TUNA/DOLPHIN PROGRAM

Five Years of Progress

by William W. Fox, Jr.

THE UNITED STATES Congress passed the Marine Mammal Protection Act (MMPA) on October 21, 1972. Among other things, the Act addresses the problem of dolphin mortality which occurs incidentally in a significant portion of purse seine fishing for yellowfin tuna in the eastern Pacific Ocean. The MMPA established a twenty-four-month period that gave the tuna fishery a temporary exemption from the moratorium provisions of the Act, provided that all known gear and procedures which minimized harm to marine mammals, were used. The two-year period also gave the National Marine Fisheries Service (NMFS) time to develop new gear and procedures for reducing dolphin mortality and to obtain the requisite information for bringing the tuna fishery under the permit provisions of the Act.

Following passage of the MMPA, the already-existing NMFS dolphin research program at the La Jolla, California, Laboratory of the Southwest Fisheries Center was greatly expanded to develop gear and procedures for reducing the incidental dolphin mortality and to determine the status of the sub-populations of the impacted dolphin stocks. The expanded research program was fully operational by mid-1973. However, barely a year later, the scientists of the research program had to prepare a report on their progress. The report was required for legal hearings to bring the tuna fishery under the permit provisions of the Act by October 1974, the expiration date of the twenty-four-month exemption. After public hearings before an Administrative Law Judge (ALJ), NMFS issued a general permit to the tuna fishery for the 1975 fishing season and modified the regulations covering the tuna fishery to include several new procedures developed through the research program and recommended by the ALJ. Several environmental organizations immediately filed suit to void the general permit.

While the lawsuit over the 1975 permit was pending, NMFS held hearings in late 1975 on modifications in the marine mammal regulations governing the tuna fishery for the 1976 fishing season. NMFS issued a general permit for the 1976 fishing season and again several environmental organizations filed suit to void the new permit.

The two lawsuits were consolidated and heard by Judge Charles Richey of the United States District Court. On May 11, 1976, Judge Richey decided in favor of the environmental groups. He voided the permit issued to the tuna industry by NMFS because (1) it was his opinion that certain statements about the dolphin populations which were not published in issuing the permit are so required by the MMPA and (2) the permit did not specify the exact number and kind of animals that may be taken. On very important points of policy, Judge Richey further ruled that the primary consideration shall be that the taking, allowed by the permit, shall not be to the disadvantage of the dolphin populations and that the burden of proof lies with the applicant, in this case the tuna industry.

Obscured behind all this highly visible legal wrangling was the success of the research program in developing gear and procedures to reduce the incidental dolphin mortality and in determining the impact of the incidental mortality on the dolphin stocks. Also obscured was the steady progress that the United States tuna purse seine fleet achieved in reducing the dolphin mortality rate.

Last November Oceans *published an article on the incidental porpoise mortality during seine fishing for yellowfin tuna. Here is another perspective by Dr. William W. Fox, Jr., Chief Scientist responsible for the National Marine Fisheries Service's tuna-porpoise research program.*

Progress in Dolphin Mortality Rate Reduction

Until the middle of 1976, when a quota on the number of dolphins that could be killed incidental to tuna fishing was instituted as a result of Judge Richey's ruling, the gear and procedures defined in the NMFS regulations dealt with the mortality rate, i.e., the number of animals killed during a given set of the purse seine. In any given set, the number of dolphins killed is influenced by the number and kind of dolphins in the net and the amount of yellowfin tuna caught; these conditions differ widely among fishing seasons. Comparison of the mortality rates of sets under similar conditions reveals that there were substantial and continuous reductions in the mortality rate of 28%, 22%, 18%, and 65%, each year from 1973 through 1977, respectively.

