

Deep-Sea Camera Records Hawaiian Fish Resources

A recently acquired deep-sea camera has been used to survey fishery resources at Penguin Bank off Molokai, Hawaii, reports Richard S. Shomura, Director of the NMFS Southwest Fisheries Center's Honolulu Laboratory. The camera was set on the ocean floor in 404 feet of water during a cruise of the NOAA ship *Townsend Cromwell* which was completed on 18 April. The surveys were conducted near areas where three artificial reefs have been placed by NMFS researchers.

Bait placed in front of the camera attracted animals from the surrounding water, and the camera, prepared by NMFS Fishery Biologist John T. Harrison, took a picture every minute for 2 hours. Although aweoweo were the only food fish attracted to the camera, other creatures such as puffers, eels, and crabs were attracted to the bait and small shrimp were seen in almost every photograph.

The shrimp, too tiny to be used as food directly by man, may be an important energy source for commercially valuable fishes. The deep-sea camera will be a useful tool for future research by the National Marine Fisheries Service, allowing views of areas difficult to see with divers or to sample with nets. The camera can be set at depths as great as 20,000 feet.

Under the supervision of Chief Scientist Bruce C. Mundy, the *Townsend Cromwell* cruise also included trap surveys at the Penguin Bank area and studies of the distribution of larval fishes near Oahu. Fish, shrimp, and lobster traps were set in the vicinity of the artificial reefs to determine what types of animals were in the area. While previous observations of the reefs from the University of Hawaii's submersible *Makali'i* have revealed concentrations of fish at the reef, little is known about the

numbers of animals on the surrounding bank. The recently completed trap survey found no commercial sized shrimp and few lobster, crab, or fish. Most of the fish were taape, an abundant species initially introduced to Hawaii in 1955.

The third of four planned studies of the distribution of larval fishes at Oahu was also completed during the cruise; studies have been done during the autumn, winter, and spring. The goal of this work is to better understand how the very youngest stages of fishes, might be affected by Ocean Thermal Energy Conversion (OTEC) power plants planned for the islands.

New Reporting System for Western Pacific Fisheries

How much of this fish is landed? Is the fishery in danger? What important food fish is abundant in June? Where is it available? Can I afford to import it? These are the kinds of questions fishery managers, producers, and processors must answer every day.

To help make better decisions concerning fisheries of the central and western Pacific, David C. Hamm, a computer systems analyst at the NMFS Southwest Fisheries Center's Honolulu Laboratory in Hawaii has worked with numerous Pacific island fishery agencies in creating an information network capable of providing data to decision makers on a timely basis.

Before Hamm became involved about 5 years ago, collection of useful information in many areas was minimal, automated processing of data by island fishery agencies outside Hawaii was nonexistent, and dissemination of information was rare. By gaining the cooperation and support of Pacific island

fishery agencies, Hamm has been successful in implementing a Southwest Fisheries Center program to improve these conditions.

The Pacific island fishery agencies have improved and standardized data collecting systems and have begun processing and sharing information by use of computers. Fishery data bases have been established at each island agency and at the Honolulu Laboratory. Hamm recently began coordinating the production of a new series of reports designed to distribute information on commercial landings of species caught around Hawaii, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Monthly and annual summaries of pounds, dollar value, and average price are reported for each species.

According to Richard S. Shomura, Director of the Honolulu Laboratory, Hamm's report gives an overall view of the fisheries. Shomura noted, "This report provides fisheries managers with vital information about the seasonality and relative abundance of fish, which in turn helps them formulate plans for managing the resources. The report will also be valuable to the fishing industry in the Pacific by improving their marketing and importing of fish from lesser developed island areas where fish are abundant."

