Fishery Outlook Brightest in 25 Years, NOAA Official Says

The Fishery Conservation and Management Act has provided the U.S. fishing industry its brightest outlook in 25 years, James P. Walsh, Deputy Administrator of the National Oceanic and Atmospheric Administration, has pointed out.

In testimony before the House Subcommittee on Fisheries and Wildlife Conservation and the Environment of the Merchant Marine and Fisheries Committee, Walsh stated that domestic commercial fishermen landed a record 2.8 million metric tons (t) with a dockside value of $1.9 billion in 1978 which was a 16 percent increase over 1977 landings and a 22 percent increase in value over 1977.

Citing investments of over $200 million in processing plants, vessels, and fishing gear in Alaska and the 54 percent increase in fishing vessels in New England, Walsh said the Act has developed a favorable investment climate in most sectors of the fishing industry.

"The number of foreign fishing vessels off our shores has been slashed from over 2,700 in 1975 to about 600 fishing vessels in 1978," Walsh said. "The Act also has reduced the foreign catch within our 200-mile fishery conservation zone to about 1.7 million t in 1978 from a high of 3.5 million t in 1971."

The Department of Commerce official told the lawmakers that the implementation of the Act has not been without thorny problems which still need to be resolved. He cited complications encountered in producing a management plan for salmon in the Northwest, difficulty of implementing the groundfish plan in New England, and the lack of certain information in the butterfish plan for the east coast, causing the Council's plan to be disapproved, as some of the major issues encountered.

"We also have been faced with problems that are generic to the fisheries conservation and management regime established by the Act," said Walsh. "The Act clearly provides for regulation of both domestic and foreign fishermen; however, many fishermen did not understand that the management provisions of the Act applied to them. There have been and will continue to be situations in which domestic fishing must be tightly managed to prevent overfishing," he said.

Walsh told the committee that during the past year the Department had been trying to improve the management system by reducing complex regulations and lengthy planned review procedures.

A New Seabed Mining Law Could Protect Marine Life, Allow Mineral Extraction

Richard A. Frank, Administrator of the National Oceanic and Atmospheric Administration (NOAA), has said that the U.S. should be able to draw vital raw materials from the deep sea floor and also assure protection of the ocean environment. In testimony before the House Merchant Marine and Fisheries Committee's Subcommittee on Oceanography in June, Frank voiced the Administration's support of deep seabed mineral legislation, and outlined additional measures that would make ocean mining ventures environmentally sound.

Frank pictured a "thriving deep seabed mining industry" by the mid-1990's taking up significant quantities of raw minerals from the ocean bottom and providing "a stable future supply . . . with reduced risk of supply disruptions and unreasonable price fluctuations." Deep seabed mining, said Frank, could result in limiting price increases of certain raw materials, thus helping to dampen inflation, reduce the unfavorable balance of payments, and promote development goals of developing nations.

Frank called for a change in proposed House Bill H.R. 2759 to require miners to submit a work plan as part of their application process. By knowing in advance what actions they propose, appropriate precautions could be taken to prevent undesirable impacts on the resource or the environment, Frank explained.

He also asked that environmental impact statements be completed before any license or permit is approved. The NOAA Administrator explained that this would permit the Government to determine if proposed exploration or recovery activities would "pose an unreasonable threat to the quality of the environment."

With these environmental protections, Frank explained, the Administration "agrees that deep seabed mining

can be commenced before all environmental research is completed.'' Otherwise, he stated, the program could be delayed for 10 or more years.

''However, if we are to allow activities to begin and operate before ocean research is completed,'' Frank told the Committee, ''the bill must provide the flexibility to modify or change regulatory requirements in light of future research.'' For that reason Frank asked that the bill be changed to ease limitations on the authority to make appropriate modifications in license permits if future research revealed such a need.

Frank also urged that the bill grant the Government the power to suspend or modify particular mining activities without necessarily having to close the total mining operation, as the bill now provides. ''Seabed mining is a costly endeavor,'' Frank acknowledged, ''and shutting down the entire operation could be extremely expensive to the miner and often unnecessary as lesser alternatives would be available.''

Frank went on to note that NOAA ''has made substantial progress in assessing the potential environmental effects of deep seabed mining.'' He pointed out that the Deep Ocean Mining Environmental Study (DOMES) has ''resolved some of the environmental concerns voiced during the early 1970's,'' since it is now possible to estimate the extent of short-term effects.

