



ISSUE 2 - 2017

# BIONEWS

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Dutch Caribbean Nature Alliance  
Safeguarding nature in the Dutch Caribbean



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# Editor's Letter

Dutch Caribbean, February - March 2017

**With 'Nature' funding from the Dutch Ministry of Economic Affairs and support of the local governments several projects are now running to maintain and sustain nature in the Dutch Caribbean. In this issue you can find an overview on all projects and read about 'Restoration project of Bonaire's dry forest' that was recently launched by Echo. This project is among others of great value for the protection of the endangered parrot *Amazone barbadensis*.**

For the first time tiger sharks has been tagged with a satellite transmitter in the Dutch Caribbean. This project is part of DCNA's "Save Our Sharks" project funded by the Dutch National Postcode Lottery. Little is currently known about the status of shark populations in Dutch Caribbean waters and tagging studies are a pivotal first step in determining which sharks are present, where they can be found and most importantly how best to improve management and protection of these important apex predators.

Other great news for shark and ray conservation in the Caribbean is that it was officially decided to protect eight shark and ray species under the International Specially Protected Areas and Wildlife (SPAW) protocol. This is a major step for international protection of Caribbean sharks.

It's the humpback time of the year in our Caribbean waters! After feeding in the cold Artic waters throughout summer, humpback whales migrate south to the Caribbean each winter to breed and give birth. In this issue you can read about the Caribbean Humpback Acoustic Monitoring Programme (CHAMP). With passive acoustic recorders throughout the Caribbean

researchers will be able to monitor distribution, assess differences in arrival and departure of the whales, and analyze the whales' songs.

We also put some attention to the finding that certain UV-filters in sun care products are an emerging risk for Caribbean coral reefs. Recently researchers from Wageningen Marine Research, under the leadership of Dr. Diana Slijkerman, have been investigating the effects of sun care products on our reefs. Read about their project and first findings on page 17.

In the Netherlands, ANEMOON has for many years run successful long-term projects to monitor marine wildlife using an extensive network of volunteers who are active citizen scientists. The Foundation hopes to set up a similar long-term project on St. Eustatius in close collaboration with STENAPA. They already developed an Observation Card for St. Eustatius' marine life and recently published a Field Guide to the Marine Life of St. Eustatius that includes data and information of an expedition in 2015.

Lastly there is an article on a new course from van Hall Larenstein, University of Applied Sciences that gives students the chance to gain fieldwork experience on St. Eustatius with CNSI and Stenapa.

As always BioNews provides overviews of the research and monitoring efforts, a list of recent publications as well as a calendar of upcoming events.

Happy reading!

# The Nature Funding projects

By Paul Hoetjes (RCN)

In 2012, as part of the so-called spring agreement, the new Dutch government coalition reserved 10 million Euro for nature projects on the BES islands as part of a 200 million Euro package for nature in the Netherlands. In the end however, the coalition decided to cut this extra funding for nature, including the BES part. The new Minister of Agriculture (=“State Secretary” of Economic Affairs) subsequently managed to get back some of that funding intended for the provinces and the provinces agreed that a small part should also go to the BES islands. In April 2013 the Minister presented the “Nature Policy Plan for the Caribbean Netherlands 2013-2017” to the Dutch Parliament. This plan included the intent to provide a one-time allotment of 7.5 million Euro, at that time US\$ 9.8 million, for a period of 4 years (the duration of the Nature Policy Plan). In September 2013 this was implemented in a Ministerial Decree setting the amount (in US\$) and the objectives of this funding, the criteria for eligibility and the mechanism for proposing projects. The funding was made available as a special allotment for the public entities, a three-person advisory committee was appointed to evaluate project proposals and advise on their eligibility and effectiveness towards the objectives.



Photo by: © Hans Leijnse

The objectives of the funding were to promote:

- coral reef conservation;
- sustainable use of nature, or
- the synergy of sustainable use of nature in combination with agriculture and tourism.

Because of the way the funding was set up, only Public Entities (island governments) could propose projects for funding and a set amount was allocated for each island. The idea was for the islands to consult with the local stakeholders (NGOs) to identify specific projects to be proposed. In 2015 a mid-term evaluation was commissioned by the Minister and this led to an extension of the end date of projects (originally October 2017) with two years, taking into account the long road from project formulation, submission by the islands, review by the advisory commission and final approval and contracting and disbursement to the island. The submission deadline for projects, October 2016, was not changed however, due to budgetary constraints.

From the start in October 2013 till the end date in October 2016, a total of 22 projects were approved, 10 from Bonaire, 7 from Saba and 5 from St. Eustatius (see table) .

