drive or guide the fish from deep water to the areas where they

could be taken in the weirs and stop seines. In the past three years, the usefulness and effectiveness of an air-bubble curtain for driving and guiding the herring has been demonstrated to the industry, and at least 12 air-curtain units have now been constructed by members of the Maine industry.

Essentially, the air-bubble curtain consists of several lengths of  $\frac{1}{2}$ - to  $\frac{3}{4}$ - inch-diameter polyethylene pipe, weighted to lie on or near the sea bottom, and from which columns of bubbles escape through  $\frac{1}{64}$ - inch holes bored in the pipes at regular intervals. Air is supplied by a shipboard compressor. The bubble curtain is used to surround the fish and slowly draw them to the seines, or to otherwise direct them in the direction of the weirs and seines by cutting across their normal path of movement..

Smith, Keith A.  
1963

Exploratory fishing for Maine herring.  
Dept. of the Interior, F.W.S., S.S.R.-  
Fish., No. 463, pp. 9, Wash., D. C.,  
December, 1963.

Exploratory herring fishing operations were carried out along the Maine coast during the summers of 1955 and 1956 using the research vessel Theodore N. Gill and the chartered small otter trawler Metacommet. The coastal and Gulf of Maine waters were sounded and fished with a lampara seine, gill nets, midwater trawls, and otter trawls. Inshore explorations located zero-year-class herring in the bays and inlets and traced their development in these areas until they became sardine-sized fish in late fall. Sardine-sized and large herring were found occupying an ocean-bottom habitat during the winter. A scattering of large unschooled herring was found in coastal waters during the summer of 1956.

Smith, Keith A.  
1964

The use of air-bubble curtains as an aid to fishing. In: Modern Fishing Gear of the World, Vol. II., pp. 540-544, Fishing News (Books) Ltd., London, June, 1964.

The use of air-bubble curtains for guiding herring schools to point of capture was first tried by the U. S. Fish and Wildlife Service in Maine, U.S.A., in the fall of 1957, and has been reported on in the Commercial Fisheries Review of the U. S. Bureau of Commercial Fisheries. The air-bubble curtain was used to intercept the movement of young herring (Clupea harengus) and lead them to stationary weirs, traps or seines fencing off a bay. The most satisfactory air-compressing unit consisted of a three-cylinder single-stage compressor, 196 ft<sup>3</sup>/min at 80 psi, driven by a 52-hp diesel engine. The required power input is about 25-30 hp. The air compressor has a 30-gallon air receiver and a sea water-cooled compressed air aftercooler. To lay out the air curtain, a polyethylene pipe was used. Being flexible, it can be wound on to a reel and minutely small holes can be easily drilled in the wall of the pipe to provide air outlets; furthermore it is inexpensive, lightweight and easy to handle. The disadvantages are that it is buoyant and must be weighted to sink, melts at relatively low temperature so that an aftercooler is required to remove heat of compression from the air. The above compressor could supply air for 2,400 ft of air curtain, emanating from 0.016 inch holes in the pipe, or else 600 ft of a heavier curtain achieved with 0.0312 inch holes, drilled in the plastic pipe at 1-ft intervals. A galvanized wire rope was attached along the pipe to sink it. In commercial fishing trials the air curtain was looped around the school of herring and the pipe was then towed slowly inshore by boats on each end, thus driving the school to within range of the stop-seine.

Smith, K. A., and  
H. E. Stubbs  
1971

Rotor device for controlling depth of towed fishing trawls. In: Modern Fishing Gear of the World, Vol. III; "Fish Finding, Purse Seining & Aimed Trawling". pp. 401-405. Fishing News (Books) Ltd., London. 1971.

A brief summary of early midwater trawl doors leading to the development of this use for the rotor devices is given. The developmental and testing steps for the technical basis of rotor lifts is given. A description of the rotor when incorporated into doors for midwater trawling is supplemented with a suggested alternate positioning of the rotor directly onto the net instead in the trawl doors.

Smith, Keith A.  
1971

Untapped north Atlantic fisheries. In: Our Changing Fisheries. pp. 360-373. Dept. of Commerce, NOAA - National Marine Fisheries Service, Wash. D.C. 1971.

This is the leading article in the section of the book titled "Fisheries in the future". In introducing the content, the author has grouped the underused species into loose groupings which reflect similarity of occurrence and probable best fishing methods. To orient the reader in respect to the possible potential value of each unused resource discussed, a general assessment of the resource size is attempted and the suitability of each species for use under present conditions is indicated.

Squire, James L., Jr.  
1956

Development of the Pacific coast ocean shrimp fishery; Dept of Interior, US.F.W.S.; B.C.P., Wash., D.C.; C.F.R. Vol. 18, No. 9, pp. 1-6, Sept. 1956

Traces development of the deep water fishery for shrimp starting in 1952. Exploratory fishing by the N.B. Scofield and early catch results and regulations.

