NORTHEAST FISHERIES CENTER

END-OF-YEAR REPORT

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts 02543

CALENDAR YEAR 1988

The Northeast Fisheries Center's End-of-Year Report is a synoptic administrative report on key Center research activities during the year. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each write-up to contact for more information.

April 1, 1989

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center

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1. **STATUS OF THE STOCKS:** The "Status of the Fishery Resources Off the Northeastern United States for 1988" was published, reviewing the status of 33 species or species groupings, as well as discussing trends in commercial and recreational fisheries, economic aspects of commercial fisheries, and overall resource abundance (Dr. Tim D. Smith, FTS 840-1251 or (508) 548-5123).

2. **COLLECTION OF FISHERIES DATA AT SEA:** A contract was awarded to the Manomet Bird Observatory of Manomet, Massachusetts, to provide observers for collecting commercial fisheries data and samples on board 200 domestic fishing trips in 1989 (Gregory L. Power, FTS 840-1266 or (508) 548-5123).

3. **EFFORT AND CATCH OF BIG-GAME SPECIES:** Recreational fishing effort and catch data, as well as biological data, were obtained and processed for tunas, billfishes, and sharks in Southern New England and Mid-Atlantic waters (Harold A. Foster, FTS 840-1212 or (508) 548-5123).

4. **SAMPLING OF COMMERCIAL ATLANTIC SALMON FISHERIES:** The commercial Atlantic salmon fisheries of Labrador, Newfoundland, and West Greenland were sampled to collect biological data and recover internal and external tags (Dr. Kevin E. Friedland, FTS 840-1369 or (508) 548-5123).

5. **NUMERICAL PREDICTIONS OF MARINE ANGLERS:** A method was developed to estimate the future number of anglers in a marine fishery (Dr. Steven Edwards, FTS 840-1364 or (508) 548-5123).

6. **NORTHEAST COMMERCIAL FISHERIES REVENUES ARE LEVEL OR HIGHER IN 1987:** A summary of the economic performance by the Northeast's commercial fisheries in 1987 was prepared, showing level revenues in the finfish fisheries (smaller landings offset by higher prices) and higher revenues in the shellfish fisheries (level landings but higher prices) (Dr. Philip N. Logan, FTS 840-1354 or (508) 548-5123).

7. **ECONOMICS OF ATLANTIC SALMON RESTORATION:** The economic value of Atlantic salmon restoration in New England was estimated to be 309 million dollars annually (Dr. Steven Edwards, FTS 840-1364 or (508) 548-5123).

8. **ISSUANCE OF FISHERMEN'S REPORTS:** Computer-generated reports of the sampling locations, the catches of selected species, and the environmental conditions during our resource surveys were distributed immediately following the spring and autumn bottom-trawl surveys and the summer sea scallop survey (Linda I. Despres-Patanjo, FTS 840-1346 or (508) 548-5123).

9. **EVALUATION OF RESOURCE SURVEYS:** A comprehensive review of the Center's bottom-trawl survey program, including methods and applications, was published (Dr. Michael J. Fogarty, FTS 840-1255 or (508) 548-5123).

10. **WORKSHOP ON TRAWL SURVEYS:** We cosponsored a workshop (for which a report will be available in early summer 1989) with the Atlantic States Marine Fisheries Commission to review ongoing federal and state trawl survey programs and to explore areas of potential cooperation (Thomas R. Azarovitz, FTS 840-1283 or (508) 548-5123).

11. **MANUAL FOR AGING FINFISH AND SHELLFISH:** A comprehensive manual was produced which summarizes our materials and methods for determining the ages of 18 species of finfish and shellfish (Jay M. Burnett, FTS 840-1286 or (508) 548-5123).

12. **WORKSHOPS TO ASSESS STOCKS:** Workshops were held during May and November--for which reports are available--to examine the status of several Northeast fish and invertebrate stocks, as well as to evaluate aspects of the fisheries data, survey data, and analytical techniques going into stock assessments (Dr. Tim D. Smith, FTS 840-1251 or (508) 548-5123).

