

## NOAA's Nautical Charts and Weather Information Essential for Boating Safety

Most motorboat operators involved in collisions or grounding accidents are not newcomers to the water, according to the Commerce Department's National Oceanic and Atmospheric Administration.

A profile of the accident-prone boater, drawn from the more than 4,500 collision or groundings reported to the U.S. Coast Guard last year, shows that the operator was between 26 and 50 years old with over 500 hours operating experience. In more than half of the accidents reported, he or she was operating a fiberglass open motorboat between 16 and 26 feet in length with an outboard engine of over 75 hp.

NOAA, whose nautical charts and weather services are used by boaters year-round has added a new service—the Loran-C lines of position for long range navigation—to over 100 nautical charts since the program was launched a year ago. The Loran-C chart program is one of a number of programs taken to advance boating safety and to assist recreational boaters, fishermen, and commercial shipping by NOAA's National Ocean Survey, National Weather Service, and the National Marine Fisheries Service and the Commerce Department's National Bureau of Standards.

NOAA's National Ocean Survey has updated and printed new editions of approximately 550 nautical charts. In addition, four new charts, one reconstructed chart and one new training chart were published, and the limits of two charts were extended.

To help prevent collisions, traffic separation schemes implemented by the U.S. Coast Guard to separate inbound and outbound traffic were added to the following charts: Strait of Juan de Fuca, Puget Sound and the Strait of Georgia, Washington; Prince William Sound, Alaska; and the Delaware-Cape Henlopen approach to Delaware Bay was realigned. In addition, safety fairways in the approaches to Corpus Christi, Texas; Pensacola Bay, St. Andrews Bay, Port St. Joe, Charlotte Harbor and Tampa Bay, Florida were revised.

In a further effort to promote boating safety, NOAA's marine centers in Norfolk, Va., and Seattle, Wash., are sponsoring Cooperative Charting and Chart Updating Seminars for leaders of the U.S. Power Squadrons and U.S. Coast Guard Auxiliary to equip them better for volunteer investigations in support of the nationwide chart correction programs.

A new training manual on Cooperative Charting has been prepared by the U.S. Power Squadrons with technical advice from the National Ocean Survey. It is designed to help volunteer observers of the U.S.P.S. in chart deficiency survey activities and to improve volunteer chart correction work, thus fostering safer navigation through up-to-date nautical charts and related publications.

A major role in NOAA's program to increase boating safety is carried out by the National Weather Service. This NOAA agency prepares forecasts for shore areas of the U.S. every six hours, more often when conditions change rapidly. Forecasts cover specific coastal areas, such as Block Island, R.I., to Manasquan, N.J. When strong winds or hazardous seas are anticipated, these forecasts include statements of the degree of hazard and the areas where warning signals will be displayed. Similar forecasts and warnings are issued for the Great Lakes and many inland lakes, reservoirs and waterways.

Boaters also receive pertinent weather information over commercial radio and TV. Most stations in coastal regions make a special effort to answer the needs of boaters and shipping in their weather forecasts.

In a growing number of shore areas, weather information can now be received through VHF-FM radio stations operated by the National Weather Service. The more than 60 stations along the coastal areas are on the air continuously, repeating taped weather messages every four to six minutes, 24 hours a day, seven days a week. Tapes are updated periodically, usually every two to three hours, and revised also to

meet fast-changing weather. Special receivers or tuners are required since the weather forecasts are made on 162.40, 162.475, and 162.55 MHz.

As a supplement to NOAA Weather Radio, the U.S. Coast Guard broadcasts the National Weather Service's forecast four times a day from stations strategically positioned on the nation's coast line.

In addition to its long-range weather broadcasts, the Coast Guard has 54 Coast Guard stations broadcasting with short-range VHF-FM radio transmitters. Other information available to the mariner is from the National Bureau of Standards time signals which are broadcast world wide over their stations WWV (Ft. Collins, Colo.) and WWVH (Kauai, Hawaii). Imposed on the time signal for certain portions of each hour is storm information for deep water vessels.