Squire, James L., Jr. 1959 New England commercial bluefin tuna purse seining - 1958 season. Dept. of Int. U.S.F.W.S.; B.C.F., Wash., D.C.; C.F.R. Sep. #538, Vol. 21, No. 2, pp. 1-5 February 1959

Description of early commercial purse seining in New England. The fishing activities of the Silver Mink, Santa Maria, and Western Explorer are reviewed.

Squire, James L., Jr. 1963 Distribution of tuna species in the oceanic Northwest Atlantic. In: Proceedings of the World Scientific Meeting on the Biology of Tunas and Related Species. F.A.O. Fisheries Reports, Vol. 3, No. 6, pp. 1477-1514. United Nations, Rome

Explorations of the oceanic Northwest Atlantic by the exploratory fishing vessel Delaware during the years 1957 to 1960, using sub-surface long-line fishing gear are discussed. Species dominance in this area changes from bluefin tuna to yellowfin tuna, Thunnus albacares, during the summer and early autumn.

Catch per unit effort ranged from zero to 20.8 fish (or 1,431 kg) per 100 hooks for bluefin tuna and 14.1 fish (or 568 kg) per 100 hooks for yellowfin tuna.

A comparison is made between tuna occurrence in the vicinity of the Kuroshio Current in the Pacific and the Gulf Stream of the Atlantic.

Squire, James L., Jr. & Frank S. Mather III  
1962  
Observation on the commercial potential of tuna in the oceanic Northwest Atlantic. In: Proceedings of the Gulf and Caribbean Fisheries Institute. 15th Annual Session, Nov. 1962 pp. 125-134

Explorations using tuna longline gear in the Oceanic Northwest Atlantic, from off Cape Hatteras to east of Bermuda and north to near the Grand Banks are discussed. Exploratory catches by the research vessels DELAWARE, CRAWFORD, SILVER BAY, SHOYO MARU and CAP'N BILL III are projected to a theoretical catch rate of 100 ten-hook baskets of tuna longline gear

Squire, James L., Jr.  
1962  
Distribution of tunas in oceanic waters of the Northwestern Atlantic. Fishery Bulletin No. 211. Dept. of Interior, U.S.F.W.S.; B.C.F. Wash. D.C.; Vol. 62, pp. 343-402.

A discussion of tuna distribution based on relation to water mass and geographic positions.

Squire, James L., Jr.  
1961  
Aerial fish spotting in the United States. Dept. of Interior, U.S.F.W.S.; B.C.F., Wash., D.C.; C.F.R., Sep. No. 633, Vol. 23(12) pp. 1-7  
September 1961

The use of aircraft in locating various commercial fishes are discussed.

Standley, Mark L. and  
Phillip S. Parker  
1967

Development of a submersible pumping system for a hydraulic surf clam dredge. Dept. of Interior, U.S.F.W.S.; B.C.F., Wash., D.C.; C.F.R., Sep. No. 793, Vol. 29(6) June 1967.

A 65 hp electrically driven submersible pump was tested as a means of supplying water to a 48-inch hydraulic surf clam dredge. Comparison tows were made with a conventional hydraulic supply system with comparable results. Ease of handling and greater efficiency in power transmission are advantages of the new system.

Twohig, Patrick J.,  
B. L. Griswold, and  
Y. Kurlyandsky  
1971

Performance of trawls used in joint US-USSR groundfish studies. In: Proceedings of the Annual Meeting, June - 1971. ICNAF Res. Doc. 71/117, Serial No. 2604 (B.g.20)

The USA and USSR conducted a cooperative cruise in the autumn 1970 aboard the USSR scouting vessel KVANT for the purpose of measuring the performance characteristics of trawls used in the possible candidates for a new standard trawl. The cruise was divided into two parts. Part 1 of the cruise took place during the daylight hours from September 25 through October 1 in an area 25-30 miles south of Martha's Vineyard in water about 50-100 meters deep. The objective of this part was to measure the vertical and horizontal spread of six trawls (three USSR, two Canadian, and one US) under varying

towing conditions. Part II of the cruise was conducted from October 2-10 in the same general area as Part I and the purpose of this part was to compare the fishing power of the USSR trawls.

Wolf, Robert S.  
1971

Research vessels of the N.M.F.S.  
NOAA Technical Reports, Wash., D.C.  
Circ. 362. August 1971.

The research fleet of the National Marine Fisheries Service (formerly the Bureau of Commercial Fisheries) of the National Oceanic and Atmospheric Administration, U.S. Dept. of Commerce, is described. Vital statistics for each ship are given. Vessel descriptions are accompanied by photographs. A brief text covering fleet activities and modernization precedes the vessel description.

