

Restoration of Key Biodiversity Areas of St. Maarten

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In July 2017, Environmental Protection in the Caribbean (EPIC) Foundation initiated a project to restore coastal and terrestrial biodiversity by planting native tree species at three ecologically degraded sites on St. Maarten while simultaneously increasing community involvement and appreciation for conservation.

St. Maarten is the most densely populated island in the Caribbean. The massive loss of biodiversity initiated upon human contact has accelerated in recent decades with the development of the tourist industry, upon which most of the economy depends, yet no terrestrial legally protected areas exist on the island.

Three sites served as the focal point for restoration actions: 1) Little Key, 2) Sentry Hill, and 3) Cay Bay. Each offers a different habitat type: coastal mangrove wetland, montane dry forest, and coastal terrestrial scrub respectively.

The aim of restoring Little Key was to increase Red Mangrove coverage, thus increase habitat and nursery grounds for native species and to increase the provisioning of ecosystem services such as water filtration and carbon sequestration. In the past, mangrove restoration at Little Key was hindered by wave disturbances. Therefore, it was decided to use the Riley Encased Methodology (REM) which uses full-length PVC tube encasements to reduce wave action and create an environment favorable to the seedlings' initial stages of development while

protecting the plant long enough to become established. Similarly, the goal at terrestrial sites was to remove non-native plant species and establish a secondary forest comprised of a higher diversity of native species.

Since many mature trees at the restoration sites were lost due to Hurricane Irma in September 2017, the goal was not to increase the number of trees on site over the year-long project but instead to increase the diversity of native species of tall canopy trees and to ensure high survival rates.

The hurricane caused an average two-month delay in the timeline of activities. EPIC's headquarters lost its roof and suffered major damage to equipment and furniture, complicating operations. In addition, nearly all mangrove propagules were blown or washed away so they could not be grown locally and instead were ordered from Florida. Likewise, many local nurseries lost their terrestrial plant stock to the storm and could not source plants until commercial shipping resumed. During this period, the focus was on preparing the terrestrial sites for planting by removing invasive species.

In November a team of volunteers, with boat support from the Nature Foundation of St. Maarten, planted 290 Red Mangrove propagules at Little Key. In January, a landscaping crew and volunteers planted approximately 309 plants at Sentry Hill and 125 at Cay Bay over three days.



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Delays in establishing irrigation systems required significantly more hours of staff time in watering the plants three times per week until April. In addition, goats foraged on a number of plants that escaped through damaged fencing at Cay Bay; all but 13 recovered from the foraging.

Student scientists from the nearby St. Dominic High School were recruited to monitor the individually tagged plants at Sentry Hill once a week for eight weeks while EPIC staff monitored the Cay Bay plants. The mangroves planted at Little Key were monitored every two weeks by volunteers with a boat donated by St. Maarten Sails.

Plant species diversity increased from pre-restoration to post-restoration by 25 to 35 different species at Cay Bay and 41 to 52 different species at Sentry Hill. The post-restoration survival rates were found to be up to 96.1% at Sentry Hill, 89.6% at Cay Bay and 84.5% at Little Key. These results point to an increased biodiversity at the restoration sites when compared with pre-restoration assessments and, as the new plants mature into large trees, an increased carbon sequestration capacity.

To ensure long-term management of the restoration sites, a formal Transfer Agreement was created and signed by the site owners/managers in May 2018. The Transfer Agreement includes a guide of Best Practices and lessons learned during restoration to ensure successful management of the sites over the long-term.

The outreach component of the project reached approximately 1,253 participants who took part in

volunteer opportunities, educational presentations, and field trips. Stickers and reusable water bottles with the tag line "*plant a tree, grow a forest*" were shared with participants. Survey response forms confirm that teachers found the presentations and field trips to be informative, engaging, and beneficial.

A volunteer WhatsApp group created for this project was also active and used to inform volunteers of upcoming events. The group was very motivated and popular with recurring volunteers who contributed 435 days of volunteer time.

A campaign in support of the establishment of terrestrial protected areas was also started and some 507 people signed the online petition and 84 people signed the in-person signature sheet. The advocacy campaign may have been limited by the focus of residents and businesses on rebuilding. A letter writing campaign resulted in one letter of support.

A video summarizing the restoration project was produced and received 1,800 views by the end of project implementation.

Local organizations and government representatives visited the restoration sites, offering an opportunity to share lessons learned and the value of habitat restoration. An open house was held at the end of the project to welcome the community to walk the nature trail established at the Sentry Hill restoration site. Signs along the pathway provide information about biodiversity and the restoration work.

Despite significant challenges caused by Hurricane Irma, the project met its objectives thanks to the dedication and hard work of staff and volunteers. This work has resulted in increased biodiversity and potential carbon sequestration at the restoration sites but has also built local capacity and support for future restoration projects while strengthening community through service projects. Seedlings can also be seen as symbols of hope and the promise they hold for a better future was much needed during recovery from Irma's devastation.

For further information on this project, please check the Post-Restoration Assessments and Best Practices Report available at EPIC's website.

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