

Consideration of adaptation measures based on the current status of use and management and future projections of coastal ecosystems in Japanese national parks

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Biodiversity plays an important role in human life, but there are many places where ecosystems are being degraded due to global and regional stresses. Therefore, the need to manage ecosystems is widely recognized. National parks are designated for areas with outstanding landscapes and ecosystems. National parks in Japan have very different biota, reflecting differences in the environment, such as air and water temperatures. There are also likely to be differences in ecosystems, communities, and species utilized as tourism resources. It is important to balance use and management in national parks, and various conservation measures have been implemented so far, but management is not always carried out considering the effects of climate change. This study focused on reef-building corals, macroalgae, and seagrasses that constitute the underwater landscape. The objectives of this study were to summarize the perceptions of national parks as a resource, to identify what kinds of regulations, conservation activities, and monitoring of plants and animals are being implemented in the parks, and to discuss adaptation measures that should be taken to address vulnerability to climate change. On the website describing the features of the national parks, corals, macroalgae, and seagrasses were sometimes mentioned, and they were recognized as resources of the parks. A comparison of the number of species restricted in the marine park zone of each national park showed that the number of corals was significantly higher than that of macroalgae and seagrasses, especially in low latitude national parks. In addition, many conservation activities such as population control of predators were being implemented in the park by the Ministry of the Environment. On the other hand, although there are several national parks where macroalgae and seagrass are listed as restricted species, the scale of conservation activities and monitoring targeting these species was small, in contrast to corals. To evaluate future changes in the distribution of corals, macroalgae, and seagrasses, an index of each organism's optimal water temperature zone was constructed based on information on the distribution area and minimum and maximum water temperatures of the organisms subject to use and management. The changes in the distribution area were then projected using the results of future SST simulations. Based on these results, the characteristics of each national park were summarized, and future issues under rising water temperatures were discussed. Corals at low latitudes are very vulnerable to rising water temperatures, and at the same time, their distribution range expands northward. It will be necessary to strengthen conservation activities and reconsider restricted species in many parks in the future. In some parks, gaps exist between the current distribution of corals and their use and conservation management, and it is essential to implement projects that will resolve these gaps. Concerning macroalgae and seagrasses, the challenge is to properly understand their value and promote their use and establish a system that enables continuous monitoring and conservation activities. While the expansion of the marine protected areas is being considered (e.g., 30by30), it is necessary to properly assess the status of use and management of the organisms and ecosystems to be conserved and to take into account future changes under climate change.

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