The first volume of the report, "Fishery Statistics of the Western Pacific," is a compilation of fishery statistics for American Samoa for 1982-1984; the Commonwealth of the Northern Mariana Islands, 1979-84, and Hawaii, 1979-84. The second volume will contain summaries for Guam and will be published in the summer of 1986. A third volume which will be published during the fall of 1986 will report landings for 1985 for all of the regions. According to Hamm, subsequent volumes will be annual updates and will be published as soon as possible after the data are processed following the close of the calendar year.

This series of reports is generated from a computerized data management and collection system for the western Pacific called WPACFIN, (Western Pacific Fishery Information Network)

which Hamm designed and implemented with the cooperation of participating island government fishery agencies and private industry.

NOAA, PRC Scientists Study El Niño Sources

Chinese and American scientists participating in an international climate research cruise aboard the Chinese research ship *Xiangyanghong #14* were honored in Honolulu in ceremonies sponsored by NOAA. The *Xiangyanghong #14*, which means "the sun rising red," was the first Chinese research ship to visit Hawaii. During the visit, NOAA Administrator Anthony J. Calio and American scientists and other officials conferred with Yan Hongmo, director general of the People's Republic of China State Oceanic Administration, and members of a visiting Chinese science delegation.

The *Xiangyanghong #14* and its Sino-American scientific party sailed from Honolulu in January to search for the sources of "El Niño," the mysterious Pacific Ocean current. The research is part of a 10-year international climate study organized by the World Meteorological Organization and the International Council of Scientific Unions. Called TOGA (Tropical Ocean/Global Atmospheric Program), the program is considered a landmark in U.S.-Chinese cooperation.

TOGA scientists are trying to predict future occurrences of the El Niño, which turns the world's weather topsy-turvy every 2-7 years. Because devastating effects on fish were first noted by South American fishermen around Christmas time, the phenomenon was named El Niño, Spanish for "the child." The last El Niño occurred in 1982-83 and brought unprecedented death and damage to many. The incident disrupted fishing all along the Pacific coast of South America and caused immense storm damage along the entire west coast of North America.

For the first time in 75 years, French Polynesia was hit with a typhoon—and then was hit five more times in the next 5 months. Australia had its worst drought in 200 years. In New Zealand

it was "the summer that never was." In Northwest Africa, the winter rains never came. The Ethiopian drought intensified and spread southward along the entire east African continent. In China, El Niño brought floods to southern regions and drought to the north.

Scientists from Duke University, Woods Hole Oceanographic Institution, Louisiana State University, and NOAA's Pacific Marine Environmental Laboratory, participated in the research. From Honolulu, the *Xiangyanghong #14* sailed for tropical waters west of the international date line to measure variations in heat transported by east-west currents along the equator. Scientists moored meters on the equator near the Gilbert Islands and measured subsurface currents and temperatures to help validate measurements made by satellite.

Meteorological measurements were made by the ship throughout the cruise in this sparsely monitored region of the Pacific Ocean. After a brief stop on Ponape in the Caroline Islands, the ship returned to its homeport of Guangzhou, China, in late February. Over the next 10 years, a number of countries, including France, Australia, Chile, and Peru, will work on the TOGA Program. In addition to research cruises, scientists will increase atmospheric measurements worldwide and develop numerical models and other methods to predict abnormal variations in weather and climate, and help lessen the often devastating effects they have on the world.

Histological Techniques for Marine Bivalves

The National Marine Fisheries Service Laboratory in Oxford, Md., announces the publication of a manual of "Histological Techniques for Marine Bivalve Mollusks." This manual describes and illustrates techniques used by the Oxford Laboratory in processing marine bivalve mollusks for histopathological examination. Anyone interested in this manual should contact the authors, Dorothy Howard and Ceil Smith, at the NMFS Oxford Laboratory, Oxford, MD 21654, regarding its availability as copies are very limited.