**NOS TA BIBA DI NATURALESA**

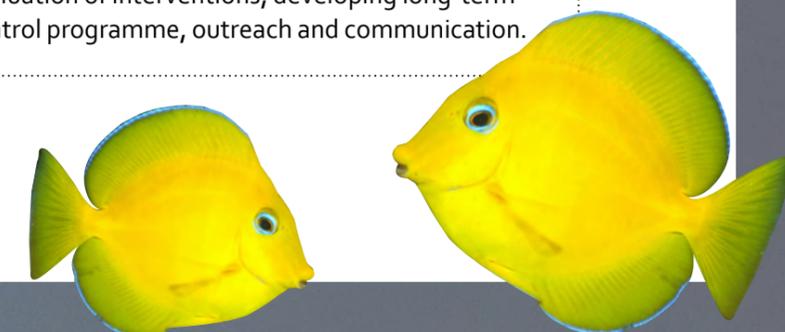


**Traha huntu na un desaroyo duradero pa Boneiru**

*The Nature Funding Projects  
on Bonaire can be followed on  
Facebook: @NTBDN*

SUBJECT	ISLAND	ORGANIZATION(S): Lead scientist(s)	GOAL	ACTIVITIES
Ecological restoration Lac Bay and South coast, Bonaire	BON	<b>STINAPA:</b> Sabine Engel <b>WUR:</b> Dolfi Debrot, Klaas Metselaar <b>STCB:</b> Mabel Nava <b>DRO:</b> Frank van Slobbe	Improve biodiversity and accessibility of Lac Bay and South coastline of Bonaire by restoring hydrological conditions, protecting biodiversity and promoting sustainable tourism.	Create culverts, sediments traps, opening and cleaning of channels in mangroves, build toilet facilities, clean-ups, education and outreach, natural barriers for cars to protect breeding grounds of turtles, flamingos and sterns, research restoration Pink Beach, monitoring program for evaluation of interventions.
The sustainable agriculture and rural development program (POP Bonaire)	BON	<b>Bonaire Agri &amp; Aqua Business BV:</b> Sherwin Pourier <b>Wayaká Advies BV:</b> Jan Jaap van Almenkerk <b>DRO:</b> Frank van Slobbe	Strengthen entrepreneurship and self-reliance in rural areas and agriculture (Rincon and Playa Oost).	Improve entrepreneurship by creating studygroups for the themes agriculture, live-stock farming and tourism, stimulate sustainable tourism development, promote sustainable agriculture to locals and young people, decrease erosion by restoring dams and making water accessible for irrigation.
Feral Pig Control	BON	<b>Echo:</b> Nathan Schmaltz <b>DRO:</b> Frank van Slobbe	Recovery of habitats so they are better able to provide services for people and nature, improved conditions for agriculture and increased community support for invasive species management.	Feral pig density assessment, pig eradication, raising awareness and support, monitoring program for evaluation of interventions .
Reforestation Project	BON	<b>Echo:</b> Lauren Schmaltz <b>DRO:</b> Frank van Slobbe	A restored dry-forest habitat across Bonaire that is better able to provide services for people and nature in the present and; in the future through increased resilience to climate change.	Establish a strategic network of herbivore exclusion areas within which the abundance and diversity of native plants is increased. Increase capacity for habitat restoration through creating a team of habitat restoration wardens and the expansion of the native plant nursery. Build a foundation of community support and sustainable financing, upon which island wide dry-forest habitat restoration can be achieved.
Goat eradication and control in Washington Slagbaai National Park	BON	<b>STINAPA</b> <b>DRO:</b> Frank van Slobbe	Draw the goat population down to a manageable level within 3 years so that the vegetation can recover	Bringing the number of goats down in Slagbaai and Washington, practice and train locals and park staff to effective goat control, monitoring program for evaluation of interventions, developing long-term control programme, outreach and communication.

## The Nature Funding projects



SUBJECT	ISLAND	ORGANIZATION(S): Lead scientist(s)	GOAL	ACTIVITIES
Coral Restoration	BON	<b>CRF Bonaire:</b> Augusto Montbrun <b>DRO:</b> Frank van Slobbe	Restore the shallow populations of elkhorn and staghorn corals along the coasts of Bonaire and Klein Bonaire.	Replant degraded reefs with nursery grown corals, support efforts to improve water quality, developing multi-clonal thickets of each species of coral that will be able to successfully reproduce, outreach and communication, involve local dive community in project.
World Heritage Nomination Bonaire Marine Park and/or other interconnected sites	BON	<b>Wolfs Company:</b> Esther Wolfs, Boris van Zanten, Amilcar Guzman, Viviana Lujan <b>DRO:</b> Frank van Slobbe	Ensure that the quality of the second intermediary nomination file for the nomination of the Dutch Caribbean marine ecosystem as an UNESCO World Heritage Site meets the criteria set by the Kingdom of the Netherlands and the requirements of the World Heritage committee.	Describe the: (1) fulfilment of the criteria for the Outstanding Universal Value, (2) conditions of integrity, (3) fulfilment of requirements for protection and management of the site, (4) carrying capacity to safeguard this Outstanding Universal Value. Also demonstrate the active support and commitments of relevant stakeholders and active engagement of the steering committee. Include interactions marine and terrestrial ecosystems and marine ecosystems in Curacao and Venezuela.
Erosion control and nature restoration	BON	<b>Bonaire Agri &amp; Aqua Business BV:</b> Sherwin Pourier <b>Wayaká Advies BV:</b> Jan Jaap van Almenkerk <b>DRO:</b> Frank van Slobbe	Less erosion towards coral reefs, less flooding in residential area, increased biodiversity and nature development, more attractive nature for tourists, more water for agriculture.	Improve water storage capacity dams, restoration Saliña di Vlijt and Saliña Onima, Nature conservation in abandoned 'diabaasgroeves', restoration water wells and mills and research into catchment area of Bonaire
Cave and karst nature reserve	BON	<b>DRO:</b> Frank van Slobbe <b>CARIBSS</b> (Caribbean Speleological Society): Fernando Simal	Creation of the "Bonaire Caves and Karst Park" to improve the situation for the cave users, while ensuring that the cave values and resources are preserved and used for the benefit of the Bonaire community and visitors to the island in a sustainable way.	<ul style="list-style-type: none"> <li>• Selection and classification of the caves to be included in the park, create footpaths and hiking trails, provide signage and fence the perimeter of the park;</li> <li>• Cave guide certification course;</li> <li>• Select and classify the most popular and visited caves on Bonaire, provide limited and controlled access and signage;</li> <li>protect bat maternity chambers and monitor the bats;</li> <li>• Apply for SICOM (Site of Importance for Bat Conservation) status for the maternity caves of <i>Myotis nesopolus</i> and <i>Natalus tumiridostris</i> located at Bakuna and Sabadeco.</li> </ul>

