OUR OCEAN PRIORITIES ARE CHANGING, NOAA HEAD SAYS

In the 7 fiscal years 1967-1973, total Federal investment in marine-science activities has increased 53%--from $438 million to $672 million--Dr. Robert M. White, NOAA Administrator, told the Marine Technology Society in Washington, D.C., on May 15. During these years, the total Federal Research and Development budget rose only 16%--from 16 billion to 18.6 billion.

Significant, too, Dr. White noted, was the trend since 1967 in the investment of Federal money. In the first half of the period, there was an increase of $75 million; in the second, $159 million. "The growth rate appears to be accelerating," he said.

Priority and Importance

As a percent of annual ocean expenditures, national security programs "suffered the greatest loss in relative priority." In 7 years, these dropped from 37% of total effort to only 14%.

Dr. White stated: "Our National expenditures for both living and nonliving resources, ocean monitoring and prediction, mapping and charting, general purpose engineering, and education, were relatively constant as percentages of the total."

The big gainers were 3 major program areas: coastal zone, from 5% to 14% of total, marine transportation, from 3% to 10%, and general-purpose ocean research, from 14% to 19%. "These numbers reveal a very clear reordering of our national ocean priorities," Dr. White asserted.

Greater emphasis on the Coastal Zone reflects the growing national demand to protect the environment. It conforms to the purposes of the Environmental Policy Act of 1969, the clean Water Act of 1969, pending legislation on Ocean Dumping, Coastal Zone Management, etc.

In 6 years, the budget for coastal-zone activities increased from $21 million to $94 million.

MARINE TRANSPORTATION

Greater emphasis on transportation reflects 3 factors: increasing U.S. concern with its economic position in the world; U.S. attempts through research and technology to create again a merchant marine fleet equal to its growing needs; expansion of Coast Guard enforcement of marine law.

The budget for marine transportation rose from $12 million to $70 million.

GENERAL-PURPOSE OCEAN RESEARCH

Ocean research mirrors the policy of the Resources and Engineering Act of 1966. It represents U.S. determination "to seek the understanding of the oceans which underpins all else that we seek to do."

Ocean research increased 100% from $62 million to about $126 million. In fiscal year 1973, this research--19% of the total--is the largest slice of the ocean-budget pie.

Several ocean activities that increased at a much faster rate than the average included

those involving living and nonliving ocean resources. Fishery activity rose from $38 million to $62 million, a gain of 62%. Nonliving-resource activities gained 181% from $7 million to $20 million.

Dr. White singled out two programs as "candidates for greater emphasis in the future. . .Our National programs directed at the exploration, development and conservation of our nonliving and living resources." He believes their growth in recent years reflects "the growing realization that the oceans offer substantial hope for meeting some of our pressing National resource needs."

At the same time, there is growing realization that our living resources have to be protected. This will push us towards a comprehensive living-resource management system. We need new technologies of fish-stock assessment, new understanding of pollution's effects on marine ecosystems, and national systems of fishery resource management through new institutions. This development will underscore the need for greater investments to protect and manage our invaluable resources.

And the NOAA Administrator saw this prospect:

"We in the marine field have a new climate and a new opportunity for innovation in marine industry. The oceans offer excellent opportunities of substantial potential--aquaculture, marine mining technology, and environmental preservation, to name a few. And I see encouraging opportunities arising for collaborative work between the Government and industry. I believe that these kinds of opportunities will be among the principal determinants of the nature of the National ocean program over the next six-year period."

NMFS PREDICTS GOOD ALBACORE FISHING SOUTH OF SAN FRANCISCO

The best location for catching albacore tuna this year will be south of San Francisco, according to Dr. R. Michael Laurs of the NMFS Laboratory in La Jolla, California. Dr. Laurs is in charge of fishery prediction investigations.

He bases his forecast on environmental conditions and the trend over the years in distribution of the commercial albacore catch. He estimates that 70 to 80% of the 1972 catch will be south of San Francisco, with most of it off central California; 20 to 30% is expected to come from waters north of San Francisco, which is below the long-term catch average of 36%.

