

Distribution, temporal change, and conservation status of tropical seagrass beds in Southeast Asia: 2000–2020

ABSTRACT

Although Southeast Asia is a hotspot of global seagrass diversity, there are considerable information gaps in the distribution of seagrass beds. Broad-scale seagrass distribution has not been updated in the global seagrass database by UNEP-WCMC since 2000, although studies on seagrasses have been undertaken intensively in each region. Here we analyze the recent distribution of tropical seagrass beds, their temporal changes, causes of decline and conservation status in Southeast Asia (plus southern mainland China, Taiwan and Ryukyu Island of Japan) using data collected after 2000. Based on the 195 literature published since 2000, we identified 1,259 point data and 1,461 polygon data showing the distribution of seagrass beds. A large discrepancy was found in the seagrass bed distribution between our updated data and the UNEP-WCMC database, mostly due to inaccurate and low resolution location information in the latter. Temporal changes in seagrass bed area analyzed for 68 sites in nine countries/regions demonstrated that more than 60% of seagrass beds declined at an average rate of 10.9% year⁻¹, whereas 20% of beds increased at an average rate of 8.1% year⁻¹, leading to an overall average decline of 4.7% year⁻¹. Various types of human-induced threats were reported as causes for the decline, including coastal development, fisheries/aquaculture, and natural factors such as typhoons and tsunamis. The percentage of seagrass beds covered with existing marine protected areas (MPAs) varied greatly among countries/regions, from less than 1% in Brunei Darussalam and Singapore to 100% in southern Japan. However, the degree of conservation regulation was not sufficient even in regions with higher MPA coverage. The percentage of seagrass beds within EBSAs (Ecologically and Biologically Significant Area determined by the Convention of Biological Diversity) was higher than that within MPAs because EBSAs cover a greater area than MPAs. Therefore, designating EBSAs as legally effective MPAs can greatly improve the conservation status of seagrass beds in Southeast Asia.

Keyword: Broad-scale distribution; Coastal ecosystem; GIS mapping; Marine protected area; Temporal trend