

Estimation of the Volume of Fishery Sources and Evaluation of the Catch Effort Impact Based on Statistical Data

HAJIME YOSHIDA

Socio-Technology Systems Dept., Mitsubishi Research Institute, Inc., 3-6, Otemachi 2-chome, Chiyoda-ku, Tokyo, 100 Japan

Assuming that the quantity of fisheries resources in closed waters is in equilibrium to a certain extent, a hypothesis can be set up that the pressure of fishery on a single variety of non-migratory fish is subject to the interrelations between the technique and effort of fishery and the quantity of resources. This research deals with a case study using catch data of a specific variety of fish in Osaka Bay and Lake Biwa, typical closed waters in Japan.

Sampling

Statistical data available in Japan is the "Annual Report on Production Statistics of Fishing and Fish-Raising Industry" issued by the Ministry of Agriculture, Forestry and Fishery. This report provides annual numerical values of the catch of each variety of fish including in specified lakes and marshes, the catch by fishing method, the number of days of fishing, etc. Taken up in this research are the catch data of sardines in Osaka Bay (See Fig.1) caught by the Purse Seiner (pulling-in by two boats) method during the recent 10-year period (1978 to 1987).

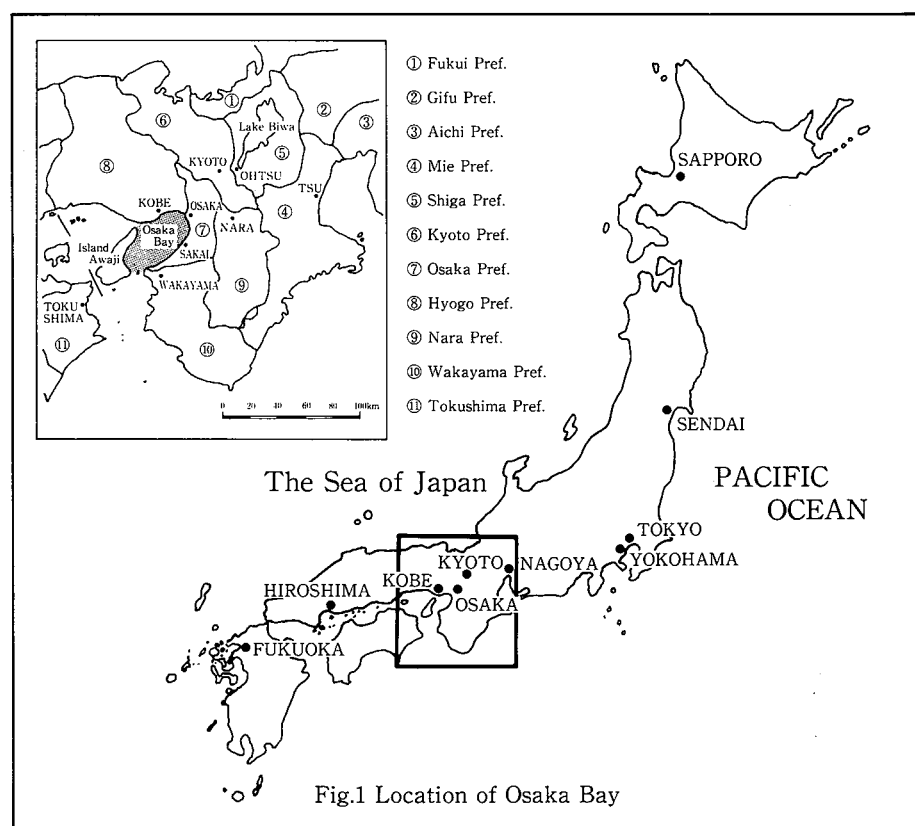


Fig.1 Location of Osaka Bay

Analytical Methodology

The trend of the quantity of resources is examined mainly on the basis of the index of the catch per unit effort (C.P.U.E.). Further, the Ricker's type reproduction model was introduced in the current research to examine the degree of effect (average number of days of fishing and standard deviation) of the catch intensity during the recent 10-year period, and a guideline on the number of days of fishing was calculated to find the maximum sustainable yield (MSY). (See Fig.2.)

As a result, it was estimated that the quantity of sardines in Osaka Bay to be caught by the Purse Seiner (pulling-in by two boats) method is more or less large enough if the catch intensity remains to be on the present level.

Future Problem

The model used in the current research seems to be good enough for simplified verification based on easily available data. However, this reproduction model needs some improvement because (1) fluctuation of resources, (2) expenditure for catch, (3) marketability of catch, and (4) multiple varieties of fish and movement of ecosystem are not taken into.