13. **FISHERIES YIELD OF NORTHEAST CONTINENTAL SHELF ECOSYSTEM:** Center scientists have concluded that the Northeast's continental shelf ecosystem annually produces 17.6 billion pounds of fish and can support a fisheries yield of 2.2-4.4 billion pounds--the current yield is 2.8 billion pounds. Yields could be increased if fishing effort were increased for sand lances, dogfishes, and skates (Dr. Kenneth Sherman, FTS 840-1238 or (508) 548-5123).

14. **STABILITY/VARIABILITY IN FINFISH COMMUNITY:** Fish-egg-and-larva surveys of the Northeast continental shelf ecosystem indicate that during 1977-87 the total finfish biomass was relatively stable, but that species composition was highly variable (Dr. Kenneth Sherman, FTS 840-1238 or (508) 548-5123).

15. **EXPERIMENTAL FISHERY FOR SILVER HAKE:** We conducted with the cooperation of the commercial fishing industry an experimental fishery for silver hake with small-meshed trawls in an area of Georges Bank otherwise restricted to large-meshed trawls, and found only very small catches of the groundfish species which the large-mesh regulations were designed to protect (Frank P. Almeida, FTS 840-1308 or (508) 548-5123).

16. **INTERACTIONS BETWEEN FISHERIES AND MARINE MAMMALS:** To assist managers in minimizing conflict among user groups, we described the spatial relationship among fisheries resources, marine mammals, and seabirds (Dr. Tim D. Smith, FTS 840-1251 or (508) 548-5123).

17. **CONDITION OF OLD ARTIFICIAL REEFS:** Collaborative studies with the New York Department of Environmental Conservation using a remotely-operated vehicle with a mounted television camera showed that the old (20-25 years) artificial reefs off the south coast of Long Island, New York, are covered with sand and show little elevation above the bottom to serve as fish habitat (Dr. William C. Phoel, FTS 342-8215 or (201) 872-3015).

18. **DESIGN CHANGES IN SEA SCALLOP GEAR:** We documented the historical changes in sea scallop gear design and evaluated recent research findings in gear design for reducing juvenile mortality, improving gear selectivity, reducing noncatch mortality, and enhancing resource survey capabilities (Dr. Fredric M. Serchuk, FTS 840-1245 or (508) 548-5123).

19. **EDIBILITY CHARACTERISTICS OF SEAFOOD:** Flavor and texture characteristics, which also take into account seasonal variability, have now been established for 15 common seafood species (Barbara L. Jobe, FTS 837-9279 or (508) 281-9300).

20. **CLEANSING OF SEWAGE-CONTAMINATED SHELLFISH:** We prepared information on methods for commercially cleansing shellfish which have been harvested from sewage-contaminated waters (Dr. Walter J. Blogoslawski, FTS 642-5235 or (203) 783-4235).

21. **PRESERVATIVE EFFECT OF POTASSIUM SORBATE:** Experiments showed that the iced shelf-life of individually-packaged haddock fillets was extended by 2.5 days when the fillets had been dipped in a five-percent potassium sorbate solution (Vincent G. Ampola, FTS 837-9285 or (508) 281-9300).

22. **FISH WASTES AS PLANT FERTILIZER:** In tests of fish hydrolysates (liquid fish wastes) as a fertilizer, the hydrolysates performed as well as inorganic fertilizers on cranberries, and performed better than commercial fertilizers on greenhouse chrysanthemums (Vincent G. Ampola, FTS 837-9285 or (508) 281-9300).

23. **INFLUENCES ON YOUNG WINTER FLOUNDER GROWTH:** Field studies show that the growth and condition of young-of-the-year winter flounder in Narragansett Bay are more related to natural environmental conditions (food, temperature, etc.) than to the pollution levels in the Bay (Dr. Lawrence J. Buckley, FTS 838-6368 or (401) 782-3368).

24. **BACTERIAL ROLE IN WINTER FLOUNDER MORTALITY:** Studies on the role of bacteria in the mortality of winter flounder have identified many bacterial types that can establish infections and even kill flounder when the fish are under stress (Dr. Richard A. Robohm, FTS 642-5237 or (203) 783-4237).