The National Weather Service has also established a more widespread distribution of its "Marine Weather Services Charts," which list weather information for various coastal areas and the Great Lakes. These charts are available from the National Ocean Survey's nautical chart sales agents.

The National Marine Fisheries Service also has safety placards available again to commercial fishing vessels on how to deal with emergency problems at sea. The placards will be suitable for posting aboard the vessels.

### ALASKA OCS Ecological Program Adds Chukchi Sea, Norton Sound Areas

The National Oceanic and Atmospheric Administration's Outer Continental Shelf Environmental Assessment Program has been expanded to cover prospective oil-lease areas off Alaska's northwest coast, the Commerce Department agency has announced.

The \$8 million, multi-year study of life forms and environment in Alaska's Norton Sound and Chukchi Sea is part of a continuing investigation conducted by NOAA's Environmental Research Laboratories for the Interior Department's Bureau of Land Management. It extends work already underway in the Bering Sea, the Gulf of Alaska, and the Beaufort Sea, which links Alaska to the Arctic Ocean.

Emphasis in the program will be on conducting reconnaissance work to identify the crucial biological and physical elements of the Alaska marine ecosystem. These findings will be used to establish scientific baselines for the regions, against which petroleum-connected impacts can be detected, assessed, and monitored.

Design of the Chukchi Sea-Norton Sound study has been guided by more than a year and a half of such investigations in other outer continental shelf areas off Alaska, according to Rudolf J. Engelmann, who directs the program for NOAA.

"Given the time constraints of oil leasing and development schedules," he explains, "we've had to narrow our investigation. Our first year and a half up here taught us that we're not going to obtain a full statistical description and explanation of the environment in a reasonable time, at tolerable cost. The natural variability of the ecosystem is too great, the species are too mobile, and the environment is too hostile to accomplish that.

"Instead, we are doing reconnaissance to identify key species and habitats and then placing high priority on determining how they will be affected by petroleum development. We are also doing our best to incorporate those items needed for assessment and environmental protection.

"This type of selective investigation is cutting the time it takes to develop the data, models, and methods needed for assessment of environmental impact."

As in the other Alaskan study areas, much of the Chukchi Sea-Norton Sound research will be performed by scientists in other government agencies, universities, and private industry, working as NOAA subcontractors.

## Two-Man Research Sub Gathers Marine Data

Studies ranging from the geology of potential offshore oil drilling sites to the ecology of fish and shellfish were carried out from a two-man research submarine operating off the northeast coast from mid-June to 1 August, the Commerce Department reports.

Nekton Gamma, the tiny underwater

workhorse of General Oceanographics, Inc.<sup>1</sup>, carried scientists to study sites deep in the ocean under contract with the Commerce Department's National Oceanic and Atmospheric Administration (NOAA). The cooperative scientific-exploratory program is carried out by the U.S. Geological Survey, the U.S. Army Corps of Engineers, and NOAA's Manned Undersea Science and Technology office.

Richard Cooper of the Northeast Fisheries Center in Woods Hole, Mass., part of NOAA's National Marine Fisheries Service, used the submersible in July to conduct ecological studies of areas in Stellwagen Bank and the Gulf of Maine. He investigated bottomfish and shellfish behavior and distribution, as well as ecological factors affecting survival of the animals in their egg and larval states.

David Folger of the U.S. Geological Survey, also from Woods Hole, made bottom geological observations in expected oil-drilling areas of Georges Bank and the Baltimore Canyon trough

1-15 July as part of the program.

Biological studies of ocean dumping sites were carried out during mid-July by Gilbert Chase of the U.S. Army Corps of Engineers, Waltham, Mass. His work involved dives on the Brenton Reef ocean dumping site and the Rhode Island sound shelf area.

Finally, George Freeland of NOAA's Atlantic Oceanographic and Meteorological Laboratories, Miami, Fla., gathered geological and biological information on the seafloor of the New York Bight during dives from 21 July to 1 August. This work was part of Freeland's ongoing research in the area in connection with the Marine Ecosystem Analysis program undertaken by NOAA's Environmental Research Laboratories.

