

# Management Plan

## Marine and Terrestrial Ecosystems of St. Maarten



For the Management Agreement 2019-2021 between the Government of St. Maarten, represented by the minister of VROMI, and the Foundation for the Management and Conservation of Nature on St. Maarten.

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## 1. Introduction

Nature Foundation St. Maarten (NFSXM) was established in January 1997 with the objective of enhancing the environment through effective management, education, awareness and protection of natural resources.

The Management Agreement 2019-2021 is between the Government of St. Maarten, represented by the minister of VROMI, and the Foundation for the Management and Conservation of Nature on St. Maarten (Nature Foundation St. Maarten, NFSXM). Based on this agreement, the Nature Foundation is regarded as the Management and Scientific Authority as referenced in article 5 and article 6 of the National Ordinance on Nature Management, with regards to Marine and Terrestrial Ecosystems and the associated values and assets for St. Maarten.

The Nature Foundation is herein granted the authority to manage Marine and Terrestrial Ecosystems of the territory of Sint Maarten. The Nature Foundation is hereby authorized to make and execute all necessary decisions pertaining to the management of the Marine and Terrestrial Ecosystems, species management and specifically introduced species for the territory of Sint Maarten. The NFSXM is the management authority for the Man of War Shoal National Marine Protected Area and surrounding waters.

The Nature Foundation St. Maarten has set several nature goals in order to manage the marine and terrestrial ecosystem of St. Maarten for 2019-2021, which includes the protection of the marine park, conservation of all nature areas on St. Maarten, conserve endangered species, preventing of invasive species entry into the natural habitats, respond to environmental emergencies, perform species monitoring and research to discover significant trends of species and ecosystems and to increase nature education and awareness on the island.

This Management Plan is written for the implementation of the mentioned Management Agreement 2019-2021 and describes how the management of marine and terrestrial ecosystems and the Marine Protected Area Man of War Shoal will be executed by the Nature Foundation and how those nature goals will be reached. For each task mentioned in the Management Agreement the implementation will be discussed in this document in order to reach the strategic goal and to provide each year the deliverables requested to manage the marine and terrestrial ecosystems of St. Maarten. The Management Plan will also describe the staff members, capacity and assets which will be used to execute the mentioned tasks, to monitoring species and conduct operational activities for the Management Agreement on behalf of the Nature Foundation St. Maarten.

## 2. Nature Foundation St. Maarten

The St. Maarten Nature Foundation is a non-governmental and non-profit organization, working to promote conservation of St. Maarten's environment. The primary concern is to preserve and enhance nature while in the process of strengthening the economic and educational value and potential of our natural resources. The mission statement of Nature Foundation is thus as follows: "To preserve and enhance the natural environment of St. Maarten through proper management, education, public awareness, law enforcement, scientific research and monitoring relating to all aspects of the terrestrial, wetland and marine surroundings."

It is a Foundation registered locally on St. Maarten and governed by a volunteer Board of seven local people. The day-to-day management of the foundation is carried out by a full-time staff of four along with part time consultants, interns and volunteers.

### 2.1 Nature Foundation Board

The St. Maarten Nature Foundation has a permanent Board of seven Directors, see table 1, who oversee the organization's activities and direct overall policy and strategy. Elected Board members have additional responsibilities in accordance with respective positions. Board meetings are called monthly, with minutes being circulated to the Board members. Meetings between the manager and Board representatives take place, as necessary.

*Table 1. Board members of the Nature Foundation St. Maarten*

Position	Name	Representing	Appointment date
<b>Chair</b>	Jan Beaujon	Finance	1997
<b>Member</b>	Frank Boekhout	Biology / Education	1997
<b>Member</b>	Marie-Louise Carty	Media	1997
<b>Secretary</b>	Rikke Bachman	Biologist	2010
<b>Treasurer</b>	Paul Ellinger	Marine industry	2020
<b>Member</b>	Jesse Petersen	Marina Manager	2011
<b>Member</b>	Beverly Mae Nisbeth	Education Biology and Environmental Sciences	2020

## 2.2 Nature Foundation Staff

The Nature Foundation St. Maarten has four members of staff, whereby three members have a permanent position and one staff member a one-year appointment, funded by the Port de Plaisance Yacht club for 2020. See table 2 for staff members their appointment date and main qualifications. In the below headings staff experience, skills and certifications will be elaborated for each staff member.

*Table 2. Staff of Nature Foundation St. Maarten*

Position	Staff Member	Start year	Academic qualification
Manager (permanent)	Melanie Meijer zu Schlochtern (MM)	2016	MSc Marine Biology and Ecology, Commercial and Scientific diving
Office Administrator (permanent)	Marisa Dyer-Brandy (MB)	2006	BSc Human Resource Management
Chief Ranger (permanent)	Etienne Lake (EL)	2008	Certificate Extraordinary Police Officer, Technician, Law Enforcement Expert
Educational Outreach Officer (one-year contract)	Leslie Hickerson (LH)	2020	BSc Sustainable Tourism, Dive Instructor and Regulator Tech

### 2.2.1 Melanie Meijer zu Schlochtern, Manager

Melanie Meijer zu Schlochtern is thirty-two years old and grew up and studied in the Netherlands and has been living on the island of St. Maarten since 2015. She was first working as the projects and research officer at the Nature Foundation St. Maarten and became the manager of the foundation in October 2019. Her interest in nature and biology started already when she was young, after high school there was only one study she wanted to fulfill: Biology. During her studies she also became fascinated about the underwater world and developed many scuba diving related skills. Therefore, during her Masters in Ecology, conducted at the VU University of Amsterdam, her final thesis was concentrated on the ecology of the marine species Queen Conch and led her to the Caribbean, Sint Eustatius. After her studies, Melanie worked as the Science Officer at the Saba Bank Management Unit with the Saba Conservation Foundation on the beautiful island of Saba, where she conducted fisheries research, continued conch research and participated in different research projects such as shark tagging and research. After exploring the underwater world of St. Maarten, she started with the Nature Foundation in the beginning of 2016 and worked on several research projects, mainly on the Save our Sharks project and coral restoration, in order to protect St Maarten's marine life and natural habitats. Melanie has a special love and interest in sharks and stony corals, due to their significance and dependence on each other and the beauty they show. She often uses the Foundation its slogan 'Nature is our Future', as she believes without protecting our nature there is no future for humans on this earth.



She often reminds people about the following quote to realize the importance of our natural habitats; 'When all the trees have been cut down, when all the animal have been hunted, when all the waters are polluted, when all the air is unsafe to breath, only then will you discover you cannot eat money'.

#### **Certifications:**

- Master of Science in Ecology, VU University Amsterdam, the Netherlands
- Bachelor of Science in Biology, VU University Amsterdam, the Netherlands
- Emergency First Response, Primary and Secondary Care, CPR/first Aid certificate
- International Small Powerboat and RIB Master certificate, Marine Communication Master VHF Short Range Certificate (SRC), International Yacht Training Worldwide, Maritime school of the West Indies, Marigot, Saint Martin.
- Certificate of Competency (local boat license), Binnenvaartverordening St. Maarten
- PADI Divemaster and Discover Scuba Diving Leader
- Coral Reef Restoration Course
- Reef Monitoring course, GCRMN-Caribbean Guidelines
- Advanced sport instructor certifications in skiing and kitesurfing
- Training in issuing CITES permits

#### **Skills:**

- Publications – once first author and four times co-author in scientific publications in respectable peer reviewed research papers.
- Computer - Respectable computer and data analyses skills, advanced understanding of Microsoft Office and experience with the programs: Google Earth, Transect Measure, SeaGIS, SBSS, ImageJ, Wildlife Computers, PAUP, MacClade, MrBayes, FigTree, Tinytag, GPower, R, VUE, Flash Professional and ArcGIS. I implemented data management for the large-scale shark research project and several other science projects, including programming and managing shark satellite and acoustic tags and data.
- Fieldwork - Extensive marine fieldwork skills, conducted numerous surveys for different marine species (wide range of techniques and methods; camera, scuba dive, boat, citizen science), research and commercial diving, shark handling, catch and release (tagged around 100 sharks), satellite and acoustic tags deployment on sharks, coral restoration, coral nursery and maintenance, GCRMN reef monitoring, reef surveys, sea turtle research and tagging, sea turtle nesting monitoring, fish measurements and identification, conch surveys, marine mammal monitoring, mooring placement and maintenance, marine park patrols, boat handling, lionfish control, water quality testing, terrestrial field measurements, soil sampling, mangrove restoration, bird surveys, fishing techniques, instructing and assisting interns.
- Laboratory - Respectable laboratory skills and experience with: conch dissection, histological sampling of conch gonads, shark and sea turtle DNA samples, fish gonads analyses, DNA-amplification, scanning electron microscopy, preparation of collections, soil extractions and measurements, continuous flow auto analyser and more techniques during studies.
- Film production - Melanie was in involved and appeared in several film and television productions about shark research and other conservation activities.
- Vara Vroege Vogels: Sharks in the Dutch Caribbean, December 2016;  
<http://vroegevogels.vara.nl/nieuws/naar-de-haaien-1>
- Bestemming (about the 'Save our Sharks' project, not featured yet due to Hurricane Irma)
- Ocean Treks with Jeff Corwin; <https://simkl.com/tv/619792/ocean-treks-with-jeff-corwin/season-2/episode-18/>
- Discovery Channel United States Shark Week Feature: Magnetic Shark, June 2017.





- Melanie developed a shark awareness educational video for the Dutch Caribbean;  
<https://www.youtube.com/watch?v=2G-G9K-emCQ&feature=share>.
- Pauw op Sint Maarten, Melanie was featured in this Dutch Television program on Monday the 11th of February at 22.30 on NPO1, regarding the environmental impacts of Hurricane Irma.
- German 'Ocean TV' (Mare tv), Nature Foundation and coral restoration activities were featured.
  - Language - Dutch (native), English (fluent) and German (fluent)
  - Others - More than 800 logged research and commercial scuba dives, prolonged experience in presenting to different age groups, extended experience in guiding and instructing groups of all ages, travel experience, underwater photography, full driver's license (BE).

### 2.2.2 Marisa Dyer-Brandy, Office Administrator

Marisa Dyer-Brandy studied at New England Institute Technology. She received her Associate and bachelor's degree in Business Management. After her studies in Rhode Island she worked in the Citizen's Bank in the Finance and Auto Loan Department. Upon her return to St. Maarten on Nov 11<sup>th</sup>, 2006, she started her job as the Office Manager at the foundation on Dec 15<sup>th</sup>, 2006 and has been a valued staff member ever since.