Catch Predictions

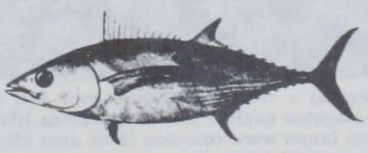
Commercial boats fishing south of San Francisco can expect to catch 30 to 45 million pounds of the valuable white-meat tuna; boats north of San Francisco may catch 10 to 15 million pounds. Dr. Laurs cautions, however, that these estimates could be low if many more boats enter the fishery.

Weekend fishermen and sport boats in southern California waters should have very good albacore fishing this season, although the development of warm water conditions in late summer could limit fishing success.

Role of Environmental Conditions

The prediction of the fishery's general distribution was developed by Dr. Laurs and his staff of meteorologists, oceanographers, and biologists. It is based partly on an experimental index that relates the north-south coastal distribution of the fishery with environmental conditions in certain offshore waters during spring. This assumes that midocean environmental conditions encountered by incoming migrant albacore affect their distribution when they enter North American waters. In past years, the albacore prediction was based solely on analysis of sea-surface temperature conditions in spring in near-shore waters; the summer albacore fishery traditionally takes place there. Biologists assumed that trends in environmental conditions observed in spring persisted and indicated the probable distribution of sea-surface temperature in midsummer. However, later research has shown that dynamic air-sea interactions during summer can alter considerably the sea-surface temperatures seen in spring prior to the fishing season--and alter albacore distribution.

"In the near future, Dr. Laurs stated, "our current population dynamics research should enable us to make more accurate forecasts of tonnage and general size of albacore that will enter the fishery."



NMFS INSPECTS AREA AFFECTED BY CANNIKIN NUCLEAR TEST

Four biologists-divers of the NMFS Auke Bay Fisheries Laboratory in Alaska made a series of reconnaissance dives at Amchitka Island in late April 1972 to determine the extent of underwater biological and geological effects of the detonation in November 1971 of a 5-megaton nuclear device. The divers were Louis Barr, Roy Martin, John Karinen, and Robert Budke. They were accompanied by Theodore R. Merrell Jr., environmental research coordinator for the Auke Bay Laboratory.

Ten locations off the Bering Sea coast within 3 km of Cannikin ground zero were inspected. Six of the locations showed shock-caused bottom disturbances in the form of broken bedrock outcrops. At some sites, damage was slight but, at others, extensive severe damage occurred.

Greatest Damage

The area of greatest damage was along the margin of a large offshore reef about 1.7 km from ground zero. The reef consists of a rock pinnacle that rises precipitously from a depth of about 10 to 15 meters to the sea surface. The basal margin of the reef was littered with freshly broken large rocks, some more than 3 meters in diameter, which apparently were broken from the reef by the shock of the Cannikin explosion. The newly exposed surfaces of broken rock were readily apparent because they were uneroded and unencrusted by marine organisms.

Biological Changes

Biological changes occurring in the disrupted areas are of two types: disappearance of organisms from previously exposed rock

Fig. 1 - Diver inspecting a small underwater rock fall caused by the shock of Cannikin, a 5-megaton nuclear test at Amchitka Island, Alaska. Rock falls of this size and larger were common in an area off the Bering Sea coast of Amchitka adjacent to the test site.

Fig. 2 - Diver at base of a precipitous underwater cliff in an area off Amchitka Island undamaged by the Cannikin test. Closer to the test site, cliffs such as this suffered extensive breakage.

surfaces, and colonization by plants and animals of newly exposed substrate. Some kelps and other algae growing on exposed surfaces of rocks which have been displaced are now in shaded positions where insufficient light penetrates to support plant life. These algae are dying and will eventually disappear. Likewise, some sessile filter-feeding invertebrates (such as sponges and tunicates) may be eliminated on surfaces where water circulation and food availability have been reduced by displacement.

Because of the extensive fracturing of rock, much new substrate has been exposed. These newly exposed surfaces are already being colonized by mobile invertebrate animals, such as urchins and gastropods and, especially at the shallower locations, by Alaria sp., a common alga. Within several years, these new surfaces probably will be encrusted by organisms and will be indistinguishable from undisturbed areas.