## The Nature Funding projects

Photo by: Rudy van Gelderen

SUBJECT	ISLAND	ORGANIZATION(S): Lead scientist(s)	GOAL	ACTIVITIES
Campaign environment en nature on Bonaire	BON	DRO: Frank van Slobbe, Peter Montanus	Implement a communication plan to improve support for nature and environment and provide improved and more structural information about all the nature funding projects ongoing on Bonaire as well as other nature/environment projects	<ul style="list-style-type: none"> <li>• Organize press conferences, briefings and excursion;</li> <li>• Issue press releases; newsletter, TV and radio programs, thematic videos, and jingle;</li> <li>• Produce website and facebook page</li> </ul>
Horticultural Project	SAB	<b>Government of Saba:</b> Randall Johnson	Improve horticultural extension to locals and inspire them to produce horticultural products (mainly fruits, vegetables) on their own properties in an organic matter, multiply indigenous trees and contribute to the environmentally conscious image of Saba.	Land lease agreement, establish a horticultural project, establish an indigenous tree nursery communication and outreach
Hiking trails	SAB	<b>Government of Saba:</b> Robert Zagers	Financial support to SCF to upgrade and maintain hiking trails.	Mount Scenery Trail: repair slippery and damaged steps, (re)construct steps, construct and install hand railing along slippery parts, reconstruct and repair stone walls
Tent Reef Protection	SAB	<b>Government of Saba:</b> Robert Zagers	Eliminate the eminent threat that the dumped rubble and dirt from the harbor project poses for Tent reef as part of the protected area; forming one of Saba's main tourist attractions	Relocation of the rubble and dirt from the current area to a safe site in the vicinity, which is privately owned. Stabilization of the reallocated sediment.
Goat buy-back program	SAB	<b>Government of Saba:</b> Randall Johnson	Protecting nature and agriculture by significantly decreasing the amount of roaming goats.	Shooting/ slaughtering, storing, selling and/or exporting the meat
Yacht mooring project	SAB	<b>Government of Saba</b> <b>SCF:</b> Kai Wulf	Increasing sustainable tourism by providing safe access (both for yachts and corals) to 12 extra mooring sites for visiting yachts, including 2 mega yacht moorings	Under the supervision of the Saba Conservation Foundation construction of the mooring blocks and buying of the necessary mooring materials. For the deployment of the concrete blocks the help of the HNLMS Pelikaan of the royal Dutch navy will be sought.

## The Nature Funding projects



Photo by: © Violetta

SUBJECT	ISLAND	ORGANIZATION(S): Lead scientist(s)	GOAL	ACTIVITIES
Saba national park	SAB	<b>Government of Saba</b> SCF: Kai Wulf SABARC: Ryan Espersen	Conserve Saba's richest and most undisturbed biodiversity in the central and northern part of the island including the top of Mt Scenery (total area 350 hectares) and to promote sustainable use with an emphasis on combined nature, cultural and historical tourism.	Upgraded Trail to Mary's Point and conservation of historical structures at Mary's Point; Draft legislation for establishing the National Park and for species protection; Drafting of a management plan for the National Park; Designing and printing tourist information; Trail on top of mountain to Hells Gate lookout; Trail on top of mountain to The Bottom lookout; Creating support among landowners and general public concerning the National Park; Two trainees educated to become park ranger; Archaeological excavations AmerIndian fire pit at Mary's Point village site; Website with trail information and trail map updated and printed.
Crispeen trail project	SAB	<b>Government of Saba:</b> Robert Zagers SCF: Kai Wulf	Repairing/renovating the damaged Crispeen trail to improve tourism access to nature through the walking trails	Build or restore walls of varying heights (1 to 4 feet) height., reconstruct certain steps and parts of the walking floor and reconstruct the path at Midway
Nature Awareness project	EUX	<b>Government of St Eustatius</b> STENAPA: Clarisse Buma CNSI: Johan Stapel, Hannah Madden	Create a mind shift in the community towards a sustainable relationship with nature.	Workshops as f.e. on invasive species and economic value of nature, communication materials such as booklets and posters, highlight island's key species.