#### **Certifications:**

- Associate in Computerized Business Management and bachelor's degree in business management from the New England Institute Technology
- VHF Radio license certification
- Emergency First Response, Primary and Secondary Care, CPR/First Aid Certificate
- CITES permit specialist

#### **Skills**

- Advanced computer skills, including QuickBooks
- Extended knowledge and training in administration and accountancy
- Fieldwork Sea turtle excavation
- Marine and terrestrial patrols

### 2.2.3 Etienne Lake, Chief Ranger

Marine Park Ranger Etienne Lake is one of Nature Foundation St. Maarten employees and he started with the Foundation in 2008. Etienne is working for the foundation because of his moto; 'Saving SXM nature for present and future'! He has worked on Saba, Stata, Bonaire, Tobago and Curacao with the local Marine Parks doing dives, reef and turtle monitoring. Etienne is very passionate about Nature and always brings fresh and innovative ideas to the table. He initiated the Snorkel Club Summer Program which was a fun way to introduce the islands youth to the Marine Industry, he was also initiator of the "Coral Reef Nursery Project" which was a way to help create new Coral Reefs.

Over the past 13 years Etienne has obtained several **certifications** and **skills**:

- Max 10Pax Captains License
- VHF radio license Certification
- Padi Advanced Diver Certification
- STCW' 95 Certification
- Reef Check Certification
- Reef Resilience and Climate Change Certifications



- Monitoring Sea Turtles Foraging Aggregations Certification
- Research and Management Techniques for Sea Turtles Certification
- Law Enforcement training for Marine protected Areas Certification
- ScubaPro and SubGear Certification
- Red Cross Certification
- Field Ecology Bird Monitoring Certification
- Reef Resilience Certification
- Under Water Drilling Certification
- CPTED Specialist Certification
- Sea Mammals Autopsy
- Whale monitoring
- Shark Tagging experience
- Judicial Officer Diploma
- Electrical Engineer Diploma

#### **2.2.4 Leslie Hickerson, Educational Outreach Officer**

Leslie Hickerson is excited to have the chance to work as the educational outreach at the Nature Foundation. “I truly believe the only way we can make lasting change is to teach the younger generations to value our planet and the animals that live here.” Leslie’s background is in tourism and her interest in conservation came from directly watching the deterioration of St. Maarten natural resources over the years. This is one of the reasons she is so excited to be a part of the incredible work the Nature Foundation does for St. Maarten.

##### **Certifications:**

- Bachelor of Science- Hospitality and Restaurant Administration with an option in Tourism, Missouri, State University, Springfield MO, G.P.A. 3.75
- Bachelor of Arts- Metalsmithing
- AB Seaman, MPT, Ft. Lauderdale, Florida
- STCW 95 Basic, 2013, Marigot, Sint Maarten
- PADI Open Water to Dive Master Instructor and Nitrox Instructor certified in 2011
- Emergency First Responder Instructor
- St. Maarten Captain’s License since 2015
- VHF Radio Operators license
- Regulator Tech for ScubaPro, Aqualung, and Mares Regulators.

##### **Skills:**

- Extensive Dive Skills both recreational and commercial
- Underwater Photography skills with published photos in several medias
- Advanced Computer Skills including, Microsoft Office Programs, Adobe Editing Programs, Wordpress Website Development, React Native App Development, basic accounting use on QuickBooks Pro
- Solid Communication skills with over 500 courses and certifications taught in the diving/sustainable tourism field
- Journalism experience with over 100 articles published on watersports and conservation in the Weekly Edition via St-Maarten.com
- Project development including The Junior Ocean Education Program in collaboration with the Carib Swim Team Pool, One Ocean Global Ambassador, Founder of Travel4Scuba.com and The Scuba Podcast.



## 2.3 Nature Foundation Interns and Volunteers

The Nature Foundation also relies on volunteers and interns which assist the Foundation during activities and events, such as beach clean ups, shark week, fundraising events and sea turtle nesting patrols. In general, about 50 volunteers are available to assist the Foundation during land-based events and activities. The amounts of volunteers attending Nature Foundation events depends on the kind of activity and the timing, some events are only for skilled and trained volunteers such as sea turtle monitoring and others such as clean-ups, many could assist even up to 100 volunteers.

Each year the Foundation has about four interns, which conduct and carry out a research project for their studies or monitoring activities for several species and ecosystems. These interns need to cover their own costs of travel and living on the island or the institution that sent them must cover the financial strains. In order to become an intern at the Nature Foundation, students will need to be registered at a University or similar educational institute and need to apply through sending their resume and motivation letter for an available intern position.

Since 2019, the Foundation also has a permanent local intern, Ray-Angel Boasman, he became the ranger intern of the Foundation and assists with scuba dive work, marine research, mooring maintenance and patrols. He is also in training for all these tasks in order to develop the skills of a NF ranger. Ray has an Emergency First Responder Certification, he is certified as a PADI advanced Open water diver and attends the 11th Grade Honor Levels Student at K12 International Academy.

## 2.4 Nature Foundation Assets

The Foundation is in the possession of a 26 feet long Marine Park Patrol vessel called "Yellowtail", built in the year of 1998, see picture 1. In 2018, the boat received two brand new Mercury 115hp 4 stroke engines. However, currently the boat will need repairs on the deck to safely operate for the future years, the Foundation is in search of additional funding and donations to finance the needed repairs or renew the hull of the vessel.



Picture 1. Marine Park Patrol vessel.



Picture 2. Nature Foundation's vehicle

The Nature Foundation is in the possession of a pick-up vehicle, a Toyota Hilux from 2008. The vehicle uses diesel fuel and has a manual transmission, it is also in need of operation repairs in order to maintain it and provide reliable transportation for the future. The Foundation is the owner of an office space in the fisherman's wharf complex in Cole Bay, mortgage for the building is still being paid off to the WIB bank. The office is located on Wellsburg street 1A apt 25+26 and has 3 separate office spaces for staff members and a common 'media' room. A boat lift and warehouse are being rented from New Wave Marina in Cole Bay, located close to the Nature Foundation its office, in order to protect the boat



and store all needed marine park and field equipment. The Foundation is in the possession of equipment for mooring installation and mooring repair, scuba dive equipment and also has several species monitoring and research materials.

## **2.5 Nature Foundation Partners**

The Nature Foundation's close partner is the Dutch Caribbean Nature Alliance (DCNA), which is a regional network of protected areas set up to help and assist the park management and conservation organizations on the islands of Aruba, Bonaire, Curaçao, Saba, St. Eustatius and St. Maarten. Together we are working to safeguard our unique natural world.

The Nature Foundation collaborates each year with several stakeholders from St Maarten, the Dutch Caribbean, the Netherlands and other countries, fruitful collaborations have been conducted each year and (financial) support has been received from local and international organizations or projects. The Nature Foundation also worked quite extensively with International NGO's and organizations, sharing expertise and working jointly towards local, regional and international nature conservation. This includes the International Union for the Conservation of Nature IUCN, the World Wildlife Fund, and the Regional Activities Center for the SPAW Protocol SPAWRAC, the US Fish and Wildlife Service, the Convention on Trade of Endangered Species and Wildlife CITES, the Bonn Convention and the Ramsar Treaty. International cooperation and information exchange are some of the most critical functions of the Nature Foundation.

### 3. Management of Ecosystems

#### 3.1 Man of War Shoal Marine Protected Area Management

The Nature Foundation is in charge of the management of the Marine Protected Area (MPA), Man of War Shoal as agreed upon the Management contract 'Nature Reserve Sint Maarten' with the Minister of Tourism, Economic Affairs, Transport and Telecommunication (TEATT) signed in 2011. The Marine Park of St. Maarten was established on December 31<sup>st</sup> of 2010. The designation of the marine protected area was a groundbreaking achievement for St. Maarten as it became the country's first legally protected area. The Man of War Shoal Marine Park covers 31 km<sup>2</sup> (3,100 hectares or 7,660 acres) and is located off the southern shore of the island of St. Maarten, see figure 1. The boundaries of the marine park comprised of four coordinates:

18° 00.0' N -63° 04.5' W 18° 00.0' N -63° 01.3' W

17° 57.0' N -63° 04.5' W 17° 57.0' N -63° 01.3' W

The Marine Protected Area will be managed based on the Man of War Shoal Marine Park Management Plan 2011'', which can be found online at <https://naturefoundationsxm.org/wp-content/uploads/2020/04/Man-of-War-Shoal-Marine-Park-Management-Plan-2011-compressed.pdf>.

Below some more basic and compressed views of the planned management strategies and activities for the Marine Protected Area will be discussed for the years 2019 until 2021.



Figure 1. Map of St. Maarten dive sites and the Marine Protected Area 'Man of War Shoal Marine Park'.



### **3.1.1 Marine Protected Area Maintenance and Patrols**

At least three Marine Protected Area (MPA) patrols will be conducted by the Chief Ranger with assistance of the other staff members each week on unexpected and variable times and days. Attention will be paid to everything in the MPA, however illegal fishing, dive operators adhering to the MPA regulations (see figure 2 for MPA rules and regulations) and to assess the state of the dive moorings will be particularized. No type of fishing is permitted in the MPA, therefore illegal fishing will be directly addressed if located and assistance of the coast guard will be requested if needed, which could lead to prosecution of the violators. Dive operators or private dive boats failing to adhere to the regulations will be confronted directly by the staff of the Nature Foundation and will receive a warning, a total of three warnings could lead to a ban of entering the MPA.

Nature Foundation's Manager, Educational Outreach officer and Chief Ranger (two scuba divers and one captain) will place and maintain dive mooring systems in the MPA. When parts or entire mooring systems are found to be missing, moorings and equipment will be replaced as soon as weather allows. Once a week, following a monthly schedule in order to have all dive sites checked, 2 till 3 dive site moorings will be assessed underwater using scuba diving equipment, in order to prevent loss of moorings due to line breakage or failing shackles and materials. Shackles and other mooring equipment will be adjusted and replaced directly if needed. The scuba divers of the Foundation (Manager, Chief Ranger and Educational Outreach Officer) will assess the state of the coral reefs in the MPA and check for diseases, injured marine life or damages to the reefs, another dive site will be visited each week following a schedule.

Each year the Chief Ranger will update and map dive site coordinates if necessary, as changes in the dive site locations and mooring systems could be outdated. Each year outreach documents regarding the MPA will be developed or adjusted to the current situation by the Educational Outreach Officer and will be published on the Foundation's its social media and website. Changes and updates in the MPA regulations will also be communicated to the media and newspapers of the island.





## Rules & Regulations: Man of War Shoal Marine Protected Area

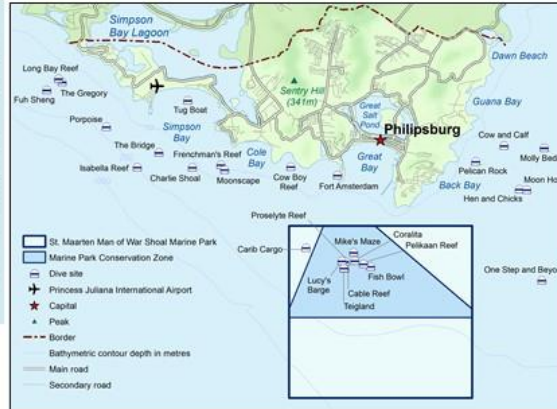


The Man of War Shoal Marine Park is an area with a healthy population of marine life including migratory whales and dolphins, numerous species of shark, rays, sea turtles and numerous fish species. Studies conducted by the Nature Foundation St. Maarten have shown that biodiversity in this area, particularly coral reef coverage, is high and the economic goods and services, which the ecosystem provides are in excess of 50 million dollars annually.



