Where is the grass greenest? Influence of seascape structure and fishing on distribution patterns of nursery and resident fish in a seagrass-dominated landscape

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Seagrass beds are important habitats for numerous species of fish. Seagrass fish assemblages are usually composed of both resident and nursery species that migrate to coral reefs as adults. Seagrass characteristics and geographical location have been proposed as important factors structuring fish assemblages in seagrass beds. Small-scale fishing in seagrass beds may have the potential to modify fish abundances and diminish strength of connectivity between nursery and adult habitats, but very few studies have investigated the effect of marine protected areas (MPAs) on seagrass fish assemblages. To understand which factors are important in structuring of fish assemblages in shallow seagrass beds, we investigated fish density and distribution patterns at 20 sites in 13 different seagrass beds in the Bazaruto Archipelago, Mozambique. We used distance to adjacent habitats, seagrass characteristics and fishing pressure as predictor variables to assess their importance on abundance of four nursery taxa (Lutjanus fulviflamma, Lethrinus spp., Scarus ghobban and Gerres spp.) and two resident species (Pelates quadrilineatus and Leptoscarus vaigiensis). The influence of the different variables were modelled with boosted regression tree technique. In general, seascape variables were more important than seagrass characteristics, and the influence of the different variables were highly species-or taxa-specific. Abundance of nursery fish taxa was negatively correlated to reef distance, while reef distance had a positive effect on resident fish species abundance. Only one species (S. ghobban) was found to be strongly positively correlated to seagrass canopy height. Similarly, effects of protected areas and fishing were species- or taxa-specific, but fishing seemed to exert a stronger effect on resident species compared to nursery species. The distribution of resident and nursery species in seagrass-dominated seascapes seems to be dependent on the different life history traits of fish. This study indicates that the effects of MPAs in seagrass beds can vary according to the geographical placement of the reserve, and highlights the importance to design MPAs regarding to main objectives with the protected area.