The Nature Funding projects



Photos by: © Hans Leijnse

SUBJECT	ISLAND	ORGANIZATION(S): Lead scientist(s)	GOAL	ACTIVITIES
Strengthening management of nature	EUX	<b>Government of St Eustatius</b> <b>STENAPA:</b> Clarisse Buma	Capacity-building and improvement of nature conservation management foundation, STENAPA	Trucks and equipment, additional staff capacity and materials at the Miriam C. Schmidt Botanical Garden, and additional equipment, training and capacity in the terrestrial and marine parks.
Rodent assessment and control	EUX	<b>Government of St Eustatius</b> <b>CNSI:</b> Hannah Madden <b>ECPHF:</b> Teresa Leslie	Decrease the number of rats on the island and implement a sustainable rat control program on the island	Determining the rat density, distribution and ecology on St. Eustatius. Implementing a baited poison program. Reaching out to and empowering the community through public awareness.
Coral restoration	EUX	<b>Government of St Eustatius</b> <b>STENAPA:</b> Jessica Berkel <b>CNSI:</b> Johan Stapel	Re-establish a healthy branching coral community	Creating a coral nursery which would supply second and third generation planting out sized coral colonies.
Erosion control	EUX	<b>Government of St Eustatius</b> <b>CNSI:</b> Johan Stapel	Reduce the amount of erosion that occurs on the island.	Implementation and time planning to be discussed and negotiated



Photo by: © Hans Leijnse

The Nature Funding projects

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# Nature funding: Restoring Bonaire's dry forest



Tree Planting Day in the first completed exclusion area in Washington. Over 500 trees planted and over 20 volunteers participated

Echo Team with the Dutch Army who volunteered in September to help "break ground" at the proposed Tolo enclosure which will fence in an existing nature area with walking trails



Photos by: © Quirijn Coolen

Forest degradation is believed to be driving Yellow-shouldered Amazon parrots (*Amazona barbadensis*) to forage feed in urban areas, which leads to conflict with local fruit growers and reduces survival (Williams 2012). Now, with funding from the Dutch Ministry of Economic Affairs "Natuurgelden" and commissioned by the Public Entity Bonaire, a local foundation Echo, has been able to launch a large-scale reforestation project with the goal of creating dry forest environments within ten protected 'exclusion areas', which have been set up on public land. Each area will measure approximately one-hectare and all non-native herbivores (goats, donkeys and pigs) will be excluded. The exclusion areas will then be reforested with as many as 20,000 native trees.

Dry forest habitats are among the least well researched and conserved habitats in the world and yet they account for about half of the world's forested area (Blackie et al., 2014). The degradation of dry forest habitats has far reaching implications. The loss of large, mature trees means that less rainfall will be retained in the soil, which can eventually lead to aridification (Brodie, Post, & Laurance, 2012). Similarly, the loss of trees and their root systems means that less soil will be retained during (heavy) rain. This causes a reduction in the nutrient cycling and a decline of soil fertility, which can impact local agriculture. The drier, more compacted topsoil will cause surface water run-off that leads to erosion and the loss of nutrients in the terrestrial ecosystem (Koster, 2013), as well as elevated amounts of harmful sediment and increased nutrient levels in surrounding coral reefs areas (Vermeij, 2011). All of these factors lead to decreased biodiversity and lowered ecosystem productivity.

At present, most of Bonaire's dry forests are dominated by only three to five tree species. This startling lack of diversity coupled

with the fact that very few mature large trees remain on the island means that Bonaire's native dry forest environments are under considerable threat. Several species of native trees are already almost extinct on the island. Bonaire's dry forests are a natural refuge for the island's flora and fauna and are home to endangered plants, including two Guaiacum species, and birds such as the Yellow-shouldered Amazon parrot (*Amazona barbadensis*), as well as several other island endemics (IUCN Threatened Species Database 2013). Therefore in 2010 local laws were passed to protect nature on land including the full protection of 25 tree species and the requirement of a Tree Cutting Permit.

On Bonaire, the dry forest habitat has undergone dramatic changes over the last two and a half centuries (de Freitas, Nijhof, Rojer, & Debrot, 2005). The impacts of historic tree felling coupled with the introduction of invasive herbivores has effectively prevented the regeneration of many native plant species (Coblentz, 1980; Coolen, 2015). In addition, many areas are affected by the introduction of exotic plants that are now outcompeting native species (Smith, Van der Burg, Debrot, van Buurt, & de Freitas, 2014).

Forest degradation is believed to be driving Yellow-shouldered Amazon parrots to forage for food in urban areas, which in turn leads to conflict with local fruit growers and reduces their survival (Williams, 2012). Ironically exotic herbivores were recognized as a key threat to biodiversity over one hundred years ago, but Bonaire has yet to develop a comprehensive control program to reduce the impact of overgrazing.

The first step towards dry forest restoration is to exclude exotic herbivores and then to improve the biodiversity through the selective planting out of native trees that would originally have been found in these areas.



“

Nearly 2,000 native trees have been planted out, thanks to support from community volunteers, including DCNA's own Emeray Martha-Neuman and her family!

