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Assessing the transferability of biodiversity models across a temperate seascape

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Marine management efforts focused on the conservation of biodiversity require an understanding of distribution of biodiversity in space. In the marine environment, however, this information is often limited or completely lacking. New technologies for remotely collecting data coupled with advancements in predictive models could help address these information gaps. The utility of using remotely sensed predictors to model biodiversity metrics will however depend on the transferability of biodiversity models, generated with data from a limited number of sites, to other un-sampled areas. Currently, however, it is not well understood how transferrable such models of biotic communities are, nor do we know how model transferability may be enhanced. Here we assess the transferability of biodiversity models and the factors that affect transferability. We developed Boosted Regression Tree (BRT) models for fish species richness at each of eight sites in Western Australia. Models were used to make predictions within (internal) and between (external) locations. Distance between locations had little or no effect on model transferability. Overall, model transferability was surprisingly high, though it varied depending on the error metric used. Transferability appears to be most affected by the variability of the predictors or the response variable, suggesting that future sampling of biotic features space should, where possible, focus on areas of highest abiotic and biotic variability.