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NOAA/NMFS Developments

Sportfishermen, Researchers, Satellites Join in Gamefish Study

A fleet of privately-owned sportfishing craft, several scientific research vessels, two refueling platforms, and two orbiting satellites rendezvoused in and over the northeast Gulf of Mexico in June to collaborate in a unique study of the ecology of ocean gamefish.

Work began June 15, 1973, when about 50 sportfish boats put to sea to take part in the "Old Salt" fishing tournament, about 100 miles off the Florida "Sun Coast" (Crystal River south to Fort Myers).

Participants included many bluewater fishermen, several components of the Commerce Department's NOAA, the National Aeronautics and Space Administration, about a dozen academic institutions, and several business firms.

Dates for the event are June 15-18, July 20-22, August 24-26, and September 14-16. The planners will take advantage of information from NASA's ERTS-1 (Earth Resources Technology Satellite) to define the fishing area. The four-part event is sponsored by the

non-profit Gulf Oceanographic Development Foundation of Florida, and the coordinator is the State University System of the Florida Institute of Oceanography. Financial profit from entrance fees in the tournament is used to support gamefish research at Florida universities.

The end result is expected to indicate whether expanded usage of scientific programs employing space technology can help NOAA—and through it the sportfishing fraternity—toward a better understanding of recreational fishing resources in the United States. Theoretically, satellite inspection of great stretches of the ocean may reduce some of the guesswork about where the big fighting fish congregate by directing fishermen to favorable locations. An auxiliary result could be an increase in the efficiency of research vessels engaged in oceanographic surveys at the sea surface.

Marine science is served in a variety of ways during the Old Salt tournament. Fishermen station their boats along the eastern edge of an oceanic feature called

the "Loop Current," a fast-moving "river" of tropical water that attracts great quantities of gamefish—marlin, sailfish, tuna, wahoo, dolphin, and others—as it flows through the Gulf. A rich supply of nutrients washes into the region with the current, which becomes a gigantic feeding station for fish of all sizes. Preliminary oceanographic investigation of the surface and sub-surface fixes the variable location of the current for fishermen. Gamefishermen keep daily logs of catches, fish hooked and sighted, and weather and water conditions encountered.

Catches, by prior agreement, are contributed to marine scientists, who seek to understand the relationship between fish populations and oceanographic features. The NOAA research vessel *Oregon II*, under the direction of the National Marine Fisheries Service Southeast Fisheries Center, Miami, Florida, stood at anchor at the fishing site to serve—for the third year—as mothership and floating laboratory for the fleet of anglers.

Aboard the *Oregon II*, the scientific

party weighed and measured trophy fish; examined and recorded biological characteristics of caught fish; preserved whole specimens or anatomical samples for later analysis of various factors related to life forces, migratory patterns, and incidence of heavy metals and pesticides in marine animals; and compiled logbooks of oceanographic circumstances before and during the tourney. The scientists have even developed a special sampling system for those anglers who wish to mount their catches—dissection procedures are confined to one side of the fish; the other side is left intact.

The research vessel *Virginia Key* from NOAA's Atlantic Oceanographic and Meteorological Laboratories, Miami, Florida, conducted preliminary surveys of Gulf waters to be studied during Old Salt. The Laboratories' studies of the Loop Current are part of a larger investigation of the application of satellite technology to oceanography.

ERTS-1 and NOAA-2 (the National Oceanic and Atmospheric Administration's operational environmental satellite), orbiting at 570 and 900 miles over the earth, will repeatedly focus banks of scanners on the fishing site. ERTS-1 provides coverage of the Gulf once every 18 days, and NOAA-2 views the area twice daily. Oceanic features, such as the edges of major currents, can be detected by interpreting information on their shape, color, and temperature transmitted from the versatile sensing systems aboard the unmanned space vehicles. In earlier experiments, scientists at NOAA's NMFS laboratory at Pascagoula, Mississippi, were able to link satellite and aircraft-acquired data to the location of schools of menhaden (an important commercial catch) in the Gulf of Mexico.