”



Echo's first three exclusion areas have been completed and nearly 2,000 native trees have been planted out, thanks to support from community volunteers, including DCNA's own Emeray Martha-Neuman and her family! Cargill and Digicel also each participated in tree planting by organizing corporate volunteer days with Echo. At each of the reforestation sites, the Echo team collects baseline data about the trees allowing their growth and success to be monitored. After planting, trees are watered twice weekly until they show new growth and water retention is apparent in the soil, at which time watering is reduced to once weekly and eventually tapered out all together.

*Echo is a small non-profit foundation, which was set up on Bonaire in 2010. Its mission is to safeguard the future of the island's endemic subspecies of the Yellow-shouldered Amazon parrot (*Amazona barbadensis*), locally known as the "lora".*

*Echo is always looking for more volunteers, so please contact [info@echobonaire.org](mailto:info@echobonaire.org) to learn more.*

Photo by: © Quirijn Coolen



Students of CIEE who volunteered with Echo in its existing fenced area in the Washington side of the WSNP. The students came out early on a Saturday morning to help dig holes (aka future tree homes) with members of the Echo team



Members of STINAPA's Junior Ranger Aspirant group who joined the Echo team for a tree planting day at Dos Pos.

## Nature Funding: Restoring Bonaire's dry forest

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# Great news for shark and ray conservation in the Caribbean!

*The first cross-border protective management in a Wider Caribbean context for elasmobranch species*

**In March 2017 it was officially decided to protect eight shark species under the international Specially Protected Areas and Wildlife (SPA) Protocol following a proposal by the Dutch Ministry of Economic Affairs in cooperation with a team of shark experts. The SPA protocol is the only cross-border legislative instrument for nature conservation in the Wider Caribbean Region.**

Through the SPA protocol, which is a United Nations initiative, the signatory countries set agreements to protect vulnerable animals and their unique habitats. The agreements concern trade and fisheries, as well as tourism and coastal development. Until now, no sharks or rays were included in the protocol, despite being an especially threatened animal group, both on a global scale and in the Caribbean region. The main threats to shark populations are overfishing and destruction of vital habitats such as coral reefs and mangroves.

The Ministry of Economic Affairs proposed a shortlist of eight shark species for listing on the protocol. This included three species of hammerhead shark, the whale shark, the oceanic whitetip shark, the smalltooth sawfish, and two manta ray species. In November 2016, the proposals of all eight species were accepted during a technical meeting in Miami.

For the proposals, the Dutch Ministry of Economic Affairs was working closely with the Dutch Caribbean Nature Alliance and with scientific and policy support from the Dutch Elasmobranch Association (NEV).

These fact sheets with information about the proposed action were produced by the NEV to support the final decision making process.

Irene Kingma, director of the Dutch Elasmobranch Society (NEV) and one of the shark experts that helped with the shortlist: *"Sharks do not respect borders and cover enormous distances, which is why it is important to protect them on a region-wide scale. The proposals from the Dutch Ministry have helped providing these fragile species with the protection they deserve, which we consider a great success."*

The Annex II contains the list of species that are agreed to receive the highest level of protection in the wider Caribbean region. Any form of destruction, disturbance, possession and trade is prohibited and their habitats are strictly regulated.

The species listed in the Annex III are the ones that should receive special attention and sustainable management to ensure and maintain healthy populations. All protected species listed under the SPA Protocol can be found on the CAR SPA RAC website. ([http://www.car-spa-rac.org/IMG/pdf/annexes\\_of\\_spa\\_protocol\\_revised\\_22-02-2017.pdf](http://www.car-spa-rac.org/IMG/pdf/annexes_of_spa_protocol_revised_22-02-2017.pdf))

## The 8 new SPA Protocol listed shark and ray species

<b>ANNEX III</b>	Hammerhead sharks ( <i>Sphyrna lewini</i> , <i>Sphyrna mokarran</i> , <i>Sphyrna zygaena</i> )
	Manta rays ( <i>Manta birostris</i> , <i>Manta alfredi</i> , <i>Manta sp. cf. birostris</i> )
	Oceanic whitetip shark ( <i>Carcharhinus longimanus</i> )
	Whale shark ( <i>Rhincodon typus</i> )
<b>ANNEX II</b>	Smalltooth sawfish ( <i>Pristis pectinata</i> )



Photo by: © Peter Verhoog

*"We are delighted that our proposal got such broad support from the present countries," says Guus Schutjes of the Dutch Ministry of Economic Affairs. "The Netherlands has strived for the structural protection of nature and biodiversity in the Caribbean for some time now and cross-border protection is an essential part of this."*

Tadzio Bervoets, chair of the Dutch Caribbean Nature Alliance and leader of the Save Our Sharks project: *"The Dutch Caribbean Nature Alliance and its partners have been working hard in the Dutch Caribbean region and in the Caribbean in general to increase protection for sharks. Through the funding provided to us by the National Postcode Lottery we have been doing scientific research, education and outreach and in this case significant lobbying work, and we are encouraged by this excellent development coming out of French Guiana. Sharks are critical to the Caribbean region and their conservation is essential to the health of our Caribbean Sea. With this historic vote, shark conservation efforts have been significantly increased in the region and we are elated to have been a part of the process. We hope that more species will soon be added to the annexes of the SPAW Protocol giving them the conservation status that they need in the Caribbean Sea."*



Photo by: © Jim Abernethy

**Text from Save Our Sharks website:**

<http://www.saveoursharks.nl>

**Learn more about the eight species:**

<http://saveoursharks.nl/en/spaw-proposals-fact-sheets/>

Great news for shark conservation in the Caribbean!