NOAA's DOMES project began in 1972 by developing environmental baselines in areas of the ocean where mining likely would take place. A later phase, still underway with the close cooperation of industry, is monitoring industrial tests of demonstration-scale nodule recovery equipment. The information now being acquired will be used ''to start assessments of long-term, chronic, and cumulative impacts,'' Frank said, adding that many of the remaining questions would be answered in the next 1½ years. DOMES activities now underway, he pointed out, involve refined prediction capabilities, environmental guidance, and assessments of the ocean's ability to recover from the mining.

NOAA is working with the Environmental Protection Agency and the Bureau of Mines, Frank said, on a research plan to deal with problems of onshore or at-sea waste disposal. Early systems, he indicated, will probably depend upon shore-based processing.

NOAA has also supported research at the Massachusetts Institute of Technology to produce a cost model for deep ocean mining. The MIT study, now being refined, has already been used by the Departments of State and Treasury as well as NOAA in assessing Law of the Sea proposals and domestic tax alternatives.

Chesapeake Bay Oyster, Blue Crab Declines Eyed

Declines in oyster production and fluctuations of crab harvests in the Chesapeake Bay are being studied this year by University of Maryland scientists under a $725,900 grant from the National Oceanic and Atmospheric Administration (NOAA), Secretary of Commerce Juanita Kreps has announced. The research effort is one of 24 projects supported at the university under the Commerce agency's National Sea Grant College Program, which provides financial assistance to colleges and universities for research in marine resources. The NOAA grant will be supplemented by $537,050 in non-Federal matching funds.

The Maryland oyster fishery, which produces one-third of the Nation's output, has been declining in production since the turn of the century. Yields of 10-15 million bushels annually in the late 1880's have fallen to less than 1.5 million bushels in the mid-1960's.

Efforts of the State's Department of Natural Resources resulted in an increase to 2.5-3 million bushels yearly in the early 1970's, but the fishery faces new problems because the oysters are failing to reproduce in sufficient numbers. These latest declines could result in serious consequences for Maryland watermen, according to the scientists, unless natural reproduction is improved.

The oyster fishery in Maryland is the backbone of the State's fishing industry, with approximately 9,000 persons, directly or indirectly, dependent on it for their livelihood.

The blue crab studies will investigate the sources of the population—whether young crabs come primarily from estuarine waters near the mouth of the Chesapeake or Delaware Bay, as most people believe, or whether offshore larvae serve as a source of recruitment. The scientists will also investigate the effect of parasitic and other organisms on the growth and reproductive rates of the crab.

The NOAA grant will provide support for additional research projects dealing with environmental quality of Bay waters, microbial populations that affect biofouling of natural surfaces and man-made structures, the chitin content of water and sediment in the bay, and the development of a molluscan cell line to enhance the study of molluscan diseases, nutrition, and biochemistry.

U.S.-French Marine Programs Continued

Plans for continuing U.S.-French cooperative programs in oceanographic research have been announced jointly by the United States and France.

Gerard Piketty, Director-General of France's National Center for the Exploitation of the Oceans (CNEXO), and Ferris Webster, NOAA's Assistant Administrator for Research and Development, outlined the plans following a 3-day meeting in Washington, D.C., earlier this year. The collaboration has been under way since 1970.

Programs to be undertaken represent a balance between basic and applied research, and are designed to enable each nation to take advantage of the special skills, knowledge, and facilities of the other for their mutual benefit.

In addition to agreed-upon programs in 10 specific areas of current cooperation—joint man-in-the-sea projects, marine geology and geophysics research, ecological assessment of the *Amoco Cadiz* disaster, marine pollution, aquaculture programs, coastal sediment dynamics studies, bilateral climate research and data gathering, ocean instrumentation, data buoy technology, data exchange—it was also agreed to initiate discussions in ocean thermal energy conversion and in bioconversion, with a view toward possible future cooperation in those areas.

DMA, Fish Quality Changes Are Studied

The formation of dimethylamine (DMA) in fresh, frozen, and dried fishery products has been given increasing attention by chemists concerned with reactions linked with undesirable changes in quality. Early research by Japanese and Canadian investigators showed that in gadoid species, such as hake, pollock, and cod, both DMA and formaldehyde form when trimethylamine oxide (TMAO), a common nitrogenous component of fish muscle, is degraded. Studies with fresh and frozen fish included observations of the effect of kidney, pyloric caeca, and blood in catalyzing or accelerating DMA formation in fish flesh. The evidence seemed to indicate that DMA formation was initiated by endogenous enzyme(s), but no specific enzymes were demonstrated or isolated.