Kemp's Ridley Sea Turtles Released in Texas Waters

On 22 April and 6 May, about 1,550 tagged Kemp's ridley sea turtles, *Lepidochelys kempi*, were released by the NMFS Southeast Fisheries Center's Galveston Laboratory staff. About 560 turtles were released in the western portion of Copano Bay near Corpus Christi, Tex., and the other 990 turtles were released 6-8 n.mi. off North Padre and Mustang Islands, near Corpus Christi. These turtles represent the 1985 year class, the eighth year class of head-started turtles at the laboratory since 1978.

Kemp's ridley sea turtle is the most endangered species of sea turtles. Head starting is being tested as one of several conservation strategies for Kemp's ridley recovery. Kemp's ridley eggs are collected each year on the only known nesting beach in the world, a 20 km stretch of beach near the Mexican village of Rancho Nuevo, in the State of Tamaulipas, bordering the western portion of the Gulf of Mexico.

The eggs are placed in polystyrene foam boxes containing sand from the National Park Service's Padre Island National Seashore where they are incubated and hatched. The hatchlings are exposed to sand and surf at Padre Island to "imprint" them, in hopes that they will return to reproduce and lay eggs on Padre Island, thus establishing a second nesting colony in the United States. "Imprinted" hatchlings are reared at the NMFS Galveston Laboratory for 1 year or less; then the survivors are tagged and released in Texas waters near Corpus Christi, with the intent of reinforcing any imprinting they may have attained as hatchlings.

The head start project, now in its ninth year, has released 9,258 tagged Kemp's ridleys so far, and about 400 have been recovered, most from sites in the Gulf of Mexico, but others on the Atlantic coast of the U.S., and two as far away as France and Morocco. Though it is not known how long it takes for Kemp's ridleys to mature, estimates range from 6-13 years. Because the oldest of the head-started ridleys released into the wild are approaching 8

years of age, National Park Service biologists will be patrolling Padre Island this spring in search of nesters.

Cooperating in the project are Mexico's Instituto Nacional de la Pesca, the U.S. Fish and Wildlife Service, National Park Service, National Marine Fisheries Service, and the Texas Parks and Wildlife Department. Other participants have included the Gladys Porter Zoo, U.S. Coast Guard, U.S. Navy, Florida Department of Natural Resources, Texas A&M University, University of Texas, and the Houston Zoological Gardens.

Public awareness and support for the project have been promoted by a non-profit organization, HEART (Help Endangered Animals—Ridley Turtles), a special committee of the Piney Woods Wildlife Society, North Harris County College, Houston, Tex. Private sector contributions to HEART in support of the project have been made by EXXON Corporation¹, the Kempner Fund, and Pel-Tex Oil Company. For additional information contact: Charles W. Cailouet, Jr., Chief, Life Studies Division, NMFS, SEFC Galveston Laboratory, 4700 Avenue U, Galveston, TX 77550.

South Pacific Albacore Studied

Significant progress has been made in measuring oceanographic features thought to be important indicators of the availability of albacore, *Thunnus alalunga*, in the South Pacific, reports NMFS Honolulu Laboratory biologist Jerry A. Wetherall, head of a scientific group aboard the NOAA ship *Townsend Cromwell*. The *Cromwell* worked together earlier this year with a New Zealand research vessel to measure variation in temperature and salinity of ocean waters down to a depth of 1,000 m in an area east of New Zealand where albacore had been caught in previous exploratory fishing expeditions, according to Richard Shomura, NMFS Honolulu Laboratory Director.

Within their preferred temperature

¹Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

range, albacore often associate with the boundaries between different water masses, and thus are often found where temperature and salinity of the near-surface waters change abruptly. In addition to mapping temperature and salinity changes, the *Cromwell* and the New Zealand vessel sampled the surface waters by trolling artificial lures, but encountered few albacore during this part of the survey.