The total dolphin mortality that occurs in a given year depends on the amount of fishing done in association with dolphins, as well as the dolphin mortality rate. The annual catch of yellowfin tuna associated with dolphins after passage of the MMPA (1973-1977) has averaged about 114,000 tons, the highest being 127,000 tons in 1973 and the lowest being 99,000 tons in 1974. The annual mortality of marine mammals incidental to United States tuna purse seine fishing for 1971 and 1972, the two years immediately prior to passage of the MMPA, averaged 309,000 animals. Our estimates indicate that the annual mortality was even higher during several of the previous years. During 1973 and 1974, the twenty-four-month exemption period provided by the MMPA, the yellowfin catch associated with dolphins averaged 113,000 tons and the dolphin mortality averaged 137,000 animals per year under NMFS regulations and industry-wide adoption of all known gear and procedures which minimized harm to the dolphins. Therefore, over 340,000 dolphins were saved during the two-year period, despite an increase in

the catch of yellowfin tuna associated with dolphins, from 106,000 tons per year in 1971 and 1972 to 113,000 tons per year in 1973 and 1974. Further progress was made in 1975 through 1977 as the annual mortality of dolphins was reduced to 134,000, 104,000, and 27,000 animals, respectively, while the yellowfin tuna catch associated with dolphins increased slightly to an average of about 115,000 tons per year, 1975-1977.

By the end of 1977 the dolphin mortality rate and the annual dolphin mortality had decreased to less than 10% of the level that existed prior to enactment of the MMPA. This was due to the gear and procedures developed by the NMFS research program and the tuna industry, embodied in NMFS regulations, and applied with increasing diligence over the years by the fishermen of the United States tuna purse seine fleet.

The major breakthrough in 1977 had its roots in late 1975, barely two years after the expanded research program began, when an NMFS charter cruise of the M/V *Bold Contender* demonstrated the capability of the total NMFS system of gear and techniques to reduce greatly dolphin mortality. The *Bold Contender* made 25 sets with a mortality rate of only 1.44 animals per set (15 of the sets killed no animals) as compared with 12.80 animals killed per set for the comparable fleet average in 1975. Because of the remarkable success of the *Bold Contender* charter, a massive test of two modifications of this system was planned for early 1976. The purpose of this test, involving twenty purse seiners, was to determine whether or not the very low mortality rate achieved by the system on the *Bold Contender* charter was feasible under competitive fishing conditions and feasible for most tuna purse seine vessels. The experiment was a joint project of NMFS, the Marine Mammal Commission, and the tuna industry-sponsored Porpoise Rescue Foundation.

Unfortunately, the very ruling by Judge Richey on May 11, 1976, sought and won by the environmental groups, greatly interrupted the 1976 twenty-vessel test. The effects of the ruling prevented the data from being collected completely until the end of 1976 and imposed conditions that made analysis and interpretation of the results very difficult. Several problems with the system were noted during the 1976 twenty-vessel test, and a charter cruise of the M/V *Elizabeth C. J.* from October through December of 1976 successfully tested modifications designed to alleviate those problems. However, final analysis of the data could not be completed until late spring of 1977, too late for full incorporation in the 1977 regulations.

The obviously beneficial gear and procedures from the 1976 twenty-vessel test and the *Elizabeth C. J.* charter cruise; primarily the extensive use of fine mesh webbing in the net to reduce entanglement and a man with a face mask in a raft inside the net to determine if all live animals have been rescued before the net and fish are hauled aboard; were incorporated in the 1977 regulations. These gear and procedures contributed substantially to the phenomenally reduced dolphin mortality rate per set and the total mortality for 1977. Entanglement of animals in the net dropped from an average of six to seven animals per set in 1976 to less than one per set in 1977 for sets where animals were killed; the average number of animals killed when the net and fish were hauled aboard dropped from one per set in 1976 to less than one in ten sets in 1977 for sets where animals were killed; and the percentage of sets with no animals being killed rose from forty percent in 1976 to sixty percent in 1977. While the United States tuna fleet remained in port for nearly three months during 1977, preliminary data indicate that the amount of yellowfin catch associated with dolphins in 1977 was near the average amount for the previous four years. Therefore, the low mortality of 27,000 dolphins in 1977 was due almost exclusively to the mandated gear and procedures, and to the diligent efforts of the United States tuna fishermen.

The modified gear tested by the M/V *Elizabeth C. J.* was fleet-tested on nineteen vessel trips during the 1977 season from late May through December; again, this test had been extensively delayed because of the complications raised by Judge Richey's ruling. Vessels testing this gear had a dolphin mortality rate during 1977 of about half that of the other vessels in the fleet; this gear is required under NMFS regulations for 1978. Obscured by all the legal battles is the ironic fact that, in effect, the suit brought by the environmental groups and decided by Judge Richey delayed implementation of the most effective dolphin rescue gear by about one year.