25. **COPEPOD PARASITES IN LARVAL GROUNDFISH:** We have found that certain species of copepod parasites can inflict severe lesions in larval Atlantic cod and yellowtail flounder, thus permitting entry of opportunistic disease organisms (Dr. Joel E. Bodammer, (301) 226-5193).

26. **GEORGES BANK ATLANTIC HERRING AGAIN SPAWNING:** Analyses of our December 1987 fish-egg-and-larva survey of Georges Bank detected the first evidence of Atlantic herring spawning on the bank since 1978 (Wallace G. Smith, FTS 342-8260 or (201) 872-3060).

27. **DECREASED GROWTH RATE OF ATLANTIC MACKEREL:** Studies show a decrease in individual growth rate in Northwest Atlantic mackerel as a result of recent increases in the population size of this stock (Dr. William J. Overholtz, FTS 840-1256 or (508) 548-5123).

28. **PREDATION MAJOR CAUSE OF LARVAL FISH DEATH:** Analyses of our fish-egg-and-larva survey data show that predation, not starvation or disease, is the major source of natural mortality in larval fish on the Northeast's continental shelf ecosystem (Wallace G. Smith, FTS 342-8260 or (201) 872-3060).

29. **DISTRIBUTION AND ABUNDANCE OF OFFSHORE SAND LANCE:** Cooperative work by University of Massachusetts and Center scientists resulted in the documentation of the historical distribution and abundance of offshore sand lance on the Northeast's continental shelf (Gordon T. Waring, FTS 840-1311 or (508) 548-5123).

30. **SHARK REPRODUCTIVE SUCCESS LINKED TO HARVESTING:** We have developed a model which predicts the changes in shark reproductive success in response to various levels of harvesting (John G. Casey, FTS 838-6320 or (401) 782-3320, or Dr. Michael J. Fogarty, FTS 840-1255 or (508) 548-5123).

31. **FOOD HABITS OF BLUE SHARKS:** Analyses show that blue sharks consume a variety of food items to an estimated 0.6 percent of their body weight per day, meaning an 85-pound blue shark would consume 186 pounds of food per year (Dr. Nancy E. Kohler, FTS 838-6332 or (401) 782-3332).

32. **GROWTH RATE OF BLUE SHARKS:** A blue shark which had been captured and injected with tetracycline as a "marker" for age-and-growth studies was recaptured after 1.5 years at liberty (only the second tetracycline-injected shark to ever be recaptured) providing us with hard data on the growth rate of this species (John G. Casey, FTS 838-6320 or (401) 782-3320).

33. **NEWSLETTER ON SHARK RESEARCH:** Through "The Shark Tagger" newsletter, we informed 4,000 cooperating recreational and commercial fishermen of recent shark research activities and findings, as well as provided them with a four-page insert on "Identification of the Sandbar and Dusky Sharks" (John G. Casey, FTS 838-6320 or (401) 782-3320).

34. **SEMINAR ON SHELLFISH BIOLOGY:** Our 8th Annual Shellfish Biology Seminar--for which abstracts of all presentations are available--highlighted ongoing shellfish recruitment studies in Long Island Sound and other Atlantic coastal areas (Dr. Walter J. Blogoslawski, FTS 642-5235 or (203) 783-4235).

35. **LIMITING FACTORS TO NORTHERN QUAHOG PRODUCTION:** Studies of both naturally occurring and artificially stocked populations of northern quahogs in Long Island Sound have determined effects of different sites, stocking densities, phytoplankton blooms, and bacterial populations on the quahog's reproduction, growth, and health (Dr. Anthony Calabrese, FTS 642-5240 or (203) 783-4240).

36. **MICROCELL DISEASE IN OYSTERS:** Studies of the widespread and often fatal "microcell" disease of oysters have resulted in a comprehensive description--including the naming of one new genus and two new species--of the parasitic organisms causing this disease in four species of oysters worldwide (C. Austin Farley, (301) 226-5193).

37. **SARCOMA IN CHESAPEAKE BAY SOFTSHELL CLAMS:** Our observations of infectious sarcoma disease in Chesapeake Bay's softshell clams showed high levels of the disease leading to the deaths of many clams during the early summer, followed by a subsidence of the disease in early autumn and then a reappearance in early winter--setting the stage for another cycle of the the disease to begin this year (C. Austin Farley, (301) 226-5193).