Would you like to share a news item?  
Please e-mail us: [research@DCNANature.org](mailto:research@DCNANature.org)

# Tiger shark crosses thirteen maritime boundaries in four weeks

You can track tiger shark Quinty here:  
<http://saveoursharks.nl/en/events/sharktracking/>

A tiger shark (*Galeocerdo cuvier*) tagged with a satellite transmitter by scientists and researchers from Saba, Sint Maarten and the United States has migrated across thirteen maritime boundaries, making its way from the Saba Bank to Trinidad. This 3.43m female tiger shark named 'Quinty' was tagged as part of the region wide Dutch Caribbean Nature Alliance "Save our Sharks" project with funding from the Dutch National Postcode Lottery. Little is currently known about the status of shark populations in Dutch Caribbean waters (Garla et al., 2006; Chapman et al., 2007) and tagging studies are a pivotal first step in determining which sharks are present, where they can be found and most importantly how best to improve management and protection of these important apex predators (Hammerschlag et al., 2008).

On board the "Caribbean Explorer II", which set sail from St Maarten last October, scientists and conservationists from the Saba Conservation Foundation (SCF), Nature Foundation St. Maarten (NFSXM), Florida International University (FIU) and Sharks4Kids, set out to gather information on shark abundance and diversity on the Saba Bank. Over the course of the 6-day expedition the team caught 22 sharks.

A lot of shark species are known to migrate vast distances in search for food, a mate or breeding grounds (Wilson et al., 2001; Bonfil et al., 2005; Papastamatiou et al., 2013). This recent study performed by local researchers from the "Save

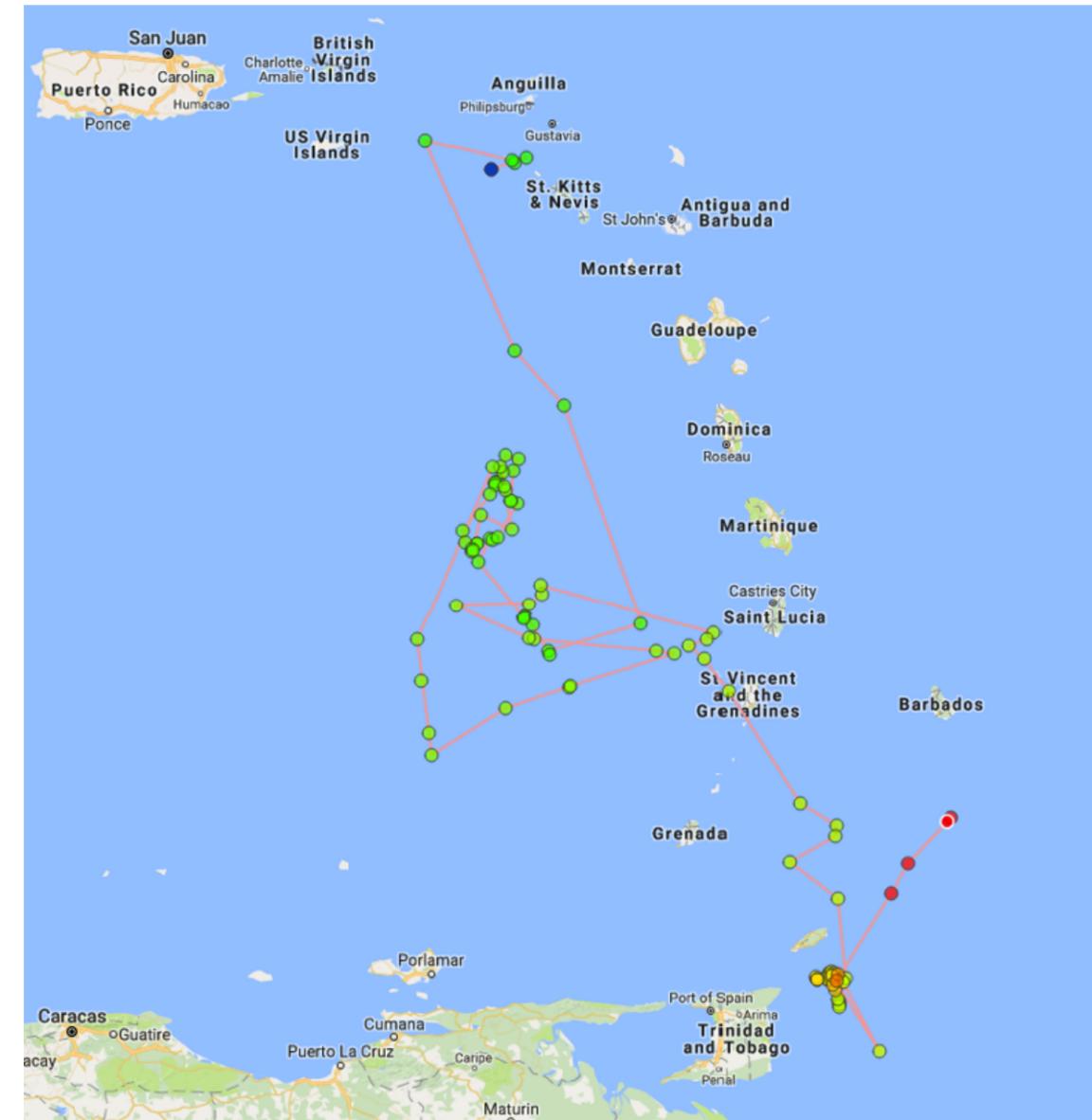
our Sharks" project shows that their 'local' tiger sharks are no exception, as Quinty travelled over 1200 kilometers within a month's time, crossing thirteen maritime boundaries. This reveals that national protection of these animals in the Caribbean is not sufficient and that more regional-wide protection is needed now more than ever.