Progress in reducing the dolphin mortality rate is continuing in 1978. The dolphin mortality rate during the first quarter of 1978 has been about twenty percent below the 1977 level. The vessels using the newly required gear, termed the porpoise apron, currently have a dolphin mortality rate of about sixty percent below that of other vessels, which must install the new gear by July 1, 1978.

NMFS scientists had formed estimates of existing dolphin population sizes and had determined the impact of fishing-caused mortality levels on existing population sizes for the two major (i.e., accounting for over eighty percent of the incidental mortality) dolphin stocks as background for the hearings held in 1974 and 1975 on the issuance of the permits disputed by the environmental groups. This information, however, was not published in the form that Judge Richey ruled is required by the MMPA, nor did it cover each of the twenty-one dolphin species or stocks involved in the tuna fishery. The primary stumbling block in performing the population assessments in the manner prescribed by Judge Richey, aside from the personnel limitations of our research program, was the lack of an intelligible or a generally accepted scientific definition of the term "optimum sustainable population" contained in the MMPA.

After the scientists in my research program conducted an accelerated project of assembling all relevant data and population parameter estimates, in July, 1976, I convened a workshop of twelve international scientists, most of whom are recognized experts in the field of population assessment. They agreed upon a working definition of optimum sustainable population, since adopted formally by NMFS, and developed assessments of all twenty-one dolphin species or stocks in the manner dictated by Judge Richey's ruling. The results of the workshop, which confirmed our previous assessment of the major dolphin stocks, were published in a report made available to the public in September 1976.

The 1977 permit and regulations issued by NMFS were based on the workshop's report. The population assessments involve a certain degree of imprecision as well as several major assumptions; therefore, the quotas established for 1977 were very conservative. While the aggregate estimate of the amount of United States-caused dolphin mortality that would allow the stocks to remain stable was 179,000 animals, the sum total of quotas set by NMFS for most species and stocks was only 62,429 animals. Furthermore, the eastern spinner dolphin stock, historically a major fished stock, was declared to be depleted by NMFS, and no intentional taking was allowed. Subsequent to the issuance of the 1977 regulations, the Committee for Humane Legislation, Inc., filed another suit to void them; the suit was also heard by Judge Richey. However, this time on June 30, 1977, he ruled in favor of

NMFS and commended us for our population assessment work.

For the first six months of 1977, we conducted a major survey of the cetacean (dolphin and whale) populations of the eastern tropical Pacific Ocean. We used two aircraft and two research vessels to cover the approximately four million square-mile area. The data collected are currently under analysis, and the results will be used to improve our assessment of the status of the populations.

Substantial progress has been made in reducing the dolphin mortality incidental to United States tuna purse seine fishing and in determining the status of the affected dolphin populations. However, considerably more research is required before we can become complacent about the status of the dolphin populations or before we can virtually eliminate dolphin mortality incidental to tuna purse seine fishing.

Our research at the Southwest Fisheries Center is continuing to refine our knowledge about the dolphin population parameters through intensive at-sea sampling and a major dolphin mark-recapture experiment. Another major survey of the cetacean populations in the eastern Pacific Ocean is planned for early 1979, and intensive localized surveys are planned for subsequent years. Now that the direct observable mortality has been reduced to such a low level, we have expanded our investigation of the effects of the pursuit and capture process on the dolphin populations. We are also examining more closely the ecological relationship between yellowfin tuna and the dolphins, since the primary objective of the MMPA is to "maintain the health and stability of the marine ecosystem."

Our research into improved fishing techniques, which will further reduce the incidental dolphin mortality, has expanded in funding and direction this year. We have begun a project dealing specifically with the behavior of dolphins and tuna; we have cooperated in and supported the funding for research on acoustics and artificial aggregating devices by the National Science Foundation; and we have funded contracts investigating the sensory systems of tuna—all leading to improved tuna fishing systems which may eventually allow capture of tuna associated with dolphins without also capturing the dolphins. Only through the development of such fishing systems, which are economically more efficient than simultaneously capturing the entire tuna and dolphin aggregations, can incidental dolphin mortality be virtually eliminated. ■