Nekton Gamma can take a pilot and scientist to depths of 1,000 feet for bottom sampling and photographic and direct observation of conditions on the continental shelf and slope that affect or are caused both by natural events and man's activities.

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## West Coast Satellite Fish Data Expanded

An innovative method of using satellite-provided information to help tuna and salmon fishermen find more productive fishing grounds off California's coast has been expanded this season according to the National Oceanic and Atmospheric Administration (NOAA).

The method, proven of worth in a pilot project last year, involves advising commercial fishermen where "upwelling" occurs in coastal Pacific waters. A NOAA polar-orbiting satellite, equipped with infrared sensors, can identify the cold, nutrient-rich waters associated with upwelling, and provides a picture showing their locations. Salmon and tuna favor these upwelled waters.

Satellite coverage has now been expanded to include the area from the Strait of Juan de Fuca (between Canada and Washington) to Point Conception, Calif., and information from the satellite is now more readily available to fishermen through use of an

automatic telecopier that transmits thermal front data to the dockside more quickly.

The service to fishermen is provided jointly by NOAA's National Environmental Satellite Service and the NOAA-sponsored Sea Grant program at Humboldt State University, Arcata, Calif. NOAA is an agency of the Department of Commerce.

The NOAA satellite, equipped with both visual and infrared sensors, passes over the coastal area twice daily, relaying environmental data including sea surface temperatures back to earth.

This information is converted into images in various shades of gray, each shade representing a particular interval of temperature. As a result, says NESS Oceanographer Larry Breaker, thermal fronts where cold, upwelled water meets the warmer offshore surface water show up clearly as gray-shade boundaries.

The locations of thermal fronts are transferred to navigation charts, copies of which are then furnished to fisher-

<sup>1</sup>Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

men at various ports. This chart can also be transmitted to anyone equipped with a telephone and a telecopier. The coordinates of this fishing broadcast by the National Marine Fisheries Service and Western Fishboat Owners Association in San Diego is also transmitted on single sideband radio. The technique may have applications for fishermen in many parts of the world.

Fishermen and oceanographers have known for years that as strong winds from the north and northwest blow along California's coast, coastal surface water is moved offshore and is replaced through upwelling.

Bottom water, according to Fred Jurick, a Sea Grant Marine Advisory agent at Humboldt State, is rich in nutrients which, when they come to the surface, cause huge blooms of plankton, the primary food source for marine life. This attracts bait fish, which in turn attract tuna and salmon.

In recent years, efforts to plot the location of upwelling have included taking infrared temperature readings from aircraft. Such attempts often were successful, but had drawbacks such as weather restrictions on operations, limited aircraft range and high cost.

The NESS-Sea Grant program is only one of several projects utilizing NOAA satellites and aimed at assisting fishermen. A second effort shows promise of pinpointing concentrations of algae in water by satellite infrared identification of the chlorophyll in the marine plants. Many kinds of fish tend to congregate in algae-rich waters. The chlorophyll project uses infrared sensors aboard NOAA satellites which are in geostationary orbit above the equator.

## **Environmental Monitor Launched for NOAA**

An environmental monitoring satellite, providing pictures and other data of value to such varied interests as weather forecasters, fishermen, aviators, oceanographers, and hydrologists, was launched at Lompoc, Calif. on 29 July for the National Oceanic and Atmospheric Administration (NOAA), the Commerce Department reports.

The spacecraft, put into polar orbit for NOAA by the National Aeronautics and Space Administration from its site

at the Western Test Range, is known as NOAA-5, representing the fifth satellite of this type to be operated by the Commerce Department agency.

Two of the previous four NOAA series of polar-orbiting spacecraft still provide limited information, but after 2½ years and 1½ years in orbit, respectively, are deteriorating from the harsh environmental conditions 900 miles (1,440 kilometers) in space.