### The Following is **PROHIBITED** within the Marine Protected Area:

- Feeding of Marine Life
- Any type of fishing
- Harassing, touching or damage marine life
- Removal of live/dead marine life
- Use of gloves by divers
- Anchoring or use of anchors
- Sinking of vessels
- Placing, moving, or removing buoys or dive moorings



The Marine Park Boundary is comprised of four coordinates:  
 18 -00.0 N 63 -01.3 W      18 -00.0 N 63 -04.5 W  
 17 -57.0 N 63 -01.3 W      17 -57.0 N 63 -04.5 W

- Within the Boundary of the park the areas:
- To the left of 17 -58.55 N 63 -04.5 W & 18 -00.0 N 63 -03.9 W
  - To the right of 17 -58.55 N 63 -01.3 W & 18 -00.0 N 63 -03.0 W
  - To the south of 17 -58.4 N 63 -04.5 W and 17 -58.4 N 63 -01.3 W
- MUST** remain open to shipping

**Marine Park Authority: Nature Foundation St. Maarten**  
 Tel: +1(721) 544 4267  
 Email: [info@naturefoundationsxm.org](mailto:info@naturefoundationsxm.org)  
[www.naturefoundationsxm.org](http://www.naturefoundationsxm.org)

### Within the 'Man of War Shoal' Marine Protected Area all vessels must adhere to the following:

- A max boat size of 15 meters (50ft) and 30 tons is allowed on moorings
- Only one boat on each dive mooring, first come first serve, a max of 2 hour stay on same mooring is permitted.
- Boats must display alpha flag when divers are in the water, other boats should keep 30 meters distance from boats with an Alpha flag displayed.
- Boats may not be left **without** surface support while on moorings
- Visitors to the island **MUST** purchase a dive tag via: [sintmaarten.reefsupport.org](http://sintmaarten.reefsupport.org)
- Each vessel **MUST** be registered with the Nature Foundation St. Maarten for the current year.

Captains should pick up the yellow floating line and feed the vessel's bow line through the loop at the end of the floating line and tie the bow line back onto the vessel. The boat line must be **at least as long as the vessel.**

Figure 2. Man of War Shoal Marine Protected Area rules and regulations, including rules for scuba diving, entering the MPA and using the dive mooring systems.

### 3.1.2 Diver Visiting Statistics (Marine Park Tags)

The Nature Foundation uses an online Marine Park Payment system, whereby visitors can purchase St Maarten Marine Park Tags online via [sintmaarten.reefsupport.org](http://sintmaarten.reefsupport.org). The system generates a unique Tag for each user that is received by the buyer via e-mail. Upon arrival at a St Maarten Dive Shop and by Nature Foundation staff and rangers, validity can be checked through a print version, in the diver phone or by simply login into the system and scanning the QR code of the tag. Marine Park tags are not being sold over the counter anymore. Nature Foundations staff is able to check online the number of sold tags and the buyer's information anytime, beside validity of tags can be checked by searching for the buyers information in the online system.

Through a license agreement with Reef Support LCC and Nature Foundation collection of user fees is conducted with the assistance of this internet-based payment system. Therefore, the Nature Foundation is able to easily collect statistics of visitors and users of the Marine Park, as all divers need to purchase a marine park tag before entering the protected area.

### Marine Park Tags Prices 2019 and 2020

Day Entry Tags, only valid for a certain day	USD 3,-
Year Entry Tags, valid per calendar year	USD 15,-
Donations, option to donate and include a year tag	USD 50,- 100,- or 200,-

The Foundation would like to increase the price of the tags for the year 2021, as currently it is creating very little revenue for the Nature Foundation, the costs of a dive tag (\$3) in Sint Maarten is very low compared to other surrounding marine parks, which often charge 4\$ per DIVE (Saba) or even \$45 (Bonaire) for a tag regardless if you dive once or many times per year. Maintenance and management of the Marine Park cost a significant amount of time and funding, therefore higher prices for the Marine Park tag is justifiable.

### **3.2 Active Area Management Outside the MPA**

In addition to the patrols conducted in the Marine Protected Area, patrols will be conducted in areas of protected ecosystems and wildlife not related to the MPA, such as areas listed as protected or which are slated to be protected and areas with important natural habitats and species.

At least one or two times a week, Nature Foundation's Chief Ranger with assistance from other staff members if needed, will patrol other marine waters of St. Maarten, such as the Simpson Bay Lagoon, Mullet Pond, Great Bay and the southwest coastline of St. Maarten. During these weekly patrols, dive sites and dive moorings outside the MPA will also be checked and assessed. If weather and ocean conditions permits, once per month a patrol will be conducted in Oyster Bay Lagoon and the East Islands; Molly Beday, Hen and Chicks, Cow and Calf and Pelican Rock.

Once a week a terrestrial patrol will be conducted by Nature Foundation staff, based on a schedule each week another natural area of importance will be visited. Terrestrial nature habitats of importance for St. Maarten are considered to be the following: Back Bay including the Natural Pools, Emilio Wilson Park, Fort Amsterdam, areas around Mullet Pond, Great Salt Pond, Fresh Pond, Little Bay Pond and Red pond. During nature areas patrols, attention is being paid to trash and littering, injured marine or wildlife, sargassum invasion in the waters, the state of the vegetation and environment, environmental issues, such as oil spills, pollution etc., and other threats to the ecosystems and its species.

Patrols on beaches are combined with the sea turtle nesting monitoring activities, see heading 3.8 sea turtle nesting. Each beach of importance to sea turtles nesting will be assessed once per week, in the meantime the beach will also be assessed for littering, erosion, sargassum invasion, beach driving and construction and other threats to the natural beach habitat and its species.

All patrols and important findings during the MPA area and areas outside the MPA patrols will be logged internally and at a later state used for the yearly assessment reporting. The Nature Foundation will create outreach about the management activities they do in the terrestrial and marine ecosystem; social media, newspaper articles and incident reports will be created depending of the level of the findings, educational purposes or significance of the incident recorded.

### **3.3 Emergency Response**

The Nature Foundation responds actively to any environmental emergency or incident, emergencies related to ecosystem degradation or immediate negative ecosystem effects, such as oil spills, sewage and waste water leaks, pollution events, algae blooms, beach issues, illegal fishing, littering or direct ecosystem degradation, are all part of emergency response by the Foundation. Mostly the Chief Ranger or Manager will assess the reported or recorded situation (or incident), they will collect evidence and inform designated authorities such as coast guard, maritime affairs, VROMI inspection or police if needed. Advice how to handle the environmental situation will be given if required and action will be





taken by the Foundation when possible and if it will lead to improvement of the situation. Outreach to the media will be conducted about the incident or situation if there is an important educational component and if it serves as an example for the residents of St. Maarten.

### **3.4 Facilitate Authorities**

The Nature Foundation reports on incidents, events and activities when they are related to the environment and nature of St. Maarten or environmental legislation, besides the foundation will assist various authorities including enforcement authorities, either on request or out of its own initiative. Authorities with who the Foundation will work together are for example; the coast guard, police force, customs, Marines, Maritime Affairs, SLAC, VROMI Inspectors, VROMI Policy and Infrastructure department, harbor, NRPB and the government of St. Maarten.

### **3.5 Supervise Regulation and Site Inspection**

The Nature Foundation staff will actively supervise environmental regulations in cooperation with the inspection department of the Ministry of VROMI. The Foundation will perform site inspections on request or on report on matters related to environmental legislation and possible issues related to environmental effects of certain developments and instances. The Foundation will conduct supervision, surveillance and monitoring of activities related to conservation management, this will mostly happen after an issue is being reported by residents or discovered during patrols mentioned in 3.1 and 3.2. The situations or issue will be assessed and inspected by the Manager or Chief Ranger of the Foundation, site inspection reports will be sent to relevant sections with recommendations on the issue, reports will be shared with government and relevant authorities when necessary. Please also see heading 3.3 Emergency Response, for both situation the Foundation it's response is similar, except that the emergency situations will be responded to very urgently, however sometimes the level of urgency only becomes clear when assessing the situation.

### **3.6 Protection of Endangered Species**

The Nature Foundation will play a central conservation role in the management of endangered species including species listed in the annexes of CITES, the SPAW Protocol, and the IUCN list of endangered or threatened Species. The Nature Foundation will actively maintain the list of endangered and protected species according the above-mentioned annexes and protocols and checked for violations and permits and provide CITES permits if applicable and justifiable.

St. Maarten is home to a number of species that are of particular importance to the island and internationally, with respect to their importance in regional and global conservation, known as Flagship species. The management and staff of the Nature Foundation identified these to be: Brown pelican, Osprey, American Kestrel, Antillean Crested Hummingbird, Anguilla Bank Bush Anole, Green Iguana, Bottlenose Dolphin, Spinner Dolphin, Caribbean Reef Shark, Black tip Reef Shark, Nurse Shark, Leatherback, Green and Hawksbill sea turtles, Orange-yellow sage, Flamboyant tree, Guava berry tree, Bromeliads and Orchids and will pay additional attention to these species as well. Also, St. Maarten is home to some highly significant natural habitats and ecosystems, namely coral reefs, wetlands with mangroves and sea grass beds. Therefore, these species and habitats will also be part of the activities of protection of endangered species.

### 3.6.1 Protected Species St. Maarten

In St. Maarten according to the nature ordinance; protected animal and plant species are all animal and plant species belonging to **Native** fauna or flora and listed in **Annex I of the Bonn Convention, Annex I and II of the SPAW Protocol, Annex I to the CITES Convention** and **Annexes I and II of the Sea Turtle Convention**. Legislation can be found on;

[https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/historie/Sint%20Maarten/142263/142263\\_2.html](https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/historie/Sint%20Maarten/142263/142263_2.html) and  
[https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/historie/Sint%20Maarten/207435/207435\\_1.html](https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/historie/Sint%20Maarten/207435/207435_1.html).

A species list of protected species in St. Maarten based on the different conventions and annexes is added in Appendix 5.2, the table shows for each species which could occur in St. Maarten their level of protection and under which protocol or convention they are protected, if the species is endemic (only occurring on St. Maarten) and in case a species is already extinct or possibly extinct on St. Maarten (Source; Ildiko Gilders, Policy Advisor Nature and Environment, Ministry of Public Housing, Spatial Planning, Environment & Infrastructure).

The Nature Foundation will pay high attention to protected species during the regular patrols, incidents, site inspections, emergencies and research and monitoring projects, in order to conserve the endangered species on St. Maarten. The Foundation believes that the protection of these species is one of the most important tasks, as this will enhance the conservation of nature and natural habitats on the island. Due to the awareness which will be created about endangered species, also reports can be received from the public via phone, email, website or social media, in order to respond to incidents with protected species. Activities will be logged and especially a list will be recorded about injured and deceased protected and endangered species on St. Maarten, one of the major species on this list are green sea turtles as often reports are received regarding injured and dead sea turtles in our waters or washed up on shore. Based on the field data, lists will be created with threats and trends regarding the recorded endangered and protected species of the years, this data will be displayed in the yearly assessment reports, also see heading 4. Reporting and Accounting.