Wilson, Peter C.  
1960

A small boat tuna long-line fishery.  
Dept. of Interior, U.S.F.W.S., B.C.F.  
Wash., D.C., C.F.R. Sep. No. 599,  
Vol., 22, No., 9, pp. 8-13  
September 1960

Small fishing vessels from Gloucester, Mass., have successfully fished sub-surface bluefin tuna (Thunnus thynnus) on Stellwagen Bank in Massachusetts Bay using long-line gear especially adapted to inshore operations for large tuna. During the short season between mid-August and late October, boats 35 to 40 feet in length have made catches approximately 60,000 pounds per vessel

Wilson, Peter C., and Martin R. Bartlett  
1967 Inventory of U.S. exploratory long-line fishing effort and catch rates for tunas and swordfish in the Northwestern Atlantic, 1957-65. Dept. of Int., U.S.F.W.S.; B.C.F. Wash.; D.C., S.S.R. No. 543, February 1967

This report summarizes the results of longline explorations for tunas and swordfish by the Bureau of Commercial Fisheries and the Woods Hole Oceanographic Institution in the Northwestern Atlantic from March 1957 to June 1965. Fishing log data from 31 exploratory cruises are summarized in 12 monthly tables that give the date, time, position, number of hooks fished and catch for each longline set. The total and monthly fishing effort (Number of longline sets and hooks fished within each 1° latitude and longitude square) is shown by 13 figures. Similar figures show the total and monthly average and maximum number of bluefin, yellowfin, albacore, and bigeye tunas, and swordfish caught per 100 hooks within each 1° square. Two figures show the monthly catch rates for blackfin and skipjack tunas by 1° squares.

Wilson, Peter C.  
1965

Review of the development of the Atlantic coast tuna fishery. Dept. of Int., U.S.F.W.S.; B.C.F., Wash., D.C.; C.F.R. Sep. #728 Vol. 27, No. 3, pp. 1-10 March 1965.

Bluefin tuna are seasonally abundant along the New England coast where they have been of minor commercial importance for many years. In 1951 the U.S. Fish and Wildlife Service began investigating that resource to determine whether a New England tuna fishery was feasible. The results of those investigations showed that several different species of tuna were present in the Northwest Atlantic beyond the U.S.

Continental Shelf. The Fish and Wildlife Service sponsored purse-seine trials in 1951 and 1954, and the 1968-61 operations of a commercial vessel (with which the Service's Bureau of Commercial Fisheries cooperated) demonstrated that commercial quantities of blue-fin tuna could be harvested in New England waters. During 1962 and 1963 the new tuna fishery had a purse-seine fleet of 16 United States and 2 Canadian vessels. The season lasted 5 months and the fishing area included all of the Continental Shelf from Virginia to Massachusetts. A skipjack resource was also discovered. In 6 years the Atlantic Coast tuna purse-seine catch rose to 9,000 short tons, including 3,000 tons of skipjack.

Wilson, Peter C.  
1965

Long-line gear improvements - aluminum crimping sleeve prevents hook damage by electrolysis - equipment note #17. Dept. of Int. U.S.F.W.S.; B.C.F., Wash., D.C.; C.F.R. Sep. No. 740, Vol. 27, No. 8, pp. 19 August, 1965.

The prevention of hook damage in long-line fishing by substituting aluminum for copper as a sleeve material is discussed.

of the National Oceanic and Atmospheric Administration, U. S. Dept. of Commerce, is described. Vital statistics for each ship are given. Vessel descriptions are accompanied by photographs. A brief text covering fleet activities and modernization precedes the vessel description.

73) Wilson, Peter C.

1960. A small boat tuna long-line fishery. Dept. of Interior, U.S.F.W.S., B.C.F., Wash., D.C.; C.F.R. Sep. No. 599, Vol. 22, No. 9, pp. 8-13.

Small fishing vessels from Gloucester, Mass., have successfully fished subsurface bluefin tuna (Thunnus thynnus) on Stellwagen Bank in Massachusetts Bay using long-line gear especially adapted to inshore operations for large tuna. During the short season between mid-August and late October, boats 35 to 40 feet in length have made catches approximately 60,000 pounds per vessel.

74) Wilson, Peter C.

1965. Review of the development of the Atlantic coast tuna fishery. Dept. of Interior, U.S.F.W.S., B.C.F., Wash., D.C.; C.F.R. Sep. 728, Vol. 27, No. 3, pp. 1-10.

Bluefin tuna are seasonally abundant along the New England coast where they have been of minor commercial importance for many years. In 1951 the U. S. Fish and Wildlife Service began investigating that resource to determine whether a New England tuna fishery was feasible. The results of those investigations showed that several different species of tuna were present in the Northwest Atlantic beyond the U. S. Continental Shelf. The Fish and Wildlife Service sponsored purse-seine trials in 1951 and 1954, and the 1958-61 operations of a commercial vessel (with which the Service's Bureau of Commercial Fisheries cooperated) demonstrated that commercial quantities of bluefin tuna could be harvested in New England waters. During 1962 and 1963 the new tuna fishery had a purse-seine fleet of 16 United States and 2 Canadian vessels. The season lasted 5 months and the fishing area included all of the Continental Shelf from Virginia to Massachusetts. A skipjack resource was also discovered. In six years the Atlantic Coast tuna purse-seine catch rose to 9,000 short tons, including 3,000 tons of skipjack.