The orbit of the new spacecraft lets it scan the entire globe twice every 24 hours. It is moving westward on each orbit so that at any given location on the Equator the satellite crosses the Equator headed southbound at 8:30 a.m., local time, and northbound at 8:30 p.m.

The launch of NOAA-5 maintains an operational satellite system begun some 10 years ago that today provides regular global observations of cloud cover, snow and ice, and the sea surface for an ever-increasing variety of uses.

Initially, polar-orbiting spacecraft were used to provide meteorologists with additional information from which to make weather forecasts. But throughout the years other uses of the visual and infrared images have been found by NOAA's National Environmental Satellite Service.

Satellite pictures have helped in the control of locusts in Africa, have provided information on ice in the Great Lakes and around Alaska, and have been at least partly responsible for saving thousands of lives by early detection and tracking of hurricanes and tropical storms.

More recently, data from the polar-orbiting satellites (NOAA also operates three geostationary satellites) have been put to use by both the U.S. Coast Guard and the Civil Air Patrol in their respective search and rescue missions; by tuna and salmon fishermen off the West Coast, helping them find more productive fishing grounds; and by planners who use imagery to help predict how much water from snow melt in the mountains and higher elevations will flow into rivers, streams and reservoirs.

Additionally, more than 120 nations in all parts of the world receive imagery from the NOAA series of satellites. Government agencies, academic

institutions, scientific groups and even amateurs use the data for many purposes in what is considered one of the most successful demonstrations of peaceful uses of space technology.

The new spacecraft, known as ITOS-H until it achieved orbit, is a box measuring 40 × 40 × 49 inches, and has three wing-like panels to which solar power cells are attached. Four major sensing systems are included as part of the main body of the spacecraft, and each has a back-up system for more reliable service and longer lifetime.

The spacecraft manufacturer, RCA, has had 24 polar-orbiting satellites of this general type successfully launched since 1960, a number of them research and development spacecraft operated by NASA. During that time, the satellites have returned some three million views of the world's weather to earth, and since 1966 no major storm has gone unobserved by them.

The sensing systems carried into space on NOAA-5 are:

1) A Scanning Radiometer System to gather data in both visible and infrared channels, scanning a swath about 2,000 nautical miles wide beneath the spacecraft's path. The system provides both stored picture coverage for transmission upon demand, and direct transmission of pictures to receiving stations within range. The visible channel resolution is two nautical miles (features two miles by two miles in size or larger can be seen on the imagery) while the infrared resolution is four miles.

2) A Very High Resolution Radiometer System to obtain higher resolution, in both visible and infrared channels, than does the scanning radiometer. VHR images can show features one-half mile in size.

3) A Vertical Temperature Profile Radiometer System to measure infrared energy radiated at six levels of the atmosphere and at the earth's surface or cloud tops for measuring vertical temperature distribution, and to provide information on the total moisture content of the atmospheric column observed.

4) A Solar Proton Monitoring System to detect the arrival of energetic solar protons in the vicinity of the earth, for use in issuing warnings of solar storms.

## Economic Impact of Marine Angling Eyed

The effects of marine recreational fishing upon this country's economy will be studied under a National Oceanic and Atmospheric Administration (NOAA) contract issued last summer.

The contractor, Centaur Management Consultants, Inc., of Washington, D.C., will gather information on the value of goods and services generated by the sport.

As saltwater anglers use fishing equipment, boat rentals, motors, camping equipment, food, and lodging, the survey will identify and evaluate the commerce created by the sale of these items.

The \$70,329 contract, awarded by NOAA's National Marine Fisheries Service, will divide the economic impact into four regional areas: Northeast, southeast, northwest, and southwest.

Sources of information will include sampling surveys of supplies of goods and services from origin to point of sale. Other data may be supplied by state and public agencies, by private organizations, and by trade associations.

Among Federal agencies, the NMFS is responsible for the development of conservation and management policies

for marine fisheries resources for both commercial and recreational purposes. Over the years, a considerable body of knowledge has accumulated on the economics of commercial fisheries, but relatively little on recreational fishing.