### 3.6.2 CITES Permits

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

The Nature Foundation is the appointed Management Authority and Scientific Authority of the country, by a 'Ministerial Administrative Decision' on the 6<sup>th</sup> of August 2014.

The Management Authority is authorized to issue permits and certificates under the provisions of Articles III, IV and V of the CITES Convention, to authorize the exception referred to in Article VII, paragraph 7, of the CITES Convention and to grant the authorization referred to in that paragraph, in accordance with the relevant or other relevant regulations;

The Scientific Authority is entrusted with the following tasks;

1. Granting of the declarations, mentioned in Article III, second paragraph, under a, third paragraph, under a, and fifth paragraph, under a, as well as Article IV, second paragraph, under a and sixth paragraph, under a, of the CITES agreement.
2. Keeping continuous inspection and monitoring (informing) =, mentioned in Article IV, third paragraph, of the CITES.
3. Giving advice mentioned in Article VIII, paragraph 4, part c, of the CITES Convention;

4. Advising, if asked, of the minister, the management authority and also the civil servants mentioned in Articles 16, first paragraph, and 18, first paragraph, about:

- a. The identification of specimens, as referred to in Article 7, or species as referred to in Article 8; and
- b. All other matters relating to nature management and nature protection which are addressed to the Scientific Authority for advice.

Based on this, the Nature Foundation will issue CITES permits when in compliance with the CITES regulations and national legislation and will keep up to date with changes in the regulations. All issued permits will be logged and communicated and reported to CITES, the Foundation will also liaise with involved parties regarding CITES and the trade of endangered species, such as Customs, the Coastguard and CITES organizations in the Dutch Kingdom. Issued CITES permits will also be communicated to the VROMI ministry as part of the yearly assessment report.

### 3.7 Invasive Species Management

The Foundation will actively maintain control and management of animals and invasive species on St. Maarten. Especially species which could have a serious impact on the fauna and/or flora of St. Maarten and which are not established in natural areas as yet. A list of invasive species and their details occurring on or threatening St. Maarten's species is added in Appendix 5.3 (Source; Ildiko Gilders, Policy Advisor Nature and Environment, Ministry of Public Housing, Spatial Planning, Environment & Infrastructure).

The Nature Foundation will pay high attention to invasive species during the regular patrols, incidents, site inspections, emergencies and research and monitoring projects, in order to manage the invasive species already on the island or potentially entering the natural habitats of St. Maarten. If needed, especially if the species can harm the local fauna and flora and are not established on the island yet, the invasive species will euthanized or if it can be arranged will be shipped off island to a zoo or something similar. In order to significantly manage established harmful invasive species populations, spay and neuter programs should be developed for invasive mammals with additional funding, for example in the case of the Vervet Monkey.

Invasive species of significant interest or potential high impact on native flora and fauna for the Nature Foundation, either already established or of risk becoming established on St. Maarten;

- Green iguana (*Iguana iguana*)
- Raccoon (*Procyon sp.*)
- Vervet Monkey (*Chlorocebus pygerythrus*)
- Boa constrictor and other snakes
- Mongoose
- Lionfish
- Invasive sea grass (*Halophila stipulacea*)
- Invasive coral disease (Stony Coral Tissue Loss Disease, probably due to ballast water)

The Foundation will also highly rely on the reports from residents, therefore awareness will be created about invasive species. Activities regarding invasive species will be reported, distributed on social media and logged. Based on the field data, lists will be created with threats and trends regarding the recorded invasive species of the years, this data will be displayed in the yearly assessment reports, also see heading 4. Reporting and Accounting.

### 3.8 Sea Turtle Nesting

Beach patrols for sea turtle nesting signs and to locate tracks and nests, will be conducted by the Chief ranger with assistance from the other staff members on a weekly basis. Seven beaches are recognized for being used by sea turtles for nesting, which include; Guana Bay, Gibbs Bay, Dawn Beach, Great Bay Beach, Simpson Bay Beach, Mullet Bay beach and Little Bay Beach, each of these beaches will be patrolled once per week during the sea turtle nesting season which is from April to November each year. Sea turtles occasionally also nest on other beaches, such as Cupe Coy beach and Pelican/Billy Folly beach or even Indigo Bay and Kimsha beach could be potential nesting beaches, therefore the Nature Foundation also relies on reports from residents and awareness will be created to receive their involvement and reports of possible nests. If a report is received, an available staff member will go directly to the location in order to verify the tracks or nest and to collect the data. At the start of each sea turtle nesting season, the Nature Foundation will host a small workshop for interested volunteers to create awareness regarding the signs of sea turtle nesting and increase the capacity for detecting nests. Hereby, volunteers and residents can assist the Foundation in reporting nests and a large amount of sea turtle nests can be protected and researched.

During the nesting patrols, staff will walk the high water line along the entire beach and will look for signs of sea turtle tracks or nests, these patrols will be conducted during morning hours in order to have the highest detection chance. Standardized protocols for sea turtle nesting monitoring will be used, when nests or tracks are found, track width, species, location and possible eggs and hatchlings will be measured depending on the nesting activity found, see figure 3. All detected data will be logged, including the patrols conducted without any tracks or signs of nesting. As mentioned under 3.2 Active Area Management Outside the MPA, each beach patrolled will also be assessed for littering, erosion, sargassum invasion, beach driving and construction and other threats to the natural beach habitat and its species.

Patrol Info					Position				Sea Turtle Info			Activity Info		
Year	Month	Date	Time	Observer	Beach	Location	Latitude	Longitude	Activity	Species	Track Width	Eggs #	Hatchlings	Comments
<b>Activity:</b> Nesting, Hatching or False Crawl					<b>Species:</b> Green, Hawksbill or Leatherback					<b>Track Width:</b> in cm				
										Etienne: 5227788 Mel: 5864223				

Figure 3. Field data sheet for sea turtle nesting patrols.

If necessary, Nature Foundation staff could relocate nests in case they are located on a vulnerable location and could be damaged by erosion or tourist activity, such as the piercing of umbrellas. Or sea turtle nests could be excavated in order to determine the success of the nest and their survival rate. In general, the Nature Foundation will follow guidelines established by the WIDECAST (Wider Caribbean Sea Turtle Conservation Network) foundation and will attend their annual meetings in order to be up to date with research and monitoring regarding sea turtles.

### 3.9 Research in the MPA and Outside the MPA

The Nature Foundation will conduct research in the Marine Protected Area and outside this area; in all terrestrial and marine ecosystem biology research can be conducted. On request by the government the Foundation can assist or lead research projects in these areas, besides the Foundation will conduct several research projects in 2019 until 2021, which are more elaborated on below. Most research will be focused on species composition, species abundance and species and habitat status over time.

#### 3.9.1 GCRMN Reef Monitoring

Each year the Nature Foundation will scientifically research the state of the country's coral reefs to determine coral reef changes over the years. Reef monitoring will be executed in the summer around August and is conducted according to the GCRMN-Caribbean scientific monitoring methods, this to determine the health, composition and state of our coral reefs.

The Nature Foundation will survey mainly dive sites in the Man of War Shoal Marine Protected Area and other important dive sites around the island. All measurements will be conducted along a transect line and repeated five times on each dive site. First, abundance and biomass of all fish species will be determined, secondly the cover of reef organisms (corals) will be analyzed based on photo quadrats made during the dives and photo quadrats will be assessed for coral health. Monitoring is also done looking for coral recruitments (juvenile corals) and algae coverage and height. Lastly, invertebrate species (sea urchins, sea cucumbers, lobster and conch) will be counted and water quality is measured. These measurements will help us to better understand our reefs and to determine if our reefs are doing well.

Due to shortage of capacity, results will be analyzed either by an expert in the coral reef field if additional funding is gained and otherwise by interns in Master education and with experience in the subject. The Manager is responsible for the data storage and management, other staff members will assist with the collection of the data.

#### 3.9.2 Sea Grass Research

Research into the status and distribution of different sea grass species in our waters is planned to be conducted in 2020 and 2021. Seagrass is one of the most important ecosystems on this planet, vital to the overall health of the ocean. It provides food and shelter for many different underwater creatures. It helps in coastal protection and is a big player in the fight against climate change. Currently we are not aware of the status of our native sea grass species *Thalassia testudinum* (turtlegrass) and *Syringodium filiforme* (manatee grass). An elaborated study needs to be conducted in order to research the distribution and abundance of these two native sea grass species.

However, another sea grass species needs to be researched; *Halophila stipulacea* which is an invasive sea grass species native to the tropical and subtropical waters of the Red Sea. Currently it is spreading through the Caribbean since its first documentation in Grenada in 2001 and has now been reported around most Caribbean islands including St. Maarten. Around the Caribbean the invasive sea grass has been spreading rapidly affecting native sea grass beds and probably the food chain of several species



relying on sea grass beds such as conch and sea turtles. The abundance and distribution of this invasive sea grass species needs to be researched on St. Maarten as yet.

The Nature Foundation is planned to research the status, distribution and/or abundance for these tree sea grass species in the shallow waters of St. Maarten. Scuba diving survey and drop cameras could be used in order to determine species composition and distribution. Scuba diving surveys along transects will be used to determine the status of the sea grass species and for example the density of the sea grass fields.

### **3.9.3 Shark Research**

The Nature Foundation will conduct scientific research in the waters of St. Maarten to provide insight into behavior, growth and movement patterns of several shark species, this research started in 2016 and is planned to be continued at least until 2021. Little is known about the current state of shark populations, even less is known about which areas they use as nursery and feeding grounds. This kind of information is essential if we are going to ensure the long-term protection of sharks and rays in our waters.

Nature Foundation trained staff members are tagging sharks in the waters of St. Maarten following strict safety protocols, whereby several 'drum lines' are being set in the water and check every hour for shark species. When a shark is caught a scientific research workup is being conducted, whereby the sharks is tagged, measured and safely released back in the water. The Nature Foundation uses different kind of tags to track sharks. Satellite Tags are for highly migratory species, such as tiger sharks (*Galeocerdo cuvier*), satellite tags are used to discover their migration patterns in the wider Caribbean and beyond. These tags transmit to satellites and can determine the shark movements with pinpoint accuracy when breaking the surface. Acoustic transmitters and receivers are used to research local movement patterns for Caribbean reef sharks (*Carcharhinus perezii*), nurse sharks (*Ginglymostoma cirratum*) and juvenile tiger sharks. An acoustic transmitter sends out unique signals which are detected in a range of 500m by an underwater acoustic receiver, which are placed on 8 locations underwater. All sharks receive a PIT tag, Passive Integrated Transponder, which acts essentially as a lifetime barcode, allowing scientists to receive information by recapture. Veterinarians also use this type of tag to 'microchip' pets, like cats and dogs. The manager is responsible for the data management and all data is being stored in online sources and will be analyzed in collaboration with the Save Our Sharks project and DCNA and will reveal more information about our local shark populations and their importance.

