

ASSESSMENT OF BIORESOURCE SUSTAINABILITY IN ENCLOSED COASTAL SEAS: AN ATTEMPT BASED ON RETROSPECTIVE STUDY IN OHTA RIVER CATCHMENT AREA AND HIROSHIMA BAY

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Many enclosed coastal seas are environmentally deteriorated in recent years and need proper management for the sustainable bioresources. The objectives of this study are to establish indicators of the sustainability of bioresources and to assess of the sustainability for the areas of Hiroshima Bay and the catchment of Ohta River, a major river flowing into Hiroshima Bay.

We examined the historical changes in environment of the area; in particular nutrients (i.e. N and P) loads from the Ohta River catchment area, and the diversity of inter- and sub-tidal invertebrates and fisheries and aquaculture products in Hiroshima Bay were considered. Due to increased anthropogenic activity in the Ohta River catchment area, both N and P loads to Hiroshima Bay increased from the 1960s to the 1980s. Accordingly, the eutrophication of Hiroshima Bay was proceeded. P load was reduced effectively since the 1980 by the acts of reduction of total pollutant loads, but there is no sign of decrease in N load. The water quality (i.e. transparency and nutrient concentrations) and sea bottom condition (i.e. ignition loss and sulfide content) in Hiroshima Bay were worst during the 1970s, and there has been no recovery yet. Annual landings from fisheries decreased temporarily in the 1970s, and showed a consistent decrease in the 1990s. The trophic diversity of harvested species by fisheries was lost since the 1970s. Oyster culture was proliferated until the latter 1980s, since then the oyster production has been decreasing contineously.

Based on the retrospective data, we proposed three indicators for the assessment of bioresource sustainability: 1)productivity, 2)efficiency, and 3)stability of bioresources. The sustainability index is the mean of these three indicators. An integrated index revealed that the sustainability of bioresources in Hiroshima Bay was highest in the middle and late 1960s. Then the sustainability was gradually deteriorated and the worst in the 1990s.