

Using Habitat Support Structures to Address Habitat Deficits Within Bayside Nearshore Hardbottom of the FKNMS

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Reductions in the quality and structural complexity of physical habitat are occurring across the Florida Keys marine ecosystem, including shallow nearshore hardbottom. Nearshore hardbottom (NH) communities are the most extensive type of hardbottom community in South Florida, covering about ~30% of the entire nearshore habitat in the Florida Keys. They occur in shallow, coastal waters -both bayside and oceanside but primarily bayside- within approximately 2km of shore on top of consolidated limestone substrate. Historically, the structural complexity of the NH bayside community was characterized by a complex assemblage of low-relief organisms including sessile benthic invertebrate species (sponges and octocorals) and macroalgae, as well as variously sized solution holes (cavities in the limestone). This shallow low-relief habitat is essential for fish and invertebrate foraging and refuge, as well as nursery habitat for juvenile reef fish and spiny lobsters. Newly settled and juvenile fishes account for over 80% of fishes found in these habitats in southeast Florida and therefore represent a vital source of fish that eventually move into offshore habitats as they mature and migrate (i.e., ontogenetic movements). However, long-term monitoring of these communities in the Keys has revealed substantial changes in habitat landscape, community composition, and ecology. Since the early 1990s, acute disturbance events like cyanobacterial blooms have caused spatially extensive mortality of many sponge species, especially those that provide structure. This is problematic because habitat structural complexity is a key factor shaping marine communities; structurally complex environments have more microhabitats and niches available for organisms to refuge, feed, breed, settle, shelter, and forage, thereby increasing the potential persistence of populations and promoting biodiversity. Conversely, loss of structural complexity is linked to ecosystem declines in biodiversity and resilience. Resulting from these reductions in sessile benthic invertebrate densities are further reductions in niche diversity, food resources, refuge space, and fish diversity. Present-day fish species richness is just 30%–40% of what it was when surveying began in the 90's. To address the habitat deficits as related to fish and invertebrate life histories in this area, Monroe County and the Florida Fish & Wildlife Conservation Commission (FWC) have partnered together to create a pilot program that will design, deploy, and evaluate habitat support structures. Our poster will showcase our science-based, ecosystem-focused approach for conducting a pilot study off the bayside Middle Keys with the ultimate goal to improve conditions and resources within the Florida Keys National Marine Sanctuary.