The surface data collected by satellite and the oceanographic data—salinity, temperature, depth, sea-state weather, movement of current, observations of fish—will be coordinated and compared at experiment's end. Biologists, oceanographers, physicists, and computer experts will analyze all data in attempts to relate those environmental

factors to the distribution and availability of oceanic game fish. Findings will be conveyed to sport fishermen in comprehensive forms and made available to other users through the facilities of NOAA's Environmental Data Service.

Fishing equipment donated by manufacturers were tested during the Old Salt tournament. This includes rods and reels designed to handle the heavy fish often boated from great depths near the Loop Current, and electric-powered reels, both to be used by scientists aboard fishing boats to catch additional specimens for scientific purposes. (The newly developed motorized reel is particularly useful to disabled fishermen whose enthusiasm for big-game fishing has not dimmed.)

The two refueling boats, stationed about 60 miles offshore at the 30-fathom curve, are 65 feet long and each carries 3,000 gallons of fuel. Those facilities are used by fishing boats whose fuel

capacity is too small to accommodate the large amounts needed for the three-day tournament and the 100-mile or more ride to shore.

The 1973 Old Salt tournament was the third such event. Last year 47 boats participated in the 4-day tournament and caught 3 blue marlin and 18 sailfish, along with numerous wahoo, dolphin, and blackfin tuna. Three blue marlin were hooked but lost. (One, estimated to have weighed 400-600 pounds, broke the line after a 6-hour fight.) Fishing on the inshore reefs netted several thousand pounds of black and red grouper and red snapper. The large amount of biological and oceanographic data acquired in the 1972 and 1971 tournaments have been processed and analyzed by several marine laboratories and will definitely influence procedures and methods used in the 1973 fishing expeditions.

Source: Department of Commerce News, NOAA 73-116.

New York Bight Atlas Planned

State University of New York has been awarded a \$125,000 Sea Grant to prepare a comprehensive preliminary atlas of the marine environment of the New York Bight, the Commerce Department's NOAA has announced. Preparation of the atlas is part of a concentrated study of the bight area planned under NOAA's Marine Eco-Systems Analysis (MESA) program.

The atlas, through text and graphics, will provide basic information on the region that is needed by Federal, state, regional, and local governmental agencies, by industry and commerce, and by citizens' groups concerned with the area's marine environment. When published, the atlas material will be made available through NOAA to decision-makers in the region.

During the five-year New York Bight study program, NOAA and a number of other agencies will monitor and describe the physical, chemical, and

biological processes of the marine environment, provide information and expert advice needed for effective management of the area, and analyze the impact of manmade alterations and natural phenomena on marine ecosystems.

The New York Bight was selected for the MESA project because it is an area of heavy environmental impact by population and economic development, and because of critical management decisions involved in the area's development.

The New York Bight, for purposes of these studies, comprises the coastal and estuarine environments from Montauk Point, Long Island, to Cape May, N. J., extending seaward to the edge of the Continental Shelf and landward to the limits of tidal effects, but excluding Long Island Sound. This includes those adjacent lands which have a direct and significant impact on coastal waters.

Source: Department of Commerce News, NOAA 73-110.

New Product May Lower Seafood Costs

A new kind of fish product will become increasingly available to consumers and is expected to be lower in cost than other similar seafood items, NOAA has announced.

"Minced fish" is the officially announced name of the commodity. The product, said Robert W. Schoning, Acting Director of NOAA's NMFS is as pure and nutritious as higher graded cuts, but processed differently. Minced fish is the result of several years of cooperative experimentation by industry and NMFS fishery scientists and technologists. Their objective was to perfect machine techniques used to strip meat from bones so that formerly wasted pieces of edible flesh could be recovered and formulated into wholesome marketable forms, attractive to

shoppers. (See page 33 of this number of *Marine Fisheries Review* for an account of one proposed use of minced fish.)

Most of the minced fish thus produced will be pressed into large fish blocks, manufacturers say, which can be processed into a variety of items for sale at frozen food counters. These include fish portions cut from blocks of minced fish, for direct use or as the main ingredient in frozen fish dinners, fish sandwiches, or casserole-type entrees. Food processors also are experimenting with new kinds of products that can incorporate the easily handled minced fish into composite items—fish mixed with potatoes, fish in spreads or dips, or several kinds of minced fish mixed together or with other ingredients to produce exciting new flavors. An added

advantage of the mincing process is that the machines are geared to extract meat from kinds of fish whose small size or bony anatomy make it impracticable to process them on machines built primarily for filleting fish. Canning companies, too, can be expected to take advantage of the new product.