38. **PARASITES AND PREDATORS OF SHELLFISH:** A review report, useful to commercial shellfish aquaculturists, has been issued on the parasites and predators affecting cultured shellfish, especially clams (Dr. Walter J. Blogoslawski, FTS 642-5235 or (203) 783-4235).

39. **UNDERWATER OBSERVATIONS OF SQUID ABUNDANCE:** Observations from a research submersible in the Bahamas showed that some squid species which were previously considered rare because of their scarcity in bottom-trawl catches were actually seen to be common (Dr. Michael Vecchione, FTS/(202) 357-4990).

40. **PREY OF JUVENILE LONGFIN SQUID:** Food habits studies of juvenile longfin squid show that copepods are the dominant prey until the squid are more than two-inches long, but by the time they are about five-inches long, prey are about equally composed of juvenile fish, squid (including cannibalism), and crustaceans (Jack R. Green, FTS 838-6240 or (401) 782-3240).

41. **NEW SPECIES OF MARINE WORMS DESCRIBED:** Extensive sampling of bottom-living invertebrates throughout the Northeast's marine waters has resulted in the finding and describing of three new species of polychaete worms, as well as developing a new key to a polychaete family which will permit using these species in environmental and pollution monitoring programs (Ann B. Frame, FTS 342-8221 or (201) 872-3021).

42. **POPULARIZATION OF LOBSTER GUIDE:** An earlier publication, "Lobsters--Identification, World Distribution, and U.S. Trade," was republished after being reformatted and adapted to a more popular audience, including an introductory section on common names, a larger typeface, distribution maps for individual species, pictures of whole lobsters, a section on freshwater crayfishes, and a checklist of species (Ian Dore, (516) 549-0143).

43. **ILLUSTRATED KEY TO PENAEOID SHRIMPS:** An illustrated key, based on easily recognized body parts, was published for the commercially important peneaoid shrimps of the Americas (Dr. Isabel Perez Farfante, FTS/(202) 357-1417).

44. **DYNAMICS OF GEORGES BANK/GULF OF MAINE COPEPODS DESCRIBED:** Studies of two of the major copepod species in the Georges Bank/western Gulf of Maine region, Calanus finmarchicus and Centropages typicus, have shown a decrease in abundance as well as a decay in the seasonal pattern of abundance during the early 1980s, which appear to be related to changes in the region's water temperatures and wind conditions during that period (Carol Meise-Munns, FTS 838-6258 or (401) 782-3258).

45. **PERSISTENTLY WARM WATERS OF 1980s:** Research on the climatological changes in the fisheries ecosystem of the Northeast's continental shelf showed that air and sea-surface temperatures in the 1980s were persistently warm compared to the previous three decades (Reed S. Armstrong, FTS 838-6280 or (401) 782-3280).

46. **WATER TEMPERATURE DATA AVAILABLE:** To assist researchers and managers, we developed computer programs that can provide the average surface and bottom temperature--based on 11 years of data--at any time and site on the Northeast's continental shelf, and that can show the changes in surface temperatures at any site over any period of time (from hours to years) for which satellite data are available (Dr. Merton C. Ingham, FTS 838-6310 or (401) 782-3310).

47. **HIGH NUTRIENT AVAILABILITY IN MIDDLE ATLANTIC BIGHT:** Studies have shown that despite the normal seasonal fluctuations in nutrient availability in the Middle Atlantic Bight, nutrients generally remain high, increasing the likelihood of phytoplankton blooms, as well as oxygen reductions (hypoxia) resulting from the decay of those blooms (Ruth I. Waldhauer, FTS 342-8287 or (201) 872-3087, or Christine E. Zetlin, FTS 342-8295 or (201) 872-3095).

48. **HARMFUL EFFECTS OF PHYTOPLANKTON BLOOMS:** A summary report, convenient for the use of environmental and resource managers, was prepared on the harmful effects that various phytoplankton blooms can have on marine biota and human health, including the effects of toxins, allelochemicals, and low levels of dissolved oxygen (Dr. John B. Mahoney, FTS 342-8255 or (201) 872-3055).

