MIGRATION PATTERNS OF TUNA IN THE PACIFIC

Dr. Richard S. Shomura

Dr. Richard Shomura has served as Director of the Honolulu Laboratory of the National Marine Fisheries Service (NMFS) since 1973. Previously, he was Director of the NMFS Tiburon Fisheries Laboratory in California. Dr. Shomura is a past president of the Hawaii chapter of the American Fisheries Society. He received his M.S. in Zoology from the University of Hawaii in 1961.

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(EXCERPTS FROM SLIDE PRESENTATION)

The recent extension of coastal jurisdiction out to 200-miles by the Pacific Basin countries has resulted in dramatic changes in fisheries strategies, fisheries policies, and international law. I do not plan to go into details of the high-seas tuna fisheries or the interaction of the high-seas fisheries with coastal fisheries and how these relate to the changes in coastal jurisdiction. With the brief time available, I will provide an overview of the movement patterns of several commercially important tuna species in the Pacific.

I should note that the tuna have been one of the key issues in international fisheries management and have been the cause of many legal problems as they relate to pelagic resources. The U.S.A. considers the tuna as highly migratory and, thus, does not include them in the MFCMA. While this interpretation is held by the U.S.A., other countries do not hold similar views. Instead, they view the tuna resources as being under their jurisdiction within the internationally accepted 200-mile zone. Since movement patterns are germane to the tuna issue, I will provide some information on the distribution and movements of several selected species of tunas and billfishes.

Tunas are related to the bonitos, mackerels, and are distantly related to billfishes. Based on the most recent FAO statistics for 1985, the world nominal catch was estimated to be nearly 85 million metric tons. Of the 85 million metric tons, the catch of tunas, bonitos, and billfishes was estimated to be 3.2 million metric tons, or roughly 3.8% of the total world landings. As you are aware, the tunas represent a high

economically valued resource to many nations, especially to the Pacific island nations.

In looking at the distribution of the tunas across the world's oceans, the Pacific is by far the largest producer of tunas. In 1985, the Pacific produced 64% of the commercially important species. When I say commercially important I am including the albacore (Thunnus alalunga), northern bluefin tuna (T. thynnus), southern bluefin tuna (T. maccoyii), bigeye tuna (T. obesus), yellowfin tuna (T. albacares), and skipjack tuna (Katsuwonus pelamis). I should note that there are several other species that, although not commercially important, are very important to the artisanal fisheries that occur throughout the world, especially in the island areas of the world's oceans.

The skipjack and yellowfin tunas are the most important of the commercially caught tunas. The world catch of skipjack tuna in 1985 was 892,200 metric tons, of which 637,000 metric tons were taken from the Pacific. The bulk of skipjack tuna was taken in the central and western Pacific, mostly as a result of the newly established purse seine fisheries in the region. The yellowfin catch is also important in the Pacific. Of the world catch of 740,000 metric tons, the Pacific landed 470,600 metric tons or roughly 64%.

Migration Patterns

The distribution of albacore ranges from 40 degrees north latitude to 40 degrees south latitude. This species is taken by several types of fishing gear including troll, pole and line, and longline. In terms of movement patterns, Figure 1 illustrates some of the results based on tag release and recovery data. Most of the tagging has been done in the North Pacific. Although we do not have definitive data on the stock structure of the albacore in the Pacific, the distributional and spawning data suggest two separate stocks: one in the North Pacific and one in the South Pacific.

In terms of movement, one can describe the albacore as highly migratory because it undergoes extensive trans-Pacific movements; at least, this would describe the North Pacific stock. Not much is known of the South Pacific albacore because tagging has only recently been initiated for this resource in the South Pacific. To date, we have recovered only one tagged albacore from several thousand releases.