More Surveys

The Auke Bay Laboratory of the National Marine Fisheries Service will make additional underwater surveys at Amchitka in 1972 and 1973 to map the full extent of the disturbed areas and to monitor the reestablishment of marine plants and animals in disturbed areas.

1972 FISH STOCKING IN GREAT LAKES TOTALS 18.5 MILLION

About 18.5 million hatchery-reared fish will be placed into the Great Lakes and their tributary streams in 1972. This will be about a million fewer than the 1970 high, but offers a better balance of species. Atlantic salmon are being introduced; and, for the first time, the release of chinook salmon will surpass coho plantings. This information is provided by the Great Lakes Fishery Commission.

Salmon

Salmon will be released in all Great Lakes and in the waters of all bordering jurisdictions. The 9.7 million smolts or young salmon will include nearly 4.3 million chinook, about 4.1 million coho, over 1.3 million kokanee, and about 39,000 Atlantic salmon. The Atlantics were transported in tank trucks by Michigan and Wisconsin department of natural resources personnel from a hatchery in the Gaspé section of Quebec. Release locations are the Boyne and Au Sable rivers in Michigan, and Pikes Creek at Bayfield, Wisconsin.

Lake Trout

Nearly 5 million lake trout were being planted in lakes Superior and Michigan this spring, the most since 1968. Planting of this species began in 1958 in Superior along with the lampricide treatment of streams where the predator sea lamprey spawn. With 1972's

addition, the 15-year total for Superior will exceed 32 million. Rehabilitation of the lake-trout fishery in Lake Michigan started in 1965, and plantings to date total more than 16 million. The Great Lakes Fishery Commission coordinates this stocking program, which is largely supplied with yearling lake trout from U.S. hatcheries.

Also being planted this spring were 3.8 million other trout--brown, brook, rainbow, steelhead, and splake. Splake is a lake trout-brook trout hybrid; steelhead is the lake-run rainbow trout, which is larger than the stream-dwelling variety.

Lake Michigan

Lake Michigan waters will receive nearly 10.3 million young fish this year--more than half the amount scheduled for release in the Great Lakes. Some 2.9 million lake trout will be put into the waters of the four bordering states by the U.S. Bureau of Sport Fisheries and Wildlife. Michigan's plans to release nearly 5.3 million game fish in Lake Michigan represents about two-thirds the state's 1972 total of about 7.9 million. For Wisconsin, another major contributor, about 1.8 million fish out of this year's $2\frac{1}{2}$-million total release will go into Lake Michigan.

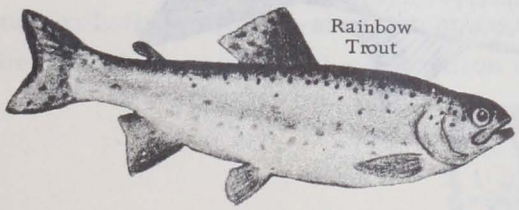
Lake Superior and Huron

Fish stocking for Lake Superior will total 3.3 million; for Huron, 3.4 million. Lake trout is the principal fish going into Superior. The selectively bred splake and splake-lake trout backcross are being used extensively in Lake Huron.

In the eastern Great Lakes, coho and chinook plantings in Lake Erie will total about 300,000, a decline from 1971. However, the Lake Ontario stocking programs of New York and Ontario indicate a two-species total of just over a million, or about double the 1970 figure for that lake.

Huron's Saginaw Bay

About 50 million walleye or yellow pickerel fry were released into the Saginaw Bay section of Lake Huron by Michigan's Department of Natural Resources. The young, quarter-inch fish were provided by New York State's Oneida Lake fish hatchery as part of a reciprocal arrangement under which Michigan has supplied New York with salmon and steelhead eggs. Walleyes are slow growers. It is expected that the legal catch size (13 inches) generally will not be attained in the once-prime Saginaw Bay fishery before 1976.



Rainbow Trout

Chinook Salmon

SCIENTISTS CONTROL REPRODUCTION OF MULLET

The controlled reproduction of mullet, including their spawning out of season, has been achieved by scientists of Hawaii's Oceanic Institute at Waimanalo. These results bring closer the commercial breeding and farming of this widely used oceanic fish. Sea Grant funds supported the research.