49. **NUTRIENT INFLUENCE ON POLLUTANT EFFECTS:** Laboratory experiments showed that the phytoplankter Isochrysis galbana is more vulnerable to cadmium pollution when nitrate levels in test-tube cultures are reduced--a similar situation could occur in coastal phytoplankton if nutrient pollution were reduced but cadmium levels remained high (Gary H. Wikfors, FTS 642-5225 or (203) 783-4225).

50. **NUTRIENT POLLUTION IMPLICATED IN NEW JERSEY FISHKILL:** Analyses showed that the apparent cause of a major die-off during June of summer and winter flounder in Sandy Hook Bay, New Jersey, was a nighttime drop in dissolved oxygen levels due to nutrient pollution and excessive phytoplankton production (Andrew F. Draxler, FTS 342-8254 or (201) 872-3054).

51. **RED TIDE IN HUDSON-RARITAN ESTUARY:** Assays suggest that contaminants in the lower Hudson-Raritan Estuary decrease the chances for the occurrence of toxic red tide in that estuary because they limit the production of the dinoflagellate, Gonyaulax tamarensis, a major toxic species in the Northeast (Dr. John B. Mahoney, FTS 342-8255 or (201) 872-3055).

52. **HEALTH OF ESTUARINE FISH:** Information, based on three years of data, is now available on the concentrations of 17 toxic metals and 43 hydrocarbon compounds in sediments and fish livers, as well as the occurrences of lesions in demersal fish species, in estuaries from Machias Bay, Maine, to Chesapeake Bay (Vincent S. Zdanowicz, FTS 342-8232 or (201) 872-3032).

53. **POLLUTANT EFFECTS ON WINTER FLOUNDER REPRODUCTION:** Research on effects of pollution on winter flounder reproduction in Northeast coastal waters shows increased abnormality and death of early life stages at the more polluted sites, adult females being more likely than adult males to have pollutant-associated liver lesions, and those females with liver lesions to have decreased levels of yolk protein (which is needed by eggs developing in the ovary) (Dr. Anthony Calabrese, FTS 642-5240 or (203) 783-4240).

54. **METHYL MERCURY EFFECTS ON FISH EMBRYOS:** Exposure of the embryos of the mummichog, a small estuarine fish, to methyl mercury resulted in genetic damage and developmental defects in the optic, circulatory, and skeletal systems (Dean M. Perry, FTS 642-5230 or (203) 783-4230).

55. **TOXIC-METAL TOLERANCE HIGH IN ESTUARINE INVERTEBRATES:** Invertebrate larvae settling in a contaminated estuary (New York - New Jersey's Raritan Bay) tolerated high levels of toxic metals in experimental sediment trays, while those settling in a cleaner estuary (New Jersey's Great Bay) did not, implying that Raritan Bay's invertebrates have evolved or acquired a tolerance to toxic metals which increases the likelihood of passing those metals on to predators (Clyde L. MacKenzie, Jr., FTS 342-8267 or (201) 872-3067).

56. **RECOVERY OF 12-MILE DUMPSITE SEDIMENTS:** Sediment quality, as indicated by reduced heavy metal contamination, is improving at the New York Bight's 12-Mile Dumpsite since sewage sludge dumping was ended there in December 1987 (Anne L. Studholme, FTS 342-8201 or (201) 872-3000).

57. **ENERGY CONTENT DETERMINED FOR BOTTOM-LIVING ANIMALS:** Energy content (or "food value" to potential predators) was determined for 88 species of common continental slope bottom-living invertebrates, showing that the energy content of these organisms differs little from that for similar organisms on the continental shelf, as well as providing a basis for constructing a multispecies energy model to evaluate habitat alterations (Frank W. Steimle, FTS 342-8259 or (201) 872-3059).

58. **INDICES FOR RESEARCH PUBLICATIONS AND REPORTS:** A bibliography of the Center's 1987 research publications and reports was prepared which included indices for organisms, geographical areas, scientific/technical disciplines, and authors (Jon A. Gibson, FTS 840-1228 or (508) 548-5123).

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