

NMFS RESEARCH ON PACIFIC BILLFISHES

You are at the Hawaiian International Billfish Tournament (HIBT), an annual event that transforms the community of Kailua-Kona into a beehive of activity. The fishing competition for billfishes and tunas is, of course, the core of it all. Since the beginning of HIBT 18 years ago, a host of activities has evolved around the competition. One of the more colorful of the satellite activities is the show that accompanies the weighing of the catch at the pier at the end of each day of fishing. There, at the pier, you witness emotions--suspense, elation, disappointment, excitement...; people--Miss Kona, Peter Fithian, Howard Kiyama, Judi Nakamaru, Richard Boone, Eric Tixier, Haku Baldwin, Paiboon Bencharit, Toshio Mifune, Robyn Hall...; action--weighmasters weighing, judges judging, announcers announcing, photographers photographing, fish handlers handling fish... Away from center stage, between the scoreboard and the refreshment stand, other activity is going on. Two men are measuring, cutting, and examining the fish. Who are they? What are they doing that for? Answering those questions is what this article is about.

Ray Sumida and I have been the ones working over the fish in recent years. We are part of the staff of the Honolulu Laboratory. For those who have a penchant for organizational structure, the Honolulu Laboratory is a part of the Southwest Fisheries Center, which is a part of the National Marine Fisheries Service (NMFS), which is a part of the National Oceanographic and Atmospheric Administration (NOAA), which is a part of the Department of the Commerce of the United States.

The purpose of the Honolulu Laboratory is to research fishery resources in the central Pacific Ocean to bring about optimal use of the resources. There are 10 tasks into which all of the research projects of the Honolulu Laboratory fit. One of them is structured to research on recreational fisheries and is appropriately called the Recreational Fisheries Task.

At HIBT, the measuring and examining of fish is our most visible activity. This work is for the purpose of gathering basic biological data on the billfishes. Data on lengths, weights, stomach contents, sex, species, and other noteworthy items are recorded. On occasion, material for special studies is also collected at the pier. An example of that is the collection of flesh samples in 1973 and 1974 for a study on mercury content.

Another activity which is standard procedure, but less visible, is the monitoring of the radio roundups thrice daily. The data from the roundups are used in an analysis of strikes, catch, and effort in the various areas. Several months after the tournament when all the data analyses have been completed, a report of the results of the activities of NMFS is distributed to the contestants.

Last year, a small portable computer was set up at the communications center of the tournament. As each team reported at roundup time, the data were entered into the computer. Within a minute after the last team reported, we had a printout of the

strike rate for each area. Phil Parker who was in charge of radio reporting was thus able to relay information on the best areas of the day at the conclusion of each radio roundup.

Science is not the only purpose of the participation of NMFS in HIBT. Another purpose is to provide an educational experience for those who wish it, not only for those participating in the tournament but for the community at large, as well. Towards that end, NMFS has organized and presented workshops, exhibits, demonstrations, and field trips on a research ship. On a less formal basis, the representatives from the Honolulu Laboratory assigned to the tournament may be approached at any time by anyone who has questions related to billfishes. They also supply notes of interesting biological information to the announcer at the weigh-in show.

Perhaps, the most significant and certainly the most far-reaching activity sponsored by NMFS in connection with HIBT was the International Billfish Symposium of 1972. The symposium was the first ever on billfishes and was attended by people from 10 states and 8 countries. Many of them were the world's leading experts in billfishes. The symposium resulted in the publication of 46 scientific papers on billfishes.

The workshops have been on a smaller scale in time and in amount of participation than the symposium. They have, nonetheless, been useful and informative. A diversity of subjects have been covered at the workshops: the biology of blue marlin, mercury content in marlins, the distribution of marlins as related to the current pattern in Kona waters, lures, baits, the Fishery Conservation and Management Act of 1976, billfish migrations, tagging of marlins, and tracking of marlins. The workshops have been open to the public. The Honolulu Laboratory has been responsible in seeing that the workshops are led by experts on whatever subject matter is being presented.

So much for tournament activities. For the rest of this article, I shall review the NMFS research projects concerning billfishes in the Pacific Ocean.