## The journey

Quinty was tagged on the Saba bank in October 2016 and was immediately labeled as the most active research animal of this study, sending out location data from the first day she was tagged. Equipped with a custom fitted satellite tag she has traveled over 1200 kilometers south within one month, reaching Trinidad and Tobago at the beginning of December 2016. In these waters she stayed for 3 months, before recently heading back up north towards Barbados. This journey turns out to be quite dangerous for a shark, as only 3 of these nations provide Quinty with the necessary protection by having declared their waters as shark sanctuaries: The British Virgin Islands, Saba and St Maarten. This means that along her journey so far, in ten different territorial waters in the Caribbean, Quinty could have been legally caught and killed for her fins, meat, oil or cartilage. Over 100 million sharks worldwide are killed for these same reasons each year (Worm et al., 2013).

## Tiger sharks

Tiger Sharks are one of the largest sharks, with a bulky body, powerful jaws and teeth strong enough to open the shell of a sea turtle. They are



The track shown in the image is from a 3.43 m tiger shark tagged on October 19, 2016.



Quinty being worked up alongside the boat during the expedition.

Photo by: © Duncan Brake

one of the oceans' most powerful predators. Their diet includes everything from jellyfish to stingrays and seals (Heithaus, 2000) and their habit of snapping up human garbage has earned them the unfortunate nickname "wastebaskets" of the sea.

### Sharks in the Dutch Caribbean

Very little is currently known about the status of tiger shark populations in Dutch Caribbean waters. They are found all around the world in temperate and tropical waters and typically move into the Caribbean Sea in the winter. Tiger sharks have been sighted so often on the Saba Bank that they have been adopted as the Saba Bank 'mascot'. Sadly, they are classified on the IUCN Red List as "Nearly Threatened". Their fins are in high demand in Asia for shark fin soup. This satellite tagging study is a pivotal first step in determining movement patterns of this shark species, and is for this reason of major importance in decision making on how to manage and protect these important apex predators within and outside Dutch Caribbean waters.

In the Dutch Caribbean sharks are protected within the "Yarari Marine Mammal and Shark Sanctuary" and conservation groups are working with local

You can track tiger shark Quinty here:  
<http://saveoursharks.nl/en/events/sharktracking/>

fishermen to reduce catch and by-catch of sharks and to establish a region-wide shark sighting network to learn more about where they live and how we can best protect them. However, this research shows that tiger sharks spend most of their time in non-Dutch Caribbean waters and therefore a more Caribbean-wide protected area should be established to help preserving this amazing shark species.

### Shark tracking

A total of five tiger sharks received a custom fitted satellite tracking device as a part of the "Save our Shark" study. Tiger Sharks spend quite a lot of time at the surface (Heithaus et al., 2002), which allows satellite tracking devices to be used to track their movements with pin point accuracy. Hopefully, Quinty and the other sharks will continue to transmit their location data so that there will be a better understanding of tiger shark movement patterns across the Caribbean.

The tagging expedition was organized as part of the Dutch Postcode Lottery funded "Save our Sharks" project, which aims to change the way we think about sharks and to create safe havens for them by working with fishermen, local communities and scientists.



Photo by: © Kai Wulf

Tiger shark crosses thirteen maritime boundaries in four weeks

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# Listening to the Caribbean's Humpback Whales with CHAMP

By Dr. Heather Heenehan (NOAA Fisheries)

In December 2016, after many months of planning, ten recording devices were successfully deployed throughout the Caribbean to listen to the sounds and song of humpback whales as part of a new collaborative acoustic monitoring program called the Caribbean Humpback Acoustic Monitoring Programme (CHAMP).

CHAMP leverages and expands on networks already established in the Caribbean including the North Atlantic Humpback Whale Catalog, Sister Sanctuaries Program, CARIB Tails, and SPAW-RAC to promote and enhance collaborative research on the biology of humpback whales, specifically focusing on acoustics research. This multi-national acoustic monitoring program now includes researchers, government officials, NGO's, managers and others in Aruba, Bonaire, Dominican Republic (Silver Bank), Guadeloupe (West and East Coast), Martinique, St. Martin, and the United States.