The bluefin tunas also show extensive trans-ocean movements. It should be noted, however, that these tuna species as well as a number of other tuna species

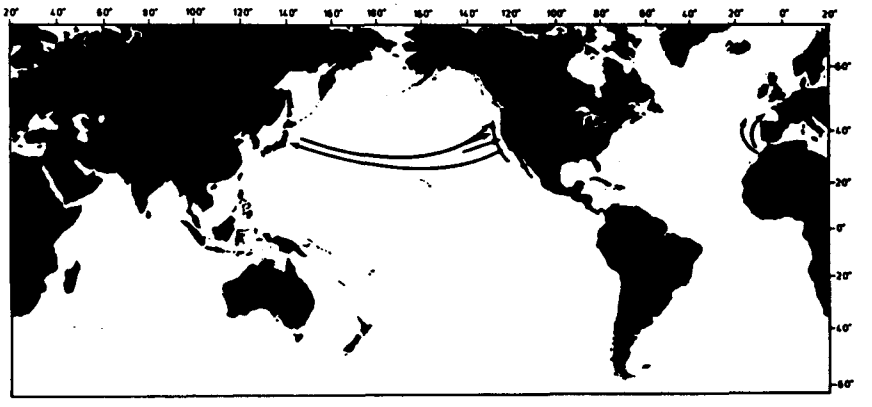


Figure 1. Movement patterns of albacore tuna in the Pacific, as determined from capture and release studies. Arrows and terminuses indicate points of release and capture, respectively. Data are from Joseph et al (1979).

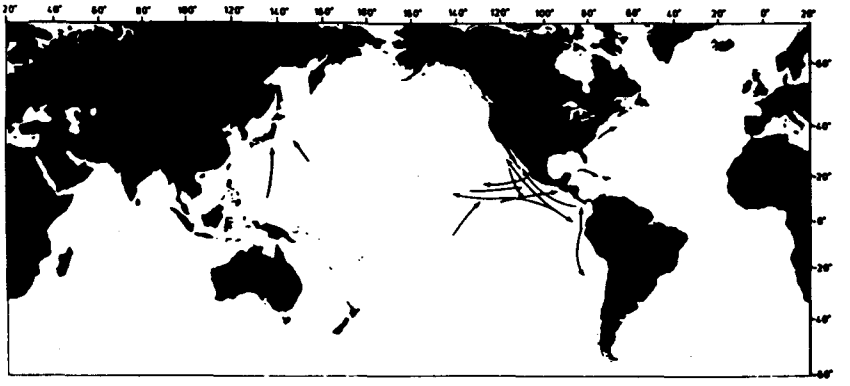
also are caught in large numbers close to shore. The northern bluefin tuna has been traditionally taken by traps in coastal waters of Japan. Because of their extensive movements, the bluefin tunas can be considered "highly migratory". In analyzing movement patterns based on tag release and recovery data, it should be noted that fishing effort is not uniformly distributed; thus, interpretation of the data may be biased by differences in fishing effort. Where we see tag recoveries, it may simply reflect more intensive fishing effort in that region.

The yellowfin tuna is found in tropical waters worldwide. This species is taken by a number of different types of gear. Recreational fishermen catch this species with troll gear, while commercial fishermen use a wide variety of fishing gear to capture this species. Commercial fishermen use troll, pole and line, handline, longline, and purse seine gears. The movements of yellowfin tuna are shown in Figure 2. Unlike the other tuna species that I have described thus far, the yellowfin tuna does not appear to move extensively, at least not as much as the albacore or bluefin tunas. Of the tens of thousands of yellowfin tuna tagged in the eastern Pacific by the Inter-American Tropical Tuna Commission (IATTC), nearly all were recovered in the same general area. These appears to be some movement of the yellowfin tuna offshore from the eastern part of Central America.

The skipjack tuna is also caught by several types of fishing gear including troll, pole and line, and purse seine. In recent years, there has been a considerable amount of tagging of this species. In the late 1970's the South Pacific Commission (SPC) tagged about 150,000 skipjack tunas from throughout the central and western Pacific. Figure 3 presents some of the results of this tagging study. There appears to be extensive movements by the skipjack tuna. To date, SPC scientists have not been able to discern any patterns that would suggest the existence of independent stocks of skipjack in the western Pacific. As with other tuna species, the skipjack tuna is found in waters close to shore as well as in waters considerable distances from shore; the skipjack tuna has been caught as far as 40 north latitude in the North Pacific.