A second phase of the survey was conducted by the *Cromwell* several hundred miles further northeast in an area south of Tahiti where two U.S. commercial albacore trolling boats, the *Day Star* and the *Bald Eagle*, had encountered a significant concentration of albacore and were making good catches. The commercial boats were partly assisted by Federal Saltonstall-Kennedy funds granted to the Western Fishboat Owners Association by the Pacific Fishery Development Foundation. Additional support was provided by the American Fishermen's Research Foundation, a U.S. albacore industry group. The *Cromwell* completed a survey of temperature and salinity conditions in the region of good albacore fishing, and trolled throughout the area in cooperation with the fishing boats. Data collected during the survey will be studied for clues which may improve albacore fishing strategies and knowledge of albacore migration behavior.

In conjunction with the oceanographic surveys, Honolulu Laboratory biologists Victor A. Honda, Thomas K. Kazama, and Bert S. Kikkawa gathered data on albacore maturation, food habits, parasites, aging, and growth rate. Albacore were also tagged and released to provide information on their migration paths in the South Pacific. The commercial vessels were active collaborators in the research, tagging and releasing several hundred albacore and collecting measurements of sea surface temperature as they fished.

The *Cromwell*, under the command of David McConaghy, is assigned year-around to work with the Honolulu Laboratory, a unit of the NMFS Southwest Fisheries Center. The *Cromwell* helps carry out the Laboratory's research programs on a wide range of marine

resources around Hawaii, American Samoa, Guam, and the Northern Marianas inside the 200-mile federal fishery zone. These include such resources as spiny and slipper lobsters, bottom fish, deepwater shrimp, and seamount groundfish. It also provides logistical support to NMFS's research programs on marine mammals and endangered species, which focus on the Hawaiian monk seal and the green sea turtle.

The Honolulu Laboratory also has responsibility for most Federal research on tuna and billfish resources in the central and western Pacific, and for albacore research in the South Pacific. According to Shomura, the NMFS tuna program involves monitoring major fisheries in the regions of interest to the U.S., assessing yield potentials for tuna and billfish stocks, and conducting biological and economic research to provide a rational basis for management policy decisions.

The *Cromwell*'s 10-week research cruise in the South Pacific, which ended 16 March, was the first phase of a cooperative, international effort to expand the South Pacific fishery for albacore and to develop a better understanding of albacore biology, distribution, and abundance. Collaborating with the Honolulu Laboratory in the research are the SWFC La Jolla Laboratory in California, the South Pacific Commission, the Governments of France and New Zealand, and the U.S. albacore fishing industry. The scientific team on the *Cromwell* included NMFS biologists and cooperating scientists from New Zealand, New Caledonia, and Tonga.

En route to the South Pacific albacore survey area, the *Cromwell* charted bottom depth contours on key bottomfish grounds in American Samoa, under the direction of Honolulu Laboratory biologist Stephen Ralston. The charts will be used to assist local fishery development programs. On the return trip to Honolulu, the *Cromwell* visited Rarotonga, Cook Islands, where an "open house" was held aboard the vessel. The *Cromwell* also mapped bottom depths and temperature profiles under several fish aggregating devices (FAD's) used for tuna fishing near Rarotonga.

According to Shomura, the Honolulu

Laboratory's research program in the South Pacific is expected to continue next year. An international meeting will be held in Auckland, N.Z., in June to review this year's preliminary albacore research and set goals for additional surveys.

Lost, Stolen Fish Trap Responsibilities Noted

A court decision issued in 1985 by Administrative Law Judge Hugh Dolan, U.S. Department of Commerce, has established several responsibilities for trap owners fishing in the U.S. fishery conservation zone (FCZ), according to Jack Brawner, Director, NMFS Southeast Regional Office. Fishermen who meet their responsibilities will avoid penalties for lost or stolen traps that are found in portions of the FCZ closed to the use of traps. Trap owners, whether recreational or commercial, are responsible for:

- 1) Placing and marking their traps in such a manner as to facilitate relocation of the traps,
- 2) Making an honest and thorough effort to locate any missing traps, and
- 3) Reporting the loss or theft of traps to the appropriate authority.