This research is timely given the West Indies Distinct Population Segment (DPS) of humpback whales (*Megaptera novaeangliae*) was delisted under the US Endangered Species Act in September 2016. This DPS covers all of the Caribbean

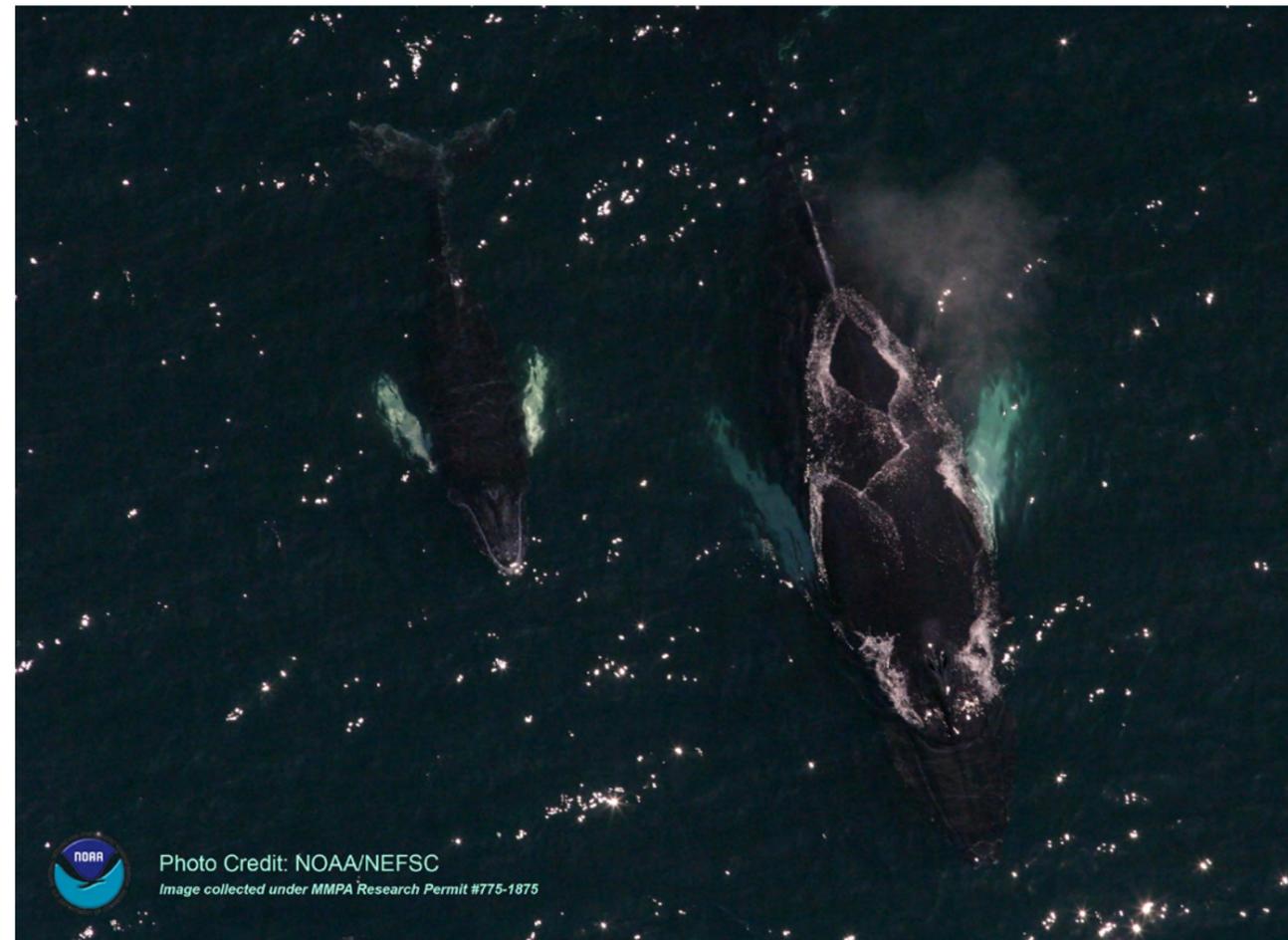


Photo Credit: NOAA/NEFSC  
Image collected under MMPA Research Permit #775-1875

breeding grounds. However, growing evidence suggests the West Indies DPS contains more than one breeding population.

Because humpback whales are known for singing on their winter breeding grounds, we can learn a lot about these animals simply by listening. With passive acoustic recorders throughout the Caribbean, we will be able to monitor distribution, assess differences in arrival and departure of the whales, and analyze the whales' song, all valuable information for management and policy decisions.

The first CHAMP deployment included two different types of recording equipment, SoundTraps and Marine Autonomous Recording Units or popups. The SoundTraps (Ocean Instruments) recorded one hour every 4 hours at a sampling rate of 48 kHz and were placed on St. Martin, Guadeloupe (East Coast), and Bonaire. The Marine Autonomous Recording Units or popups (Cornell University) recorded continuously at 2 kHz and were placed on Aruba, Bonaire, Dominican Republic, Guadeloupe (West and East coasts) and Martinique. Each of our sites received