

BioHab : Pilot Project of Artificial Habitats Establishment for Marine Mobile Fauna as a Conservation Tool for MPA Managers of Saint-Martin (FWI)

BioHab : Proyecto Piloto de Hábitats Artificiales de Establecimiento por la Fauna Marina Móvil como Herramienta de Conservación para los Administradores de Áreas Marinas Protegidas de Saint-Martin (FWI)

BioHab : Projet Pilote d'Implantation d'Habitats Artificiels pour la Faune Mobile comme Outil de Conservation pour les Gestionnaires de l'Aire Marine Protégée de Saint-Martin (FWI)

JULIEN CHALIFOUR

*Réserve Naturelle Nationale de St Martin, Résidence Les Acacias Anse Marcel, 97150 Saint-Martin.
science@rnsm.org.*

EXTENDED ABSTRACT

Since 1998, the National Natural Reserve of Saint-Martin (RNNSM) located in the Lesser Antilles has provided a biodiversity conservation mission over its 3,054 hectares. Regarding to its managing plan, the managers team of RNNSM is implementing various scientific research contributing to the improvement of knowledge on marine protected areas and species within the MPA.

As part of these actions, a pilot project of artificial habitats, called BioHab (Figure 1), was initiated in 2014 to promote the survival of fish and shellfish recruitment and improve coastal marine ecosystems resilience. The BioHab project was funded by TeMeUM and consisted in dipping light artificial structures made of cinder blocks assembled with chemical sealing under various schemes. The objective was to test the feasibility of the technique for a management team with limited financial, logistical and human resources. It also aimed to follow monthly colonization of these submerged structures by mobile marine fauna (biodiversity, density, estimated biomass).

In January 2014, 16 dives were needed to immerse nine modules (designed on seven different drafts) made of 435 cinder blocks at 21 meters of depth and to build the 225 m² of site n°1. Plans of the different module drafts were created under the Google SketchUp software. Monthly monitorings were then performed during the next nine months to document the colonization of the modules by mobile fauna (Figure 2). Nine months later, biodiversity was multiplied by 12, reaching 49 species in October 2014 (75 different species were successively observed since the beginning of the experimentation). Moreover, various emblematic coral reef species were observed : Queen angelfish (*Holacanthus ciliaris*), Rock beauty (*H. tricolor*), Foureye butterflyfish (*Chaetodon capistratus*) and Reef butterflyfish (*C. sedentarius*). Species of commercial interest were also present in large numbers : Grunts (*Haemulon* sp.), Royal spiny lobsters (*Panilurus argus*). No lionfish (*Pterois volitans*) has been observed during the first nine months.

Despite a recorded poaching event that mainly targeted Royal spiny lobster (*P. argus*), fish, and invertebrate densities observed on modules after nine months of immersion (520 individuals /100 m²) were 87 times higher than those observed in January 2014. The most abundant species were the Tomtate grunt (*Haemulon aurolineatum*) (321 individuals / 100 m²) and the Blackbar soldierfish (*Myripristis jacobus*) (41 indiv. /100 m²). Commercial fish and lobster biomasses on site n°1 were estimated at 29.36 kg / 100 m² in October 2014, but was over 69.76 kg / 100 m² in September 2014 before the poaching event. Royal spiny lobsters then accounted for 43, 5 kg / 100 m². In October 2014, the commercial biomass was mainly composed by Tomtate grunt (*H. aurolineatum*) (13.05 kg / 100 m²), one Southern stingray (*Dasyatis americana*) (7.31 kg / 100 m²), Blackbar soldierfish (*M. jacobus*) (2.53 kg / 100 m²) and Yellow goatfish (*Mulloidichthys martinicus*) (2.11 kg / 100 m²).

This study revealed that this tool is useful for St. Martin marine fauna. The artificial reefs enable to increase fish biodiversity and fish and spiny lobster biomass in a particular site with minimum financial, human and logistical resources. In addition to improve marine ecosystem resilience, BioHab could also represent an opportunity to create new diving sites channeling some divers to other areas, but also allowing the establishment of new forms of managed fisheries outside MPAs. A second BioHab site will be located at 15 meters of depth in 2015 and will be monthly monitored to assess a potential effect of depth on marine fauna diversity, abundance and biomass.

KEY WORDS: BioHab, artificial habitats, MPA, French West Indies, mobile fauna, resilience.

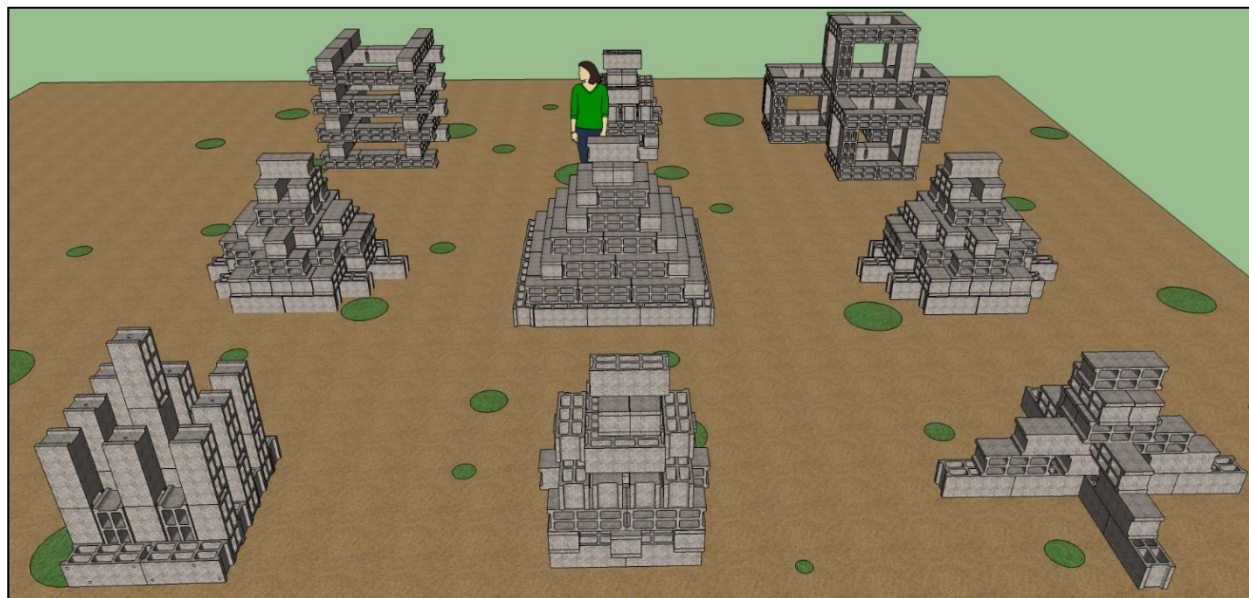


Figure 1. Plans of BioHab site n°1 designed on Google SketchUp before immersion (RNSM©).



Figure 2. Mobile fauna living on BioHab modules in 2014 (RNSM©).



Figure 3. Evidence of a poaching event during September 2014 (RNSM©).