

Movement, Home Range, and Habitat Selection of Mesopredators in the Florida Keys National Marine Sanctuary

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Seagrass habitats are important coastal ecosystems that support biodiversity and provide multiple ecosystem services. Many fishes rely on seagrass meadows as essential foraging grounds, moving between reefs and seagrasses in search of prey. Despite their ecological importance, seagrass habitats are often under-represented in marine management and spatial planning. In the Florida Keys seagrasses comprise a small portion of protected habitats within Sanctuary Preserve Areas (SPAs). Our multi-disciplinary project, FISHSCAPE, aims to identify how much seagrass area is needed to support foraging reef fishes. A key component of this project involves characterizing fish movement and habitat selection across regions where seagrasses are either abundant and relatively contiguous or sparse and fragmented. While fishes make choices on where to live and forage based on multiple abiotic and biotic factors, the seascape context where these decisions are made is often overlooked. Here, we explore how differences in seascape context, and in particular seagrass configuration, impacts the habitat selection and movement behaviors of four mesopredatory fishes in the Florida Keys National Marine Sanctuary. We tagged and tracked the movements of white grunt (*Haemulon plumieri*), yellowtail snapper (*Ocyurus chrysurus*), mutton snapper (*Lutjanus analis*), and great barracuda (*Sphyraena barracuda*) in the Upper, Middle, and Lower Keys. Fine-scale movement tracks were modeled using a time of arrival and random walk movement model framework via the YAPS package (Yet Another Positioning Solver). Broad-scale patterns of space use were evaluated using centers of activity (COAs) based on two-hour time bin intervals, which were then used to estimate home ranges and assess habitat selections using resource selection functions. Results from this study reveal that fish movement and habitat selection vary among species and across the Florida Keys in response to differences in seascape context. These findings improve our ability to predict how much seagrass is needed to support healthy fish populations under current and future habitat conditions. As such, FISHSCAPE provides critical insights to guide management decisions in the Florida Keys and similar systems. Future work will integrate additional components of the FISHSCAPE project and extrapolate habitat selection models across the Florida Keys National Marine Sanctuary. Project results will feed into a decision support tool designed to equip managers with project findings and aid conservation planning.