According to labeling requirements published by NMFS in the *Federal Register* May 12, 1973, all products manufactured from minced fish under Department of Commerce inspection procedures must be so designated in clear type following the name of the sale item. In short, the words "made from minced fish" must follow a term such as "fish sticks" or "fish portions."

Source: Department of Commerce News, NOAA 73-125.

BOWHEAD WHALE RESEARCH TO CONTINUE

Dr. Robert M. White, U.S. member of the International Whaling Commission and Administrator of the Commerce Department's National Oceanic and Atmospheric Administration, said today that NOAA has taken steps to ensure continuation of ongoing research on bowhead whales, recognizing the importance of these whales to Alaskan Eskimo communities.

Dr. White said a contract has been signed with the University of California and Dr. Floyd Durham, who has worked with bowhead whales and the Eskimo people in the Alaskan Arctic for the past decade. Dr. Durham's studies are believed to be the only U.S. research of its type being done on bowhead whales.

Personnel from NOAA's NMFS are working with Dr. Durham this year to assure a smooth transition when he retires from this phase of his work later this year.

Source: Department of Commerce News, NOAA 72-123.

Porpoise Program Manager

Dr. Eric G. Barham, 53, former head of the Marine Biology Branch of the Ocean Sciences Department at the Naval Undersea Warfare Center in San Diego, has been named Porpoise Program Manager at the NMFS Southwest Fisheries Center, La Jolla, California. He will direct and coordinate a new NMFS research program to study porpoise and tuna reactions in the tuna fisheries of the eastern tropical Pacific.



Barham

Born in Panama City, Panama, Dr. Barham received his B.S. degree with honors in zoology from San Diego State College in 1950, and his Ph.D. in biology from Stanford University in 1957. He was formerly an associate professor of biology at San Diego State.

In his work with the Navy, Dr. Barham worked on research dealing with basic information for an underwater

acoustics program. He is internationally recognized as an authority on the deep scattering layer and the bio-acoustics in the ocean and has pioneered in biological research from bathyscaphes and other deep diving research vehicles.

Source: Department of Commerce News, NOAA 73-47

PATENT ISSUED

The NMFS Pacific Fishery Products Technology Center, Seattle, has received the inventor's copy of U.S. patent No. 3,726,689, "Animal Food from Raw Whole Fish," issued to Max Patashnik, of the Center Staff. This patent, assigned to the United States, is the second one issued for the process studies in which the laboratory showed how the solubility and gelling characteristics of raw fish can be used to produce an animal food or fish bait with flavor, texture, and stability modified to suit user needs. There has been a continuing commercial interest in the future potential of this work. Small-scale commercial applications have already developed.

The Center has now had six public service patents issued in recent years—the two referred to above, one on an aqueous process for producing protein

concentrates, one on a mechanical scallop-shucker, and two on chemical intermediates from fish oil. Two patent claims are still pending.

almost virgin status of shark stocks in such regions as the western North Atlantic (the U.S. east coast), in contrast to other species that have been heavily diminished by fishing.

Added knowledge of sharks and their habits is of interest not only to research scientists, but also to sportsmen who enjoy catching them in ever-increasing numbers, to the commercial fishermen who supply foreign markets, and to students of potential fisheries resources in the United States. The many sharks available in U.S. waters represent an enormous but untapped source of nutrition.

The shark tagging program depends largely on the cooperation of fishermen, primarily along the Atlantic and Gulf coasts, who receive instructions and tagging materials from the Narragansett Laboratory. Volunteers are advised of the species of interest (described in detail in an accompanying angler's guide)—blue, mako, porbeagle, sandbar, dusky, bull, blacktip, spinner, hammerhead, thresher, and sand sharks. Detailed and diagrammed are methods used to implant a dart tag under the skin on the animal's back in a quick and painless manner. (A small plastic capsule containing a number and message on how to return the information trails from the fish at the end of a brightly colored plastic string.) The fish trackers report back on each tagging event, and newsletters from the NMFS laboratory keep participants apprised of findings and developments. Shark tagging also is done from scientific research vessels and a few commercial shark boats.

