

CP287 Population dynamics of hard corals, Cuba

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Coral reefs are in decline worldwide as a consequence of natural and anthropogenic disturbance. Local-scale human impacts include overfishing, herbivory removal, the use of destructive fishing techniques, coral removal, disease, eutrophication, and increased sedimentation from mangrove removal and changes in land-use. These impacts in combination with the global threats of climate change and ocean acidification, have caused severe damage to over 30% of the world's reefs, and close to 60% may be lost completely by 2030. Over the last 20 years, this decline in coral abundance has been well documented throughout the Caribbean, with an 80% reduction in average hard coral cover, from 50% in the 1970s to 10% at present. Given this dramatic decline, it is important to try to understand the process that regulate population dynamics of hard corals to ensure the implementation of adequate management plans

Recruitment has long been recognised as one of the most important factors driving the ecology of hard corals, is critical for the maintenance of viable reef populations, and for promoting the recovery of coral reefs after disturbances. Hard coral recruitment is influenced by a number of factors including the amount of live coral cover in the source population, sedimentation, temperature, or inhibition by other benthic organisms. Some of these factors positively affect coral recruitment, such as the presence of crustose coralline algae (CCA), while others negatively affect coral recruitment, such as competition with macroalgae and/or soft corals. Several studies have reported recruitment failure at several locations around the Caribbean due to a number of reasons, including settlement inhibition by the presence of macroalgae or increased post-settlement mortality due to eutrophication. Marine protected areas in the Caribbean have been shown to promote coral recruitment through trophic cascades: herbivore fish protection from fishing results in lower algae abundance, which in turn decreases coral settlers' mortality and promotes recruitment. Despite the importance of understanding coral recruitment process, there is no coral recruitment information for the Punta Frances National Park. One potential dissertation project could quantify coral juvenile abundance and diversity as a measure of recent recruitment events at different locations and depths in and out the Punta Frances MPA. This data will provide valuable data on hard coral recruitment dynamics for the MPA and it can be used to investigate the effect of protection upon recruitment dynamics.

Hard corals require free space to settle and grow. However, free space is an extremely limited resource in the reef. As a consequence, species often compete with each other or exhibit aggressive behavior to secure or maintain their occupied space. Fast growing invertebrate species such as Ascidiaceans (also known as tunicates) are fierce competitors for reef space and sometime can overgrowth and kill hard corals. The compound ascidian *Trididennum solidum*, a highly mobile and fast growing competitor, has been steadily increasing in numbers at several locations around the Caribbean, especially around the reefs of Bonaire and Curacao. During the 2011 benthic monitoring surveys, *T. solidum* was recorded for the first time at several sites within the Punta Frances MPA. Given the aggressive nature of this fast growing species it is import to monitor its abundance and distribution over time, and to investigate the effect of this species upon hard coral species. During the 2011 expedition, 50 permanent marked photo-quadrats were established to determine *T. solidum* interactions with the most common hard coral species in the MPA. In 2012, these areas will be revisited and new surveys will be conducted at several sites in and

out of the MPA. One potential project could conduct field surveys combined with the use of image analysis software to determine the abundance of this fast growing species over time and its competitive abilities against the most common coral species

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