The several studies by the Utilization Research Division at the NMFS Northwest and Alaska Fisheries Center, Seattle, Wash., and others have shown that DMA formation during frozen storage of gadoids might be important as a quality index. Further, formaldehyde, which is formed along with DMA, reacts with proteins that in turn may produce undesirable textural change such as dryness or toughening of Alaska (walleye) pollock after lengthy cold storage. Currently, research is being conducted in the Division's laboratory on the relation between the breakdown of TMAO to DMA and formaldehyde and changes in texture of pollock muscle stored frozen. Additives that retard (such as hydrogen peroxide) or accelerate (such as sulfur dioxide and ethylenediamine tetraacetic acid) the degradation of TMAO are being tested in pollock.

In one approach, the effects are being monitored by determination of the extractable muscle protein, as a measure of protein change during frozen storage. In a second approach, formaldehyde labeled with $carbon_{14}$ is being used to estimate the rate of binding of formaldehyde to the muscle protein of minced pollock held at 0°C. Such studies may well demonstrate the nature of the undesirable changes in texture and reveal practical methods of inhibiting the changes, thereby improving quality. Because DMA can be nitrosated readily to dimethyl nitrosamine, the above work emphasizes the importance of the selection of handling and processing procedures to insure the safety as well as the quality of fresh, frozen, and dried fishery products.

Marine Life Thrives in Arctic Winters

Teams of diver-scientists, probing the near-total darkness and -35°F temperatures under the Arctic ice pack, have discovered some forms of marine life which, contrary to the conventional belief, appear to thrive in the harsh conditions about them. Working under contract to the National Oceanic and Atmospheric Administration (NOAA), marine biologists explored under the pack near Prudhoe Bay, Alaska, from November 1978 until May 1979.

The winter under-ice study, first of a series of investigations lasting through the next 2 years as part of NOAA's Outer Continental Shelf Environmental Assessment Program, was designed to provide an understanding of the life forms and cycles of the Bering Sea, and how they might be affected by offshore oil and gas development there. The scientists took samples, searched for eggs and larvae of key marine species, placed current meters under the ice, and assessed sediments and bottom-dwelling organisms.

"The Arctic winter months are not the biological standstill period we once thought," said David Norton, a scientist with the Commerce Department agency. Many organisms, he said, not only do not retreat from the hazards of winter under the ice, but appear to go about growing, reproducing, finding food, and generally ignoring the threatening conditions.

"No one else had looked at this ecosystem systematically in winter," Norton said. "But offshore oil and gas development must proceed during 9 months of ice cover, and we needed to know if it is advisable to dump drilling muds and cuttings, for example, into the water column or out on the ice, or whether this material must be hauled ashore.

"Ecologically, we needed to know more about overwintering organisms so we don't let environmental changes tip the balance against them during what may be the most difficult period in their annual cycle. "

The assessment program is managed by NOAA for the Department of the Interior's Bureau of Land Management. Scientists from the University of Alaska, the Alaska Department of Fish and Game, Western Washington State University, Oregon State University, the U.S. Geological Survey, and a private environmental consulting firm, participated in the study.

Preserving Fresh, Whole Herring in Modified RSW

On the U.S. Pacific Coast, fresh herring for food processing (roe) are normally transported in refrigerated sea water (RSW) aboard a tender to the plant. In general, maximum storage life under commercial conditions in RSW is 4-5 days.

Earlier this year, a preliminary experiment was conducted by the Utilization Research Division of the NMFS Northwest and Alaska Fisheries Center, Seattle, Wash., with one lot of relatively immature herring caught in Puget Sound, Wash., to compare keeping quality in ice (control) with modified RSW to which carbon dioxide was added. The iced herring spoiled in about 5 days while the herring in RSW-CO_2 appeared to be in good condition after 8 days, although the brine had developed off-odors at that time.

The RSW-CO_2-held herring showed no significant autolysis of the belly cavity or softening of adjacent flesh. The gain of 2-3 days in storage life could enable the industry to land herring of better quality and make better use of the carcass for food after the roe is removed. However, the scientists cautioned that additional tests should be conducted with other lots of herring before drawing definitive conclusions.