MOVEMENT OF SKIPJACK TUNA IN THE PACIFIC OCEAN AS DETERMINED

FROM JAPANESE TUNA LONGLINE CATCHES

By

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ABSTRACT

Catch data of the Japanese tuna longline fishery from 1964 through 1967 were analyzed to determine the distribution, abundance and movement of skipjack tuna in offshore waters of the Pacific Ocean. Although the longline gear is rather inefficient for catching skipjack tuna, its wide usage in the major oceans and in all months of the year makes it especially valuable in assessing the distribution and movement of pelagic species, such as the skipjack tuna, on an oceanwide basis.

The migration paths were determined by (1) computing the catch rates (catch per 1,000 hooks) in each 5° square area fished by quarters for each year, (2) plotting these values and drawing contour lines to isolate cells of high catch rates, (3) connecting the high catch cells in quarterly sequence over the 4-year period, and (4) selecting the most consistent annual paths shown by the shifting of the high catch cells, based on the thesis that the shifts in the high catch cells from one quarter to the next represented movement of skipjack tuna stocks in the ocean.

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The apparent abundance of the skipjack tuna (Figure 1) appeared to coincide with the circulation of the major ocean currents: counterclockwise in the southern hemisphere and clockwise in the northern hemisphere, except in the eastern North Pacific where the current flow is counterclockwise. The proposed movements were consistent with hypotheses proposed by others and with the movements shown by tagging studies in the western and eastern Pacific. They also suggested the possibility that the adults or their progeny could move from one area of the Pacific to the next and from the eastern to the west-central Pacific in both hemispheres.

How well this model of skipjack tuna migration fits the actual conditions in the Pacific can be tested by the more positive means of tag returns. In this respect, the model could be helpful in pointing out those areas where future tagging operations should be concentrated.
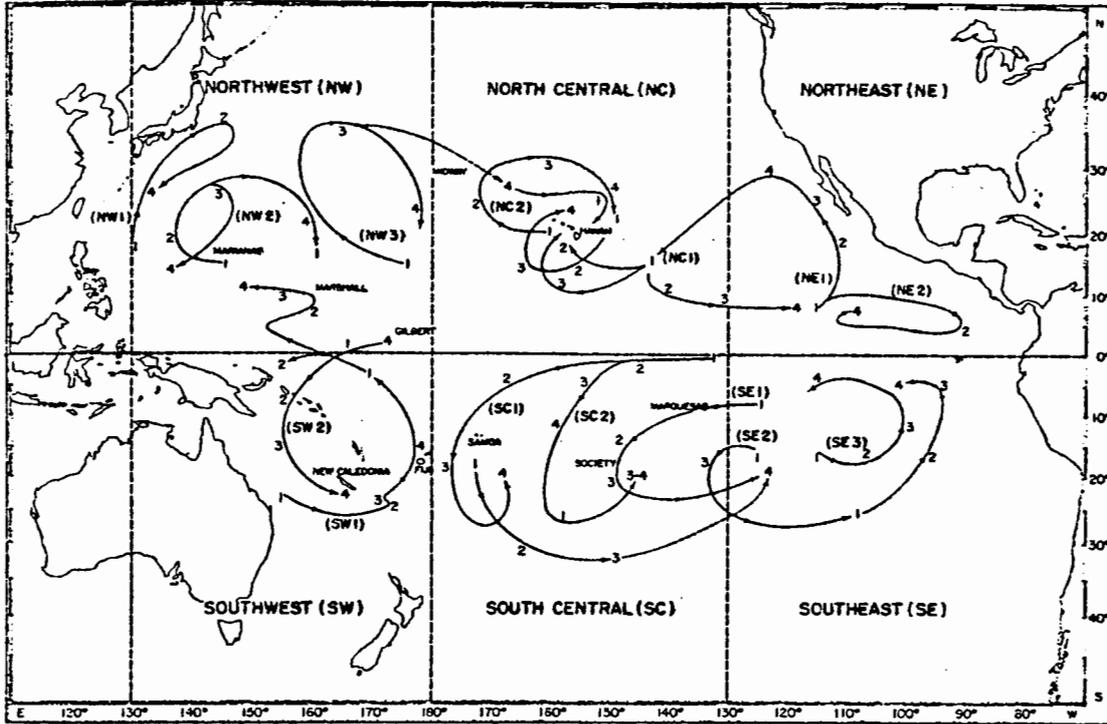
Figure 1.--Assumed movement of skipjack tuna in the Pacific Ocean.
The numerals along migratory routes represent quarters and
positions of high catch cells of skipjack tuna taken by the
Japanese tuna longline fishery.