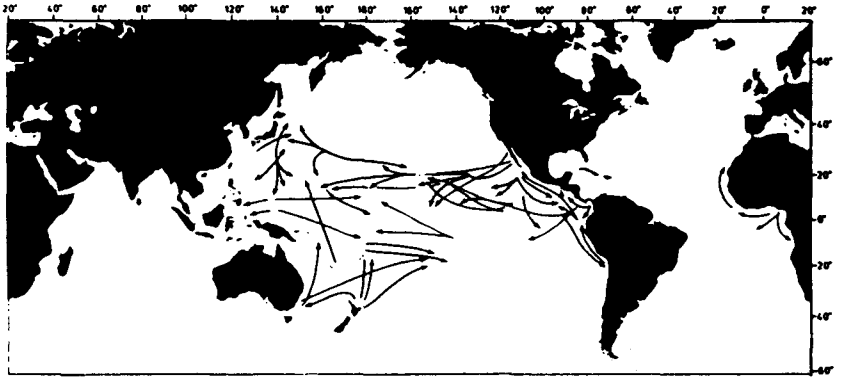
Among the other commercially important tunas, the bigeye tuna also shows extensive movements. The tag release and recovery data for bigeye tuna show patterns similar to that of albacore.

Although billfishes are not the subject of this presentation, it may be instructive to note some of the



YELLOWFIN TUNA

Figure 2. Movement patterns of yellowfin tuna in the Pacific, as determined from capture and release studies. Arrows and terminuses indicate points of release and capture, respectively.



SKIPJACK TUNA

Figure 3. Movement patterns of skipjack tuna in the Pacific, as determined from capture and release studies. Arrows and terminuses indicate points of release and capture, respectively. Data are from Joseph et al (1979).

extensive movements undertaken by some billfish species --instructive because, unlike tunas, the billfishes are included under the MFCMA. Figure 4 shows the tag release and recovery of striped marlin (Tetrapturus audax) in the Pacific and white marlin (T. albidus) in the Atlantic. Some of the striped marlin show extensive movements; one striped marlin tagged off Mexico was recovered in the Hawaiian Islands area. A more remarkable movement has been demonstrated by the black marlin (Makaira indica). A black marlin tagged off Cape San Lucas in Mexico in January 1983 was recovered off Norfolk Island, New Zealand, in September 1984. By straight line distance, this fish traveled 5,760 nautical miles over a 613-day period.

SUMMARY

We do not fully understand the stock structure and movement patterns of the various species of tunas and billfishes. There appears to be ample evidence that some species of tunas move extensively; these species would include the albacore, northern bluefin tuna, southern bluefin tuna, bigeye tuna, and skipjack tuna. The yellowfin tuna does not appear to move as extensively. Although data are limited, some species of billfish appear to move extensively also.

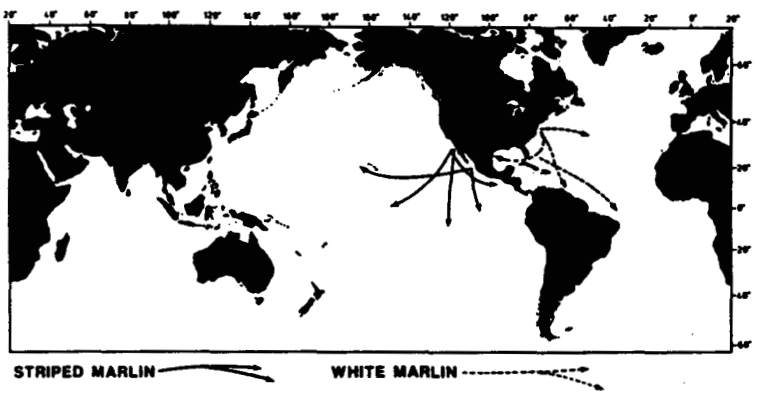


Figure 4. Movement patterns of striped marlin in the Pacific and white marlin in the Atlantic, as determined from capture and release studies. Arrows and terminuses indicate points of release and capture, respectively. Data are from Joseph et al (1979).