To meet the last responsibility, southeastern U.S. trap owners should file a written report of traps missing from the FCZ in the Southeast Region (waters off North Carolina through Texas, the Virgin Islands, and Puerto Rico) with the Regional Director, National Marine Fisheries Service, 9450 Koger Blvd., St. Petersburg, Fla. The written report must contain the following information: Time and date of report, number of missing traps, color code and trap permit numbers, specific location traps were placed and lost, date the loss was discovered, and a description of how you discovered traps were missing and what steps you took to locate traps (including name, address, and phone number of any witnesses). Keep a copy of the written report for your records. (The court decision does not apply to state violations.)

Note: Federal penalties of up to \$25,000 may be sought for illegal use

of traps. The filing of a written report is the only method of satisfying an owner's responsibility for reporting loss or theft of traps. The failure to file a prompt written report will be considered as indicative that the traps were not lost or stolen.

Rehabilitated Monk Seals Are Released

The National Marine Fisheries Service (NMFS), with the assistance of the U.S. Coast Guard, released two young Hawaiian monk seals at Kure Atoll in the Northwestern Hawaiian Islands on Monday, 5 May, reports Richard S. Shomura, Director of the NMFS Southwest Fisheries Center's Honolulu Laboratory. "These two monk seals were collected at French Frigate Shoals during the summer of 1985 to keep them from starving to death in the wild," noted Shomura. The two seals weighed about 200 pounds each at release, following their "rehabilitation" at the Waikiki Aquarium and the NMFS Kewalo Research Facility.

According to William G. Gilmartin, Leader of the Marine Mammals and Endangered Species Program, which includes this monk seal work, three female monk seal pups were collected for the same reason in 1984 at French Frigate Shoals and were similarly rehabilitated and released at Kure in 1985. "These seals have adapted well to their new home and are regularly being seen on the beaches at Kure," Gilmartin said.

To make their reintroduction to the wild as easy as possible after their flight to Kure, courtesy of the Coast Guard, the yearling seals were placed into a large fenced enclosure which included sandy beach and water. The enclosure was stocked with live fish and lobster collected for them by NMFS biologists and off duty Coast Guard personnel. "We believe it is important to ensure that the seals will catch food for themselves before they are finally released, and our experience indicates that up to a few weeks in the enclosure is sufficient time to allow them to convert from a hand-fed diet of frozen fish to catching their own live prey," Gilmartin said.

Shomura said that the reason this re-

location is being done is because "the Kure Atoll seal population has declined more than 80 percent over the last 25 years and it is hoped that adding a few new females each year will start a recovery there." Shomura added that "although the French Frigate Shoals population is the largest of all the breeding populations, it is experiencing the highest mortality rate in young seals."

Gilmartin believes that this may be because this population has grown to a point at which it is now food limited, but much more research will be necessary to fully understand why this mortality is occurring and what can be done about it. "If the population there is indeed food limited," Gilmartin said, "then returning the rehabilitated seals to French Frigate Shoals would only further stress that population. Moving these seals to Kure Atoll, where the population is much reduced, has the advantage of adding reproductive potential to that area."

WHO EATS FISH AND SHELLFISH?

The more people earn, the likelier they are to eat seafood away from home, and half of the time they choose shellfish. Those are just two characteristics of American seafood consumption patterns reported by Teh Hu, professor of economics at Pennsylvania State University. Hu's government-published survey also found that people living in cities eat less finfish away from home than people in the country, but they eat more shellfish; that people in mountain regions have increased their seafood consumption; that underutilized species—notably swordfish, dolphin, and squid—are popular away-from-home sales with middle-income and upper-income caucasians in cities in New England or the Pacific Coast region; and that black Americans eat more shark than caucasians do.

The complete report, which compares four major surveys on seafood consumption since 1969, is available for \$19.95 postpaid from the National Technical Information Service, Order Desk, 5285 Port Royal Road, Springfield, VA 22161. Ask for Publication No. PB-86135043.