### **3.9.4 Water Quality Testing**

The Nature Foundation will test water quality of beaches and ponds once a year and upon request, in a way that is financially affordable, as significant elaborated water quality test needs a laboratory and advanced equipment which the Nature Foundation does not have. The Nature Foundation will use simple absent-present tests for total coliform, which results show indications of contamination of the waters, which could be from sewage contamination. However, it does not tell us the level of contamination, as bacterial counts need to be made to analyze the seriousness of the situation. Additional funding and proper testing facilities, such as a laboratory, are needed to determine levels of pollution and amounts of contaminating bacteria present in our waters, instead of just absent and presence tests which do not tell us that much. *Enterococci sp.* is nowadays considered a better indication than fecal coliforms for water quality contamination at public saltwater beaches and *E. coli* at freshwater beaches. It is believed to provide a higher correlation than fecal coliform with many of the human pathogens often found in city sewage. For 2020 the Nature Foundation planned on a collaboration with the American University of the Caribbean of Medicine (AUC) in order to determine amounts of bacteria which indicate the level of contamination in marine waters, such as enterococci and *E. coli* at fresh water sources. Therefore, a better understanding of the level of pollution in our waters





will be expected by the end of 2020, hopefully the planned collaboration could be continued over the years.

### **3.9.5 Reptiles and Amphibians**

The Nature Foundation Sint Maarten will research the status of local lizards, especially the endemic bearded anole (*Anolis pogus*). The Foundation will collaborate with research institutes and will facilitate their research especially with scientist interested in these subjects of the local fauna, reptiles and amphibians. The Foundation is mostly interested in the status of these animals and their distribution across the island. Research collaboration and supervision with scientist will always be conducted by the Foundation and research authorization needs to be requested prior execution to the Manager of the Nature Foundation.

## **3.10 Monitoring Activities**

### **3.10.1 Pelicans Population Monitoring**

The Nature Foundation monitors the national bird population the 'Brown Pelican' on our Island, often with the assistance of interns under the supervision of the Manager. Collecting data about Pelicans is important to provide information about the population and resulting threats in Sint Maarten. Each year in October until December counting's of the birds are done in Fort Amsterdam mainly and other locations such as the great salt pond, Little Bay Pond and Fresh Pond. Adults, nests and fledging will be counted in the morning hours.

The monitoring results of the national bird will be compared with other years and will be analyzed to determine the status of the bird and if the population is increasing or decreasing

The annual data is necessary to create a long-term study about St Maarten's national bird, their health and abundance.

### **3.10.2 Marine Life Sightings**

The Nature Foundation's Manager will monitor the sightings of sea turtles, sharks and rays in the Marine Protected Area and on the dive sites of St Maarten, with the assistance from the dive operators.

Together with the Wageningen University the results will be published online at <https://www.dcbd.nl/>.

### **3.10.3 Coral Reefs and Water Temperature**

During each scuba dive visit in the Marine Protected Area and dive sites, coral reef health and marine life health will be assessed visually, any remarks or changes will be noted down and reported to the manager of the Foundation. If large changes in marine life and coral reef status are observed, a more in-depth research will be planned to assess the current situation and determine the status of the threats and the health of the MPA.

Water Temperature is being measured in one location the MPA, it will be logged every hour in order to determine changes in temperature and to compare these results with current events happening on our coral reefs. The temperature logger has been installed in the Marine Protected Area on the dive site Coralita at 9.5 meters in depth, once a year the data will be retrieved,

## **3.11 Education and Awareness Campaigns**

The Nature Foundation will be active in creating awareness and knowledge about the Marine Protected Area, our local nature, environment and the species living on our island. The Foundation believes that it is of significance to create awareness about the importance of these habitats and ecosystems protecting us and providing for us. Outreach and Awareness will be created through social media (>10.000



followers), news articles, radio interviews, flyers, posters and other outreach materials, workshops/meetings, the website and with the assistance of local companies. For the outreach and education purpose, a variety of topics will be communicated to the public and to students; such as info about the marine park, mooring installations, law enforcement and violations, reef monitoring, coral research and coral restoration, coral tissue loss disease, shark research and shark week, coral week, educational activities and school visits, beach clean ups, other research and project activities, events of the Foundation, mangroves, sargassum arrival, sea turtle nesting and research, water quality testing, pelican monitoring and marine mammals.

Educational campaigns will also be outreached through those similar channels and a major part will be the visiting of schools on Sint Maarten, either in-person or via a virtual channel. Following a schedule, throughout the year all schools; elementary, primary and high schools, subsidized, private and public schools, will be requested to be visited by the educational outreach officer in order to learn about marine life, wildlife and the local nature and environment. If schools are not allowing visitors or if they are conducting online learning the Educational campaigns will be executed via such channels as Zoom or Google Classroom. For the Spring 2020 the Educational Outreach Officer is working with students, volunteers, and staff members via teleconference on several projects including the Junior Ranger Program, the Student Coral Competition, and Awareness Campaigns.

The Foundation will organize several events and activities during the years, either for volunteers, students, visitors or residents of the island. The foundation will also attend events from other organizations, representing the Nature Foundation and also providing support to other organizations. The Education Outreach officer with the assistance of the Manager is responsible for the outreach, education and awareness campaigns of the Foundation and will update social media, websites and outreach materials accordingly. Number of events and schools visited will be logged, including the educational subject and persons reached.

The Foundation will specifically focus on significant themes each year and will create educational and awareness campaigns focusing on the following important topics:

2019 → Reduce and Reuse St. Maarten (decrease single use plastics and littering)

2020 → Save St Maarten Corals (coral reef awareness, as our reefs are disappearing)

2021 → Sea turtles need your help! (Nesting and foraging awareness on this endangered species)

### **3.12 Fishery Management**

The Foundation will liaise with fishers and representatives from the fisheries stakeholders to engage and manage fisheries resources. The Foundation will mainly respond upon request from stakeholders, such as government and assist the coast guard with fishing related issues. By monitoring and protection the habitats, such as coral reefs and sea grass beds, the Foundation takes actively care of fishing resources conserving the habitats for important commercial fishes for example snappers, groupers and lobsters and ensuring their survival for the future generations. Also, illegal fishing and fishing methods will be assessed during patrols in the marine areas and the MPA, as mentioned in heading 3.1 Man of War Shoal Marine Protected Area Management and heading 3.2 Active Area Management Outside the MPA.

### **3.13 Government Advice, Liaison and Advisory Committees**

The Nature Foundation will participate in advisory committees and interaction with various stakeholder groups with regards to environmental development and management when requested or needed.



The Nature Foundation will regularly liaise with various government departments on environmental matters and concerns, it is planned to meet at least twice a year with the VROMI infrastructure, Inspection and the Policy department. Also, meetings will be held with the TEATT Ministry, especially Maritime Affairs department which will be closely connected. Other connections for example will be with the Coast Guard, St. Maarten Tourist Bureau, department of Interior and Kingdom relations (BAK), Members of parliament, prosecutor office and customs.

Nature Foundation will prepare advice on issues of concerns or upon request from the government, advice can be communicated via email, meetings, in the form of reports and incident reports to associated government persons and departments. Unsolicited advice to the government will be managed internally with the government, and if approved will be released to the public. Decisions with a legal, financial or public safety which could be detrimental to the interest of government, will first be consulted with the government. Annual assessment reports will also contain summed advice and concerns regarding ongoing environmental issues which are of importance to the government, also see heading 4. Reporting and Accountancy.

### **3.14 Training and Capacity Building**

The Foundation can provide training and is in the position to provide training to various government departments and their employees on issues related to environmental management, response and research. Staff members of the Foundation will attend several workshops and trainings to enrich their knowledge and skills if funding is available. The Foundation often relies on outside funding source to attend significant meetings, workshops and/or trainings, however due to the Foundation its important connections around the region, support is often offered by the organizers of the international meetings/workshop or by DCNA to cover travel costs.

Each year the Foundation its Manager or an alternative will have to travel for DCNA its board meetings and another annual significant event is the regional WIDECAST meeting about sea turtles. Local workshops or trainings are also followed, such as diving courses or Emergency First Responder course. Attendance by Nature Foundation staff members of different events, trainings or workshops will vary each year due to what is available and needed.

## 4. Reporting and Accountancy

The Nature Foundation will report accordingly upon the signed Management Agreement 2019-2021, the Nature Foundation Manager is responsible for the annual assessment reports and the Office Administrator is responsible for the yearly accountant's report (or Financial Statement). The deadlines mentioned in table 1 will be adhered to by the Foundation.

All activities of the Foundation will be reported internally and logged in our staff activities documents, some will be shared on social media and via news article in order to educate the public. Incident reports will be produced by the Foundation if necessary and will be communicated to the government when completed. The annual assessment reports will compile all activities conducted for the Management Agreement based on the tasks and deliverables mentioned in the agreement appendix. The assessment reports will contain advice, concerns, developments, lessons learned and suggested changes or policy suggestions all in order to improve species protection and nature conservation on St. Maarten. The report will also summarize research and monitoring results or it will show links to full reports. All income and expenses will be properly logged using tools such as Quick books, the Foundation will keep accounts, books and records pertaining to the activities executed and reimbursable expenses incurred on the basis of generally accepted accounting principles. At the end of the fiscal year, the Nature Foundation will submit an accountant's report and financial statement with regard to the (financial) operations of the Nature Foundation. The certified accountant's report and financial statement will be assessed by a local certified accounting agency.

With the assistance of the Wolfs Company and DCNA, the Nature Foundation will communicate and propose suggestion for the extension of the Management Agreement in order to continuously improve nature conservation and management on St. Maarten to successfully manage the marine and terrestrial ecosystem.

