

Inferring the Ecological Quality of Seagrass Beds from Using Composition and Configuration Indices

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Abstract : Getting water cleaner and stopping global biodiversity loss requires indices to measure changes and evaluate the achievement of objectives. The endemic and protected seagrass species *Posidonia oceanica* is a biological indicator used to monitor the ecological quality of marine Mediterranean waters. One ecosystem index (EBQI), two biotic indices (PREI, Bipo), and several landscape indices, which measure the composition and configuration of the *P. oceanica* seagrass at the population scale have been developed. While the formers are measured at monitoring sites, the landscape indices can be calculated for the entire seabed covered by this ecosystem. This present work aims to search on the link between these indices and the best scale to be used in order to maximize this link. We used data collected between 2014 to 2019 along the French Mediterranean coastline to calculate EBQI, PREI, and Bipo at 100 sites. From the *P. oceanica* seagrass distribution map, configuration and composition indices around these different sites in 6 different grid sizes (100 m x 100 to 1000 m x 1000 m) were determined. Correlation analyses were first used to find out the grid size presenting the strongest and most significant link between the different types of indices. Finally, several models were compared basis on various metrics to identify the one that best explains the nature of the link between these indices. Our results showed a strong and significant link between biotic indices and the best correlations between biotic and landscape indices within the 600 m x 600 m grid cells. These results showed that the use of landscape indices is possible to monitor the health of seagrass beds at a large scale.

Keywords : ecological indicators, decline, conservation, submerged aquatic vegetation

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