Program managers say that cooperation by fishermen and general progress have been encouraging, but that more information is required before the migratory patterns emerging for sharks can be precisely fitted into other phases of the broader scaled NMFS investigation of the biology and life history of oceanic game fish, of which the shark tagging project is a part.

Fishermen and Scientists Track Sharks

More than 10,000 sharks travel through the Atlantic Ocean adorned with bright red, yellow, and blue decorations bearing messages in five languages, courtesy of private and Federal scientific establishments and sport fishermen.

Shark-tagging is but one of the many tools used by marine scientists in the Commerce Department's NOAA to chart the migrations of a variety of wide-ranging deep-water fish prized by big-game anglers. The shark-tagging project, carried out since 1964 at NOAA's NMFS Narragansett (R.I.) Laboratory, is the most extensive such program in the world. Under the direction of biologist John G. Casey, it is closely integrated with billfish and tuna tagging studies conducted at the Woods Hole (Mass.) Oceanographic Institution.

To date, 10,500 sharks have been caught, tagged, and released. Returned tags from recaptured sharks number 335, these from 11 species including blue, sandbar, and mako sharks. To date the maximum distance covered is 2,070 miles by a blue shark (New England to South America); the maximum time between tagging and recapture is over 7½ years for a sandbar shark. Tags have been returned from commercial fishermen of 18 foreign countries (35 percent of total), and U.S. sport and commercial fishermen (65 percent).

Among the preliminary, but potentially significant, findings from tag returns are:

- that the blue shark is an inveterate traveler, moving 1,000 or more miles

annually, from the northeast U.S. coast to as far south as Guyana, and sometimes across the Atlantic Ocean;

- that blue sharks, mako sharks, and white marlin (and perhaps swordfish as well) follow similar migratory routes;

- that migratory routes of male, female, and juvenile segments of some shark populations differ and change as the sharks increase in size;

- that some sharks may be much longer lived than had been previously supposed. For example, a specimen tagged at three feet and estimated to be three or four years old, had grown only twenty inches and was still immature when recaptured after seven years at liberty. Another, tagged at six feet, showed no measurable growth seven years later.

The NOAA program is based on the premise that investigations of shark populations can yield quantities of data important to marine science, to sport and commercial fisheries, and perhaps to economic planners. Though man's attention has been captured by large sharks since the beginning of time, surprisingly little exact knowledge about shark species is available. For instance, nobody knows how long most species of shark live or how fast they grow; information about how far and fast different sharks travel is imprecise. An accurate census of shark populations has never been taken, therefore the effect on the marine environment of substantial shark harvests customarily taken in many parts of the world cannot be measured. An opposite effect is of interest to U.S. scientists in view of the

Source: Department of Commerce News, NOAA 73-113.

Fishes Shown in New Color Chart

A new four-color poster displaying 49 marine fishes of the South Atlantic Ocean and the Gulf of Mexico is available. It is the fourth in a series of fish posters depicting aquatic inhabitants of U.S. waters, that was developed by Bob E. Finley, Chief of the NMFS's National Consumer Educational Services Office, in Chicago, Ill.

Copies of the new poster were presented by Dr. Robert W. Schoning, Acting Director of the NMFS, to industry leaders attending the joint annual meeting of the Southeast Fisheries Association and the Shrimp Association of the Americas in Tampa, Fla., on June 15.

Like the three earlier charts (devoted to fishes of the North Atlantic, of the North Pacific, and to species found off southern California and Mexico) the 30-by-48-inch charts are printed on washable nonglare plasticized paper that hangs flat against a surface without curling. A list of common and scientific names of the fishes is included, as well as artwork that shows seafloor life common to the region.

All four charts are available from Government bookstores and the Superintendent of Documents, Washington, D.C. 20402. The price of each chart is \$2.00.

For the fish chart series, The National Consumer Educational Services Office has been awarded a "Mark of Excellence" for superior craftsmanship and skill in pursuit of graphic communications by the Kimberly-Clark Corporation.