*Table 1. Delivery dates for reports and requests to the VROMI Ministry in line with the signed Management Agreement 2019-2021.*

Year	Report or request	Deliver date	Staff Involved
<b>2019</b>	Certified Accountant's Report, Financial Statement and Year Assessment Report	April 1 <sup>st</sup> , 2020	Manager and Office Administrator
<b>2020</b>	Certified Accountant's Report, Financial Statement and Year Assessment Report	April 1 <sup>st</sup> , 2021	Manager and Office Administrator
<b>2019 - 2020</b>	Certified Audit Report	April 1 <sup>st</sup> , 2021	Office Administrator and Accountant
<b>2021</b>	Suggestions and Proposal for Management Agreement Extension	July 2021	Manager, assistance from the Wolfs Company and DCNA
<b>2021</b>	Management Agreement Extension Request	October 30 <sup>th</sup> , 2021	Manager and Board Members
<b>2021</b>	Certified Accountant's Report, Financial Statement and Year Assessment Report	April 1 <sup>st</sup> , 2022	Manager and Office Administrator

## 5. Appendices

### 5.1 Yearly Planned Activities and Tasks

Area Manager	Location	Year Timing	Frequency	Assessment/Activity	Equipment	Staff Involved
MPA Patrol	Marine Waters	Entire year	3 times per week On unexpected and variable times and days	Illegal Fishing	Boat and GPS	Chief Ranger
				Mooring regulations	List of registrations	
				Dive regulations	Reefsupport login	
				MPA tags and registration	Phone/Camera	
				State of moorings		
Threats						
MPA Underwater	Dive Sites	Entire Year	At least once per week	Marine life health & injuries	Boat and GPS	Chief Ranger
	Coral Reefs			Damages to the reefs	Scuba diving gear	Manager
	Sea grass beds			Dive mooring damages/repair	Mooring equipment	Education Outreach office
				Underwater Camera	Interns or junior ranger	
Update Coordinates	Dive Sites	Once a year		Dive site coordinates update	Boat with GPS	Chief Ranger
Beach Patrols	Guana Bay Beach	March until Nov	Each Beach once per week	Sea turtle Nesting	Sea turtle patrol sheets	Chief Ranger
Sea Turtle Nesting Monitoring	Gibbs Bay Beach	March until Nov	during morning hours	Littering and trash	Handhold GPS	assistance of Manager and Interns
	Dawn Beach	March until Nov		Sargassum invasion	Measuring tape	
	Simpson Bay Beach	March until Nov		Erosion	Phone/Camera	
	Mullet Bay Beach	March until Nov		Threats to species and habitats		
	Great Bay Beach	March until Nov		Injured marine and wildlife		
	Little Bay Beach	March until Nov		Beach driving and construction		
Marine Areas Patrols	Simpson Bay lagoon	Entire Year	1-2 per week	Littering and trash	Vehicle	Chief Ranger
	Mullet Pond	Entire Year	1-2 per week	Threats to species and habitat	Note book	staff assistance
	Great Bay	Entire Year	1-2 per week	Injured marine and wildlife	Phone/Camera	
	Southwest coastline	Entire Year	1-2 per week	Dive site mooring repair		
	Oyster Bay Lagoon	Entire Year	1 per month, if swells allow	Sargassum invasion		
East Island	Entire Year	2 per month, if swells allow	Environmental Issues			
Nature Areas Patrols	Back Bay, Natural Pool	Entire year	each week one of these areas	Littering and trash	Vehicle	Chief Ranger
	Emilio Wilson Park	Entire year		Threats to species and habitat	Note book	staff assistance
	Fort Amsterdam	Entire year		Injured marine and wildlife	Phone/Camera	
	Mullet Pond	Entire year		Environmental Issues		
	Great Salt Pond	Entire year				
	Fresh Pond	Entire year				
	Little Bay Pond	Entire year				
	Red Pond	Entire year				
Protected Species	Entire Island	Upon report	Updates each weak and upon report	Create list of injured and deceased endangered species	Reports	Manager
		During patrols			Threats and trends	Chief Ranger
Invasive Species	Entire Island	Upon report	Updates each weak and upon report	Create list of recorded invasive species	Reports	Manager
		During patrols			Threats and trends	Chief Ranger
GCRMN Reef Monitoring	MPA and dive sites	Once a year	Around the month August	Assess state of the coral reefs	Boat and GPS	Manager
					Monitoring equipment	Assistance of Chief Ranger
					Underwater Camera	Education Outreach office
					Scuba diving gear	
				Monitoring Protocol		
Sea Grass Research	Simpson Bay	Once a year	starting in 2020	Research sea grass distribution and composition	Monitoring Protocol	Manager
	Great Bay			Monitoring equipment	Assistance of Chief Ranger	
				Boat and GPS	Education Outreach office	
				Scuba diving gear	Interns or junior ranger	
Shark Research	Marine Waters	Entire year	Reading receiver twice per year	Research movement patterns sharks	Boat, GPS, dive gear	Manager
					Shark tagging equipment	Staff Members
Water Quality Testing	Beaches	Feb-May	Yearly	Take water samples	Vehicle, GPS	Manager
	Ponds		Upon request		Water sampling kits	Chief Ranger and Intern
Reptiles and Amphibians	Nature areas	At least once in 3 years	Upon research project	facilitate scientists for research	Research equipment	Manager and Interns
					Vehicle	Visiting Scientists
Pelican Monitoring	Fort Amsterdam	Oct until Dec	Once per month	Count pelicans, netst and fledglings	Vehicle	Intern
	Great Salt Pond			Data sheets	Assistance of Manager and Chief Ranger	
	Little Bay Pond			Phone/Camera		
	Fresh Pond			Monitoring Protocol		
Marine Life Sightings	Dive Sites	Entire year	Monthly visits dive schools	Involve divers to count marine life	Data sheets	Manager
					Marine Life sheets	Interns
Water Temperature	Coralita dive site	Once a year	Temperature logged every hour	Read out Temperature logger	HOBO equipment	Manager
					Scuba dive gear, boat	



Area Manager	Location	Year Timing	Frequency	Assessment/Activity	Equipment	Staff Involved
<b>Education and Awareness</b>	Social Media	Entire year	Weekly			Education Outreach office
	News Articles	Entire year	Monthly			Assistance of Manager
	Website	Entire year	Monthly			
	Events	Entire year	Bi-Monthly			
	School Visits	Entire year	Weekly			
<b>Maintainance Vessel</b>	Lifter	Every year	Every 300 engine hours	Service, repairs, papers		Chief Ranger
<b>Maintainance Worksh</b>	New Wave Marina	Every year	bi-weekly cleaning	Cleaning and equipment		Chief Ranger
<b>Maintainance Vehicle</b>	Fisherman's Wharf	Every year	Twice per year service	Service, repairs, papers		Office Administrator
<b>Maintainance Office</b>	Fisherman's Wharf	Every year	bi-weekly cleaning	Cleaning, repairs, materials		Office Administrator
<b>Assessment Report</b>	Fisherman's Wharf	Every year	Daily reports, year end repo	All activities	Computer	Manager
<b>Accountancy, Paymen</b>	Fisherman's Wharf	Every year	Daily adjustment, year end r	Financial Reports, Quickbooks	Computer	Office Administrator



## 5.2 Protected Species List St. Maarten (Source; Ildiko Gilders, Policy Advisor Nature and Environment, Ministry of Public Housing, Spatial Planning, Environment & Infrastructure (VROMI)).

Scientific Name	Common Name	IUCN Red List	SPAW Annex	CMS Annex	CITES Annex	End.	Ext.
<b>PLANTS</b>							
<i>Ernodea littoralis</i>	Cough Bush, Beach Creeper	LC	3				
<i>Galactia nummelaria</i>	-	-				✓	(?)
<i>Calyptanthus boldinghii</i>	Lid Flower	-				✓	(?)
<i>Myrciaria floribunda</i>	Guavaberry	LC					
<i>Delonix regia</i>	Flamboyant	LC					
<i>Guaiaacum officinale</i>	Lignum Vitae	EN	3		2		
<i>Guaiaacum sanctum</i>	Hollywood Lignum Vitae	NT	3		2		
<i>Swietenia mahagoni</i>	West Indian Mahogany	EN			2		
<i>Zanthoxylum flavum</i>	West Indian Satinwood	VU					
<i>Maclura pomifera</i>	Orange-Yellow Sage	LC					
<i>Bromeliad sp.</i>	Bromeliad	-					
<i>Ruppia maritima</i>	Widgeongrass	LC	3				
<b>Mangroves</b>							
<i>Rhizophora mangle</i>	Red Mangrove	LC	3				
<i>Avicennia germinans</i>	Black Mangrove	LC	3				
<i>Laguncularia racemose</i>	White Mangrove	LC	3				
<i>Conocarpus erectus</i>	Buttonwood	LC	3				
<b>Seagrasses</b>							
<i>Halodule wrightii</i>	Shoalgrass	LC	3				
<i>Halophila baillonii</i>	Clover Grass	VU	3				
<i>Halophila decipiens</i>	Tape Grass	LC	3				
<i>Halophila engelmannii</i>	Engelmann's Grass	NT	3				
<i>Syringodium filiforme</i>	Eel Grass, Manatee Grass	LC	3				
<i>Thalassia testudinum</i>	Turtle Grass	LC	3				
<b>Cacti</b>							
<i>All Cactaceae</i>	All Cacti	-			2		
<i>Hylocereus lemairei</i>	Night-blooming Cactus	-			2		
<i>Hylocereus trigonus</i>	Strawberry Prickle	-			2		
<i>Melocactus intortus</i>	Turk's Head Cactus	LC	3		2		
<i>Opuntia boldinghii</i>	-	LC			2		
<i>Opuntia caribaea</i>	-	LC			2		
<i>Opuntia cochenillifera</i>	Cochineal Cactus	DD			2		
<i>Opuntia dillenii</i>	Sour Prickle	LC			2		

<i>Opuntia elatior</i>	Broad Prickly Pear	LC			2		
<i>Opuntia ficus-indica</i>	Indian Fig	DD			2		
<i>Opuntia rubescens</i>	Sour Prickle	LC			2		
<i>Opuntia stricta</i>	Erect Prickly Pear	LC			2		
<i>Opuntia triacantha</i>	Spanish Lady	NT			2		
<i>Rhipsalis baccifera</i>	Mistletoe Cactus	-			2		
<i>Subpilocereus repandus</i>	Candelabra Cactus	-			2		
<b>Orchids</b>							
<i>All Orchidaceae</i>	All Orchids	-			2		
<i>Brassavola cucullata</i>	Orchid	-			2		
<i>Encyclia fragrans</i>	Orchid	-			2		
<i>Epidendrum ciliare</i>	Orchid	LC			2		
<i>Epidendrum kraenzlinii</i>	Orchid	-			2		
<i>Epidendrum secundum</i>	Orchid	-			2		
<i>Oncidium leiboldii</i>	Orchid	-			2		
<i>Polystachia concreta</i>	Orchid	-			2		
<i>Spiranthes elata</i>	Orchid	-			2		
<b>INSECTS</b>							
<i>Zophobas batavarum</i>	Beetles	-	2				
<i>Phyllophaga stehlei</i>	-	-					✓
<i>Solenoptera chalumeau</i>	Michelle's Metallic Longhorn	-					✓
<i>Danaus plexippus</i>	Monarch Butterfly	NA		2			
<i>Phoebolampta caeruleotergum</i>	Leaf mimic katydid	-					✓
<i>Amblyolpium martinensis</i>	-	-	2				✓
<b>AMPHIBIANS</b>							
<i>Eleutherodactylus johnstonei</i>	Johnstone's Robber Frog	LC	2				
<i>Eleutherodactylus martinicensis</i>	Martinique Robber Frog	NT	2				
<b>REPTILES</b>							
<b>Snake</b>							
<i>Alsophis rijersmai</i>	Leeward Islands Racer	EN					✓
<b>Iguana</b>							
<i>Iguana iguana</i>	Green Iguana	LC	3		2		
<i>Iguana delicatissima</i>	Lesser Antillean Iguana	CR	3		2		✓
<b>Lizard</b>							
<i>Ameiva plei</i>	Anguilla Bank Ground Lizard	LC					

