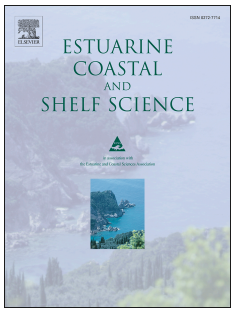
# Accepted Manuscript

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# A semi-automated approach to classify and map ecological zones across the dune-beach interface

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Abstract

Habitat classification and mapping underpins most conservation and management tools, because habitats are often used as a surrogate for all biodiversity. Some habitat boundaries are easy to delineate; however, sandy shores are ecotones or ecoclines given their dynamic interface between the marine and the terrestrial realms. Although methods for mapping habitats along shorelines have been broadly applied, we aim to test a semi-automated approach to mapping across-shore "sub-environments" in this transition zone at a finer scale. Using an empirical dataset of photographs covering a small area (three across-shore transects from each of two different areas) with a high resolution, we tested seven machine learning algorithms to determine which one had the best classification accuracy, and to identify which environmental variables are the main determinants of classifications. The randomForest, stochastic gradient boosting, and C5.0 algorithms most accurately classified the photographs as the correct sub-environment. Based on the randomForest algorithm, the variables entropy, drift cover rate, local slope, segmented vegetation cover and number of points with sand or marine litter had the highest influence on the classification. There was no sensitivity to spatial variation alongshore. This approach can be used to map sub-