

Analysis of Hydro-ecological Zonation and Production Potential of the Inner Gulf of Thailand for Sustainable Fishery Management

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Abstract

This research was initiated from the needs of ecological based fishery management policy for sustainable fishery in the Inner Gulf of Thailand. The study was carried out during 2017-2018 under the Research Program on *Development of Socio-Ecological Based Effective Fishery Management Policy for Good Governance in Sustainable Fishery of the Inner Gulf of Thailand*. For the ultimate goal on fishery resource sustainable management, spatial and temporal changes of the hydro-ecological characteristics of 101 sampling sites in the Inner Gulf of Thailand were thoroughly investigated, together with simultaneous monitoring of abundances and changes of primary productions in the water columns. During the study periods, severe impacts from frequent red tide outbreaks, estuarine eutrophication ($\text{NH}_4^+\text{-N}$ and $\text{PO}_4^{3-}\text{-P}$ reached 122 and 10 μM , respectively) and hypoxia problems (the lowest DO < 2 mg/L) on the fishery resources were apparent recognized. Study on organic carbon budgets has indicated that the major fractions of the organic carbon biomass were from zooplankton (*ca* > 60 %; particularly increased during Northeast monsoon period) and from suspended particulates (*ca* 20-40 %). The phytoplankton carbon biomass was much lower (*ca* < 5 %). Analysis on spatial and temporal changes of hydro-ecological characteristics implied the importance of area-based ecological zonation for suitable management. Assessments of production potentials of the primary consumers (detritivorous-planktivorous and planktivorous-omnivorous fishes), and the secondary consumers (omnivorous-carnivorous and carnivorous fishes) of along the hydro-ecological zones of the Inner Gulf were carried out. The production potentials varied by zones and times. Maximum allowable catches for the total area of the Inner Gulf were then determined to be *ca* 455,400 and 343,300 tons, due to different hydro-ecological conditions of 2017 and 2018, respectively. In the overall views, despite of the control of fishing problems by several measures, declination of fishery resources was still found. Understandings on changes of environmental factors and the response regimes of biological production potentials in particular zonation of the Inner Gulf are, thus, necessary. Besides recent fishing controls, holistic remediation management for the whole water mass (on both quantity and quality) was in urgently needed. Co-operations from all related stakeholders are crucial recommended for our sustainable future.