<i>Anolis gingivinus</i>	Anguilla Bank Tree Lizard	-					
<i>Anolis wattsi pogus</i>	Anguilla Bank Bush Anole	VU				✓	
<i>Sphaerodactylus macrolepis parvus</i>	Little Dwarf Gecko	LC					
<i>Sphaerodactylus sputator</i>	Island Dwarf Gecko	LC					
<i>Spondylurus martinae</i>	Slipperyback	CR				✓	
<i>Thecadactylus oskrobapreinorum</i>	Turnip-tailed Gecko	DD				✓	
<b>Sea Turtles</b>							
<i>Caretta caretta</i>	Loggerhead Turtle	VU	2	2	1		
<i>Chelonia mydas</i>	Green Turtle	EN	2	2	1		
<i>Dermochelys coriacea</i>	Leatherback Turtle	VU	2	2	1		
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	CR	2	2	1		
<b>BIRDS</b>							
<b>Migrant, visitor, non-breeding</b>							
<i>Buteo jamaicensis</i>	Red-tailed Hawk	LC			2		
<i>Pandion haliaetus</i>	Osprey	LC		2	2		
<i>Thalasseus maximus</i>	Royal Tern	LC					
<i>Sterna sandvicensis</i>	Sandwich Tern/Cayenne	LC					
<b>Resident and breeding</b>							
<i>Columba leucocephala</i>	White-crowned Pigeon	NT	3				
<i>Elaenia martinica</i>	Caribbean Elaenia	LC					
<i>Eulampis holosericeus</i>	Green-throated Carib	LC			2		
<i>Eulampis jugularis</i>	Purple-throated Carib	LC			2		
<i>Falco peregrinus</i>	Peregrine Falcon	LC	2	2	1		
<i>Falco sparverius</i>	American Kestrel	LC		2	2		
<i>Fulica caribaea</i>	Caribbean Coot	NT					
<i>Larus atricilla</i>	Laughing Gull	LC					
<i>Loxigilla noctis</i>	Lesser Antillean Bullfinch	LC					
<i>Margarops fuscatus bonaiensis</i>	Pearly-eyed Thrasher	LC					
<i>Orthorhyncus cristatus</i>	Antillean Crested Hummingbird	LC			2		
<i>Pelecanus occidentalis</i>	Brown Pelican	LC	2				
<i>Puffinus lherminieri</i>	Audubon's Shearwater	LC					
<i>Sterna antillarum antillarum</i>	Least Tern	LC	2				
<i>Sterna dougallii dougallii</i>	Roseate Tern	LC	2	2			
<b>MAMMALS</b>							
<b>Bats</b>							

<i>Tadarida brasiliensis</i>	Mexican Free-tailed Bat	LC	2	1	2		
<i>Brachyphylla cavernarum</i>	Antillean Fruit-eating Bat	LC	2				
<b>Cetaceans (Dolphins)</b>							
<i>All Cetacea</i>	All Cetaceans	-	2		2		
<i>Delphinus capensis</i>	Long beaked common Dolphin	DD	2		2		
<i>Grampus griseus</i>	Risso's Dolphin	LC	2		2		
<i>Lagenodelphis hosei</i>	Fraser's Dolphin	LC	2		2		
<i>Stenella attenuata</i>	Pantropical Spotted Dolphin	LC	2		2		
<i>Stenella clymene</i>	Clymene Dolphin	LC	2		2		
<i>Stenella coeruleoalba</i>	Striped Dolphin	LC	2		2		
<i>Stenella frontalis</i>	Atlantic Spotted Dolphin	LC	2		2		
<i>Stenella longirostris</i>	Spinner Dolphin	LC	2		2		
<i>Steno bredanensis</i>	Rough Toothed Dolphin	LC	2		2		
<i>Tursiops truncatus</i>	Bottlenose Dolphin	LC	2	1	2		
<b>Cetaceans (Whales)</b>							
<i>Balaenoptera acutorostrata</i>	Minke Whale	LC	2		1		
<i>Balaenoptera borealis</i>	Coalfish Whale	EN	2	1			
<i>Balaenoptera edeni</i>	Bryde's Whale	LC	2	2	1		
<i>Balaenoptera musculus</i>	Blue Whale	EN	2	1			
<i>Balaenoptera physalis</i>	Fin Whale	VU	2	1	1		
<i>Eubalaena glacialis</i>	North Atlantic Right Whale	EN	2		1		
<i>Feresa attenuata</i>	Pygmy Killer Whale	LC	2		2		
<i>Globicephala macrorhynchus</i>	Shortfin Pilot Whale	LC	2		2		
<i>Kogia breviceps</i>	Pygmy Sperm Whale	DD	2		2		
<i>Kogia simus</i>	Dwarf Sperm Whale	DD	2		2		
<i>Megaptera novaeangliae</i>	Humpback Whale	VU	2	1	1		
<i>Mesoplodon densirostris</i>	Blainville's beaked Whale	LC	2		2		
<i>Mesoplodon europaeus</i>	Gervais's Beaked Whale	DD	2		2		
<i>Orcinus orca</i>	Orca, Killer Whale	DD	2		2		
<i>Peponocephala electra</i>	Melon-headed Whale	LC	2		2		
<i>Physeter macrocephalus</i>	Sperm Whale	VU	2	1	1		
<i>Pseudorca crassidens</i>	False Killer Whale	NT	2		2		
<i>Ziphius cavirostris</i>	Cuvier's Whale	LC	2		2		
<b>FISH</b>							
<b>Reef Associated Fish</b>							

<i>Balistes vetula</i>	Queen Triggerfish	NT					
<i>Dermatolepis inermis</i>	Marble Grouper	DD					
<i>Epinephelus itajara</i>	Goliath Grouper	VU					
<i>Epinephelus striatus</i>	Nassau Grouper	CR					
<i>Equetus punctatus</i>	Spotted Drum	LC					
<i>Hippocampus erectus</i>	Lined Seahorse	VU			2		
<i>Hippocampus reidi</i>	Slender Seahorse	NT			2		
<i>Hypoplectrus providencianus</i>	Masked Hamlet	LC					
<i>Lachnolaimus maximus</i>	Hogfish	VU					
<i>Lutjanus cyanopterus</i>	Cubera Snapper	VU					
<i>Lutjanus analis</i>	Mutton Snapper	NT					
<i>Megalops atlanticus</i>	Tarpon	VU					
<i>Mycteroperca interstitialis</i>	Yellowmouth Grouper	VU					
<i>Scarus guacamaia</i>	Rainbow Parrotfish	NT					
<b>Demersal Fish</b>							
<i>Hyporthodus flavolimbatus</i>	Yellowedge Grouper	VU					
<i>Hyporthodus nigrurus</i>	Warsaw Grouper	NT					
<i>Hyporthodus niveatus</i>	Snowy Grouper	VU					
<i>Anguilla rostrata</i>	American Eel	EN					
<b>Pelagic – Neritic Fish</b>							
<i>Melanorhinus boekei</i>	St. Maarten Pejerry	-					✓
<b>Pelagic – Oceanic Fish</b>							
<i>Kajikia albida</i>	White Marlin, Marlin	VU					
<i>Makaira nigricans</i>	Blue Marlin	VU					
<i>Thunnus obesus</i>	Bigeye Tuna	VU					
<i>Thunnus thynnus</i>	Atlantic Bluefin Tuna	EN					
<b>Sharks and Rays</b>							
<i>Aetobatus narinari</i>	Spotted Eagle Ray	NT					
<i>Alopias superciliosus</i>	Bigeye Thresher Shark	VU			2		
<i>Carcharhinus falciformis</i>	Silky Shark	DD			2		
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	NT					
<i>Carcharhinus obscurus</i>	Dusky Shark	VU					
<i>Carcharhinus perezi</i>	Caribbean Reef Shark	NT					
<i>Carcharhinus plumbeus</i>	Sandbar Shark	VU					
<i>Carcharhinus signatus</i>	Night Shark	VU					
<i>Carcharias taurus</i>	Sand Tiger, Grey Nurse	VU					

	Shark						
<i>Carcharodon carcharias</i>	Great White Shark	VU		1, 2	2		
<i>Centrophorus granulosus</i>	Gulper Shark	DD					
<i>Cetorhinus maximus</i>	Basking shark	VU			2		
<i>Dipturus laevis</i>	Barndoor Skate	EN					
<i>Galeocerdo cuvier</i>	Tiger Shark	NT					
<i>Glaucostegus thouin</i>	Clubnose Guitarfish	CR					
<i>Gymnura altavela</i>	Butterfly ray	VU					
<i>Isurus paucus</i>	Longfin Mako	EN		2			
<i>Leucoraja ocellata</i>	Winter Skate	EN					
<i>Manta birostris</i>	Giant Manta Ray	VU		1, 2	2		
<i>Odontaspis ferox</i>	Smalltooth Sand Tiger Shark	VU					
<i>Pristis pectinata</i>	Wide Sawfish	EN			1		
<i>Rhincodon typus</i>	Whale Shark	VU	3		2		
<i>Sphyrna lewini</i>	Scalloped Hammerhead Shark	CR	3		2		
<i>Sphyrna mokarran</i>	Great Hammerhead shark	CR	3		2		
<i>Sphyrna zygaena</i>	Smooth Hammerhead Shark	VU	3		2		
<b>GASTROPOD</b>							
<i>Lobatus gigas</i>	Queen Conch	-	3		2		
<i>Conasprella berschaueri</i>	(sea snail)	-				✓	
<b>CRUSTACEAN</b>							
<i>Panulirus argus</i>	Caribbean Spiny Lobster	DD					
<i>Acanthomolgus seticornis</i>	(small crustaceans)	-				✓	
<i>Leptocaris glaber</i>	(small crustaceans)	-				✓	
<b>CORAL</b>							
<i>All spp.</i> (order Antipatharia)	Black Corals		3		2		
<i>All spp.</i> (order Alcyonacea)	Gorgonians		3				
<b>Stony Corals</b>							
<i>All spp.</i> (order Scleractinia)	Stony Corals		2		2		
<i>Acropora cervicornis</i>	Staghorn Coral	CR	2		2		
<i>Acropora palmata</i>	Elkhorn Coral	CR	2		2		
<i>Agaricia lamarcki</i>	Leaf Coral	VU	3		2		
<i>Dendrogyra cylindrus</i>	Pillar Coral	VU	3		2		

<b><i>Dichocoenia stokesii</i></b>	Elliptical Star Coral	VU	3		2		
<b><i>Montastrea annularis</i> (s.l.)</b>	Mountainous Star Coral	EN	2		2		
<b><i>Montastrea faveolata</i></b>	Boulder star coral	EN	2		2		
<b><i>Montastrea franksi</i></b>	Bumpy Star Coral	VU	3		2		
<b><i>Mycetophyllia ferox</i></b>	Rough cactus coral	VU	3		2		
<b>Fire Corals</b>							
<b><i>All spp.</i></b> (order Milleporidae)	Fire Corals		3		2		
<b><i>Millepora striata</i></b>	Bladed Box Fire Coral	EN	3		2		



### 5.3 Invasive Species List St. Maarten (Source; Ildiko Gilders, Policy Advisor Nature and Environment, Ministry of Public Housing, Spatial Planning, Environment & Infrastructure (VROMI)).