The most important effort on billfishes currently is the locating and accumulating of data in preparation for a billfish stock assessment workshop to be held at the Honolulu Laboratory in early December. A knowledge of the status of the stocks is essential for rational decisions on conservation measures. The leading billfish fishing countries will be represented at the workshop. Scientists from Japan, Republic of China, Republic of China, Republic of Korea, and the United States will pool their data to arrive at estimates of the magnitude of the billfish stocks. Needed for this study are data on catch and effort, areas of catch, individual sizes of billfishes caught, and dates of capture. Commercial fishing data, which make up the bulk of the extant data, are readily available. Data from recreational fishing activities, however, are more difficult to obtain because of the lack of an organized system to record these data. Efforts are now going on to contact all sport

fishing clubs in the Pacific in the hope that hidden in their records are treasures of data. Another source of data on recreational fishing is fishing tournaments.

The short-term movements of marlins and how these movements are related to environmental features is the subject of another study. The blue marlin is the species we are presently concentrating on. Movements are determined by attaching a transmitter to a fish and following it with a boat equipped with receiving equipment. The first tract of a blue marlin was made in 1971 without research ship, the Charles H. Gilbert. Subsequent tracks were too short to provide information on blue marlin, but did provide hints on how to improve our tracking performance. Since then, the ship has been sold and I have decided to use smaller boats for tracking. The bulky tracking equipment is now being purchased so that we shall be able to resume the project shortly.

Long-term movements of marlins are being studied by James Squire of the La Jolla Laboratory, which is also part of the Southwest Fisheries Center. Fish are tagged with a vinyl tag and released with the expectation that some of them will be recaptured, hopefully, at some location along the migration route other than the site of release. He depends entirely on sports fishermen to do the tagging. Recoveries are made by sports and commercial fishermen. Most of the tagged fish have been striped marlin (about 10,000) and sailfish (about 5,000) caught off California and Mexico. The tagging of black marlin off Australia has accelerated in recent years and about 700 have been tagged. The tagging of blue marlin lags behind the other species. About 300 have been tagged.

James Squire is also responsible for the annual Billfish Angling Survey which is conducted by the La Jolla Laboratory with the assistance of the International Game Fish Association. Measures of fishing effort and catch by species are obtained in this survey.

To avoid future shortcomings in data from the recreational segment of the fishery, the Honolulu Laboratory is working together with the Hawaii State Division of Fish and Game on a data collecting system. Although the system will be designed for the State of Hawaii primarily, it is our intention that it will be flexible enough to include all the sport fishing areas in the Pacific. The data will be used for periodic updating of the status of billfish stocks.

An important study on the economic and social impact of recreational fishing for large game fishes on the Kona community is almost completed. This study was contracted out to Research Associates, a firm of professional survey specialists.

Walter Matsumoto of the Honolulu Laboratory is conducting an experiment designed to find out whether or not floating platforms anchored at sea will aggregate enough fish for commercial fishing purposes. Although the experiment is commercially oriented, it will have an effect on recreational fishing. Sports fishermen

are, in fact, fishing around the platforms.

A problem that was serious only in the Kona area, but seems to be spreading throughout the State of Hawaii, is the taking of fish by porpoises. Why this is considered a problem is that the fish are on fishermen's lines, as bait on trolling lines or longlines, or as the catch on bottom fishermen's handlines. We did a preliminary study to define the problem and submitted a research proposal. The proposal has not been approved as yet.

I frequently attend and present talks at meetings of various sport fishing clubs. This activity does not have any specific scientific purpose, but does serve the general purpose of facilitating communication. Through this activity, I have become more aware of what the game of sport fishing is about and the fishermen have become more aware of what fishery science is about.

Fishery research is an interesting, exciting, and challenging occupation. I view it to be as much of a game as the big game that you as big game fishermen play. In my contacts with you, I have come away with the impression that a number of you are interested in getting involved in research projects, that you want to expand your game by participating in my game. Accordingly, in planning my projects I have included space for your participation. If you have a boat and would like to track marlin or yellowfin tuna, if you would like to tag and release marlins, if you would like to keep records in a way that they can be used by science, I invite you to play at my work. I may be contacted at the following address and telephone:

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