The end product of the study will be a comprehensive document of the socio-economic scope and value of marine recreational fishing in the United States. The study, to be completed in the spring of 1977, will assist the NMFS, state agencies, and regional management councils in evaluating the relative merits of recreational and commercial fishing in the management of marine resources and in administering the Fishery Conservation and Management Act of 1976.

### Foreign Fishery Developments

## Egyptian Fishery Developments Noted

Admiral Emad El Din Madkour, Managing Director of the Egyptian High-Seas Fishing Company (a government-owned corporation), traveled to Aden in early April 1976 to conclude an agreement for a proposed joint Egypt/People's Democratic Republic of Yemen Fisheries Company. However, the Admiral has indicated that all financial problems associated with the formation of this new joint venture have not been solved. The proposal requires an initial investment of US\$5 million which will be paid by the two partners on signing the agreement; the remaining \$20 million is to be paid in equal amounts by both partners at the rate of US\$5 million annually within the next 4 years. The company will own and operate one large refrigerated fish carrier and a fleet of eight fishing vessels. The company plans to fish in the southern Red Sea, the Persian Gulf, and the Indian Ocean. Admiral Madkour said that, based on his company's past experience, the initial US\$5 million will not be sufficient. The Egyptian High-Seas Fishing Company was to have had a capitalization of US\$14 million in 1964 to acquire 21 fishing and fish-transporting vessels. The Egyptian Government reduced the capitalization to \$3 million. Even with sizeable loans, the Company was able to acquire only five used vessels, two with a capacity of 1,700 GRT and three

having 650 GRT. Admiral Madkour is now seeking US\$4.5 million (including a request to the US Agency for International Development) to refit and modernize these vessels.

The Egyptian High-Seas Fishing Company does not have any vessels fishing in the proposed fishing area of the southern Red Sea and northern Indian Ocean where the Admiral has indicated that lobster and shrimp are plentiful. Despite occasional calls by Egyptian Government planners for greatly increasing the supply of fish to help meet Egyptian protein needs, Admiral Madkour seems to get very little help in his efforts. The present annual catch of the Company's fleet is only 15,000 metric tons. By modernizing and expanding the fleet to the 21 vessels originally planned, Admiral Madkour says he could increase the company's catch to 100,000 metric tons per year. (Source: U.S. Consulate General, Alexandria.)

### JOINT VENTURE WITH GDR

Late in 1975, Egypt announced the formation of a joint fishing company to exploit the fishing resources of Lake Nasser. With the technical assistance of experts from the German Democratic Republic (GDR — East Germany), the company intends to operate a fleet of 16 fishing vessels in the Aswan Dam's Lake Nasser, and construct three cold-

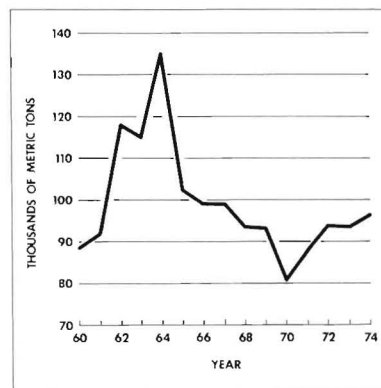


Figure 1.—Egyptian fisheries catch, 1960-74.

storage plants capable of holding 1,000 metric tons of catch each. The company will also acquire a fleet of refrigerated trucks to transport the catch to population centers. (Source: U.S. Embassy, Cairo.)

### JOINT VENTURE WITH NORWAY

Negotiations are about to be concluded with the Norwegian firm Hareide International Group to develop fishing resources in Lake Nasser. Production is expected to double within 1 year. Hareide International will also submit a 5-year development plan to the Egyptian Government to expand Egyptian fishing in the Mediterranean and the Red Sea. (Source: *La Pêche Maritime*.)

### DEVELOPMENTS IN LAKE MARYUT

Pro-fisheries forces seem to have won a low-key struggle over the future of Lake Maryut, a sizeable expanse of