Scientific Name	Common Name	Details
<b>PLANTS</b>		
<b>Grass</b>		
<i>Bothriochloa pertuse</i>	Donna grass, hurricane grass	Invasive, potentially spreading on a massive scale, Origin: Asia
<i>Dactyloctenium aegyptium</i>	Egyptian crowfoot grass	Established, reproducing, Origin: Africa
<i>Echinochloa colona</i>	Jungle rice	Established, reproducing, Origin: Asia
<i>Eleusine indica</i>	Goosegrass	Invasive, potentially spreading on a massive scale
<i>Eragrostis ciliaris</i>	Gophertail grass	Invasive, potentially spreading on a massive scale
<i>Megathyrsus maximus</i>	Guinea grass	Naturalized, spreading, Origin: Africa
<i>Melinis repens</i>	Natal grass	Established, reproducing, Origin: Africa
<i>Pennisetum purpurem</i>	Napier grass, elephants grass	Naturalized, spreading, Origin: Africa
<i>Urochloa mutica</i>	Para grass	Naturalized, spreading, Origin: Africa
<b>Seagrasses</b>		
<i>Halophila stipulacea</i>	Halophila seagrass	Exotic, Origin: Red Sea, Possibly Introduced through ballast water
<b>Succulent</b>		
<i>Agave sisalana</i>	Sisal	Naturalized, spreading, Origin: Mexico
<i>Euphorbia tithymaloides</i>	Redbird flower	Established, reproducing, Origin: Americas
<i>Kalanchoe pinnata</i>	Life plant	Established, reproducing, Origin: Madagascar
<i>Sansevieria spp.</i>	Snake plant	Invasive, potentially spreading on a massive scale, Origin: Africa/Southern Asia
<b>Vine</b>		
<i>Antigonon leptopus</i>	Bellisima, coralita	Naturalized, spreading, Origin: Mexico
<i>Caesalpinia bonduc</i>	Grey Nicker, nickerberry	Invasive, potentially spreading on a massive scale
<i>Clitoria ternatea</i>	Butterfly pea, Bluebell vine	Naturalized, spreading, Origin: Asia
<i>Cryptostegia grandiflora</i>	Rubber vine	Exotic, not reproducing, Origin: Madagascar
<i>Jasminum fluminense</i>	Jasmine	Established, reproducing, Origin: Africa
<b>Herb</b>		
<i>Arivela viscosa</i>	Wild massamby, kaya-kaya	Established, reproducing, Origin: Asia
<i>Asystasia gangetica</i>	Chinese violet	Established, reproducing
<i>Catharanthus roseus</i>	Madalena, periwinkle	Naturalized, spreading, Origin: Madagascar
<i>Chenopodium murale</i>	Nettle	Naturalized, spreading, Origin: Europe/Asia/Africa
<i>Cleome gynandra</i>	Yerba di kaya, massamby, shona cabbage	Naturalized, spreading, Origin: Africa
<i>Parthenium hysterophorus</i>	Santa Maria	Established, reproducing, Origin: American tropics
<b>Shrub</b>		
<i>Calotropis procera</i>	Katuna di sedam, sodom	Naturalized, spreading, Origin: Africa/Asia
<i>Gossypium spp.</i>	Cotton	Naturalized, spreading, Old and New World
<i>Indigofera tinctoria</i>	Indido	Naturalized, spreading
<i>Lawsonia inermis</i>	Henna	Naturalized, spreading, Origin: Africa, Asia and Northern Australia
<i>Tecoma stans</i>	Yellow Bell	Naturalized, spreading, Origin: Americas
<i>Rincus communis</i>	Castor	Established, reproducing, Origin: Mediterranean Basin, Eastern Africa and India

<i>Senna italica</i>	Italian Sena	Naturalized, spreading, Origin: Africa
<b>Tree</b>		
<i>Azadirachta indica</i>	Neem	Invasive, potentially spreading on a massive scale: Origin: Indias
<i>Delonix regia</i>	Flamboyant	Naturalized, spreading: Origin: Madagascar
<i>Leucaena leucocephala</i>	Tan tan, false tamarind	Invasive, potentially spreading on a massive scale, Origin: Mexico and Northern Central America
<i>Mangifera indica</i>	Mango	Invasive, potentially spreading on a massive scale, Origin: Indias
<i>Moringa oleifera</i>	Moringa	Established, reproducing, Origin: Asia
<i>Psidium guayava</i>	Guava	Naturalized, spreading, Origin: Caribbean, Central America and South America
<i>Ziziphus mauritiana</i>	Chinese date	Naturalized, spreading, origin: Asia
<b>EARTH WORMS</b>		
<i>Eudrilus eugeniae</i>		Origin: West Africa, Introduced through the transport of agricultural goods
<i>Pontoscolex corethrurus</i>		Origin: South America, Introduced through the transport of agricultural goods
<b>MOLLUSCA</b>		
<i>Bulimulus guadalupensis</i>	West-Indian Bulimulus	Current invasive species, Origin: Saba, Introduced as pet
<i>Achatina fulica</i>	Giant East African land snail	High Impact, Origin: East Africa
<i>Zachrysia provisoria</i>	Cuban garden snail	High Impact
<b>MILLIPEDES</b>		
<i>Leptogoniulus sorornus</i>	-	-
<i>Oxidus gracilis</i>	Greenhouse millipede	Origin: Asia
<i>Trigoniulus corallinus</i>	Rusty millipede	Origin: Burma/Thailand
<b>INSECTS</b>		
<i>Apis mellifera</i>	Honey bee	Eradicated*, Origin: Old World, Introduced through agriculture
<b>Ants</b>		
<i>Solenopsis geminata</i>	Tropical fire ant	High Impact, Origin: Tropical South America/West Indies
<i>Paratrechina longicornis</i>	Longhorn crazy ant	Origin: India
<i>Monomorium floricola</i>	Flower ant	High Impact, Origin: Tropical asia
<i>Tapinoma melanocephalum</i>	Ghost ant	High Impact, Origin: Old World/Tropics
<i>Monomorium destructor</i>	Destroyer ant	High Impact, Origin: Old World
<b>Cockroaches</b>		
<i>Blatella germanica</i>	German cockroach	-
<i>Periplaneta americana</i>	Palmetto bug	-
<b>AMPHIBIANS</b>		
<i>Eleutherodactylus johnstonei</i>	Johnstone's frog	Origin: Leeward islands, Introduced through ornamental plants
<i>Eleutherodactylus martinicensis</i>	Martinique robber frog	Origin: Leeward islands, Introduced through ornamental plants
<i>Osteopilus septentrionalis</i>	Cuban tree frog	Low impact, Origin: Cuba, Introduced through ornamental plants
<b>REPTILES</b>		
<b>Snake</b>		
<i>Pantherophis guttata</i>	Corn snake	High impact, introduced as pet

<b>Iguana</b>		
<i>Iguana iguana</i>	Green Iguana	High impact, Origin: South America
<b>Lizard</b>		
<i>Anolis cristellatus</i>	Puerto Rican crested anole	Origin: Puerto Rico, Introduced through ornamental plants
<i>Anolis sagrei</i>	Cuban brown anole	Origin: Cuba, Introduced through ornamental plants
<i>Gymnophthalmus underwoodi</i>	Underwood's spectacled tegu	Origin: South America
<b>Gecko</b>		
<i>Hemidactylus mabouia</i>	Cosmopolitan house Gecko	Eradicated*, Origin: Africa
<b>Turtle</b>		
<i>Trachemys scripta</i>	Common slider	Origin: North America, introduced through exotic pet trade
<b>BIRDS</b>		
<i>Bubulcus ibis</i>	Cattle egret	Potential invasive species, Origin: Eurasia/Africa, introduced through natural dispersal
<i>Gallus gallus</i>	Chicken	Eradicated*, High impact, Origin: Eurasia, introduced through agriculture
<i>Passer domesticus</i>	House sparrow	Eradicated*, High impact, Origin: Eurasia/Africa, introduced as pet
<i>Quiscalus lugubris</i>	Caribbean grackle	Potential invasive species, Origin: Americas, introduced as pet
<i>Streptopelia decaocto</i>	Eurasian dove	Potential invasive species, Origin: Old world, introduced as pet
<i>Cairina moschata</i>	Muscovy duck	Origin: Americas, introduced as pet
<b>MAMMALS</b>		
<b>Rodents</b>		
<i>Mus musculus</i>	Mouse	Eradicated, high impact, Origin: Old world, introduced through transport of goods
<i>Rattus rattus</i>	Black rat	Eradicated*, high impact, Origin: Old world, introduced through transport of goods
<b>Household Pets</b>		
<i>Cannis familiaris</i>	Dog	Medium impact, Origin: Old world, introduced as pet
<i>Felix domesticus</i>	Cat	High impact, Origin: Old world, introduced as pet
<b>Livestock</b>		
<i>Capra hirus</i>	Goat	High impact, Origin: Old world, introduced through agriculture
<b>Other mammals</b>		
<i>Chlorocebus pygerythrus</i>	Vervet monkey	High impact, Origin: Africa, Introduced as pet
<i>Herpestes auropunctatus</i>	Mongoose	High impact, Origin: Africa, introduced through agriculture
<i>Procyon lotor</i>	Raccoon	High impact, Origin: North America, introduced through agriculture
<b>FISH</b>		
<i>Oreochromis mossambica</i>	Tilapia	Introduced, Origin: Africa, Introduced through aquaculture
<i>Poecilia reticulata</i>	Guppy	Introduced, Origin: S. America, Introduced as aquarium pet
<i>Pterois miles, P. volitans</i>	Lionfish	Exotic, Origin: Pacific, Introduced through aquarium trade

<i>Poecilia vandepolli</i>	Machuri	Origin: ABC islands, Introduced through aquarium trade
<b>MARINE PATHOGENS</b>		
	Black band disease	Exotic, terrestrial origin, Introduced through sewage runoff
	Diadema disease	Exotic, Origin: possibly Pacific, Possibly introduced through the Panama Canal
<i>Aspergillus sydowii</i>	Seafan disease	Exotic, terrestrial origin, Introduced through terrestrial runoff
	Sea turtle fibropapilloma	Cyrtogenic: a disease of obscure or uncertain origin
	White pox Acropora disease	Exotic, terrestrial origin, Introduced through sewage runoff
	Stony Coral Tissue Loss Disease	
<b>DIDEMNID COLONIAL ASCIDIANS</b>		
<i>Trididemnum solidum</i>	Overgrowing mat tunicate	-
<b>ANIMAL DISEASES VECTORS PARASITES</b>		
<i>Aedes aegyptii</i>	Yellow fever mosquito	High Impact,
<i>Myrmecophilus americanus</i>	Ant cricket	Low Impact, Origin: India
<b>PLANT DISEASES VECTORS PARASITES</b>		
<i>Cylas formicarius</i>	Sweet potato weevil	-
<b>MLO'S (Mycoplasma Like Organisms)</b>		
	Lethal yellowing of palms (LYdisease)	-