The researchers succeeded in spawning the fish in September 1971, five months earlier than their natural spawning season of January or February. They used temperature and photoperiod (light) control. With this, conditions in the holding tank simulated the midwinter season. Also, the females were injected with hormones. Both males and females responded to cool water and short light exposure. Three females were successfully spawned in September. The process was repeated with three other females in October and early November.

Critical Accomplishment

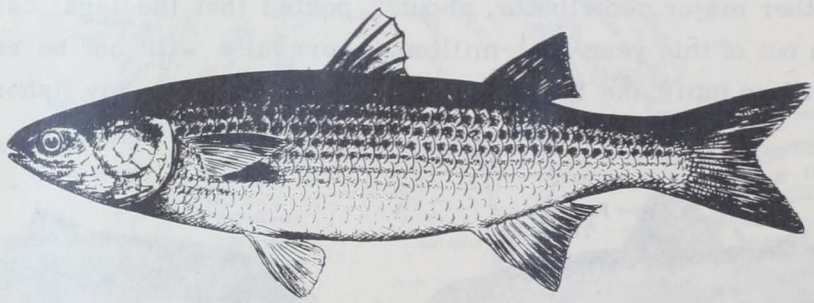
Another important achievement was finding ways to enable the tiny mullet to survive the critical three days after hatching. Immediately after hatching, larvae are nourished by their attached yolk sac. At the end of this stage, about three days, their mouths break through; shortly thereafter, they begin feeding. They sink to bottom of tank. (In the ocean, thermal layers in the water keep them afloat.) Their tender skins break or are bruised by the bottom of the tank, and the injuries lead to infection and mass mortality.

The researchers used an upwelling system in the tanks to prevent larval settling. They achieved survival rates ranging up to 70% instead of the previous 0.5 to 5.0%.

Applicable to Other Fish?

The researchers are refining their techniques. They are examining the possibility of transferring these techniques to other commercially important fish.

They have taken the first steps toward trying to spawn the mahimahi--Hawaiian name for the dolphin or the dorado, an important food fish and luxury item on dinner menus across the Pacific.



FDA SEEKS TO IMPROVE FOOD-PLANT SANITATION

The Food and Drug Administration (FDA) will intensify its regulatory program designed to end insanitary conditions in U.S. food plants. Dr. Charles C. Edwards, Commissioner of Food and Drugs, stated that FDA has devoted most of its inspection resources in recent years to microbiological contamination problems. "It has become apparent, however, that there has been a general decline in the food industries sanitation practices. This has been shown by recent FDA inspections and confirmed by a report of the General Accounting Office which concluded that serious insanitary conditions exist in the food industry."

300 More Inspectors

The proposed 1973 budget for FDA will provide for 300 more food-plant inspectors. They will be able to carry out the sanitation-inspection program without reducing microbiological-contamination inspection.

The Commissioner added: "While we must continue to give high priority attention to microbiological problems such as salmonella and botulism which can present a serious hazard to health, we cannot tolerate a decline in general sanitation practices. We, therefore, intend to take prompt, vigorous action to assure good housekeeping operations, including cleanliness of personnel, equipment, and premises and elimination of all conditions that attract vermin and rodents."

FDA Push Begins

FDA is notifying the food industry through more than 100 trade associations that it is increasing inspection and enforcement actions against sanitary violations. Inspection priority will be given those establishments with a record of deviating from good manufacturing practices.

Inspection Procedure

FDA inspectors will report violations to management and request a written response within 10 days detailing steps taken to correct conditions. The plant will be reinspected within 30 days. Regulatory action will be taken if uncorrected violations are found. Action could include seizure of products, injunction against the plant, or civil or criminal prosecution.

FDA will work closely with State and local officials in all parts of the new program.

Dr. Edwards emphasized that this is not a short-term program but a policy action. Priority will be given to the inspection of conditions under which foods are processed, packed, shipped, and stored. At the same time, the level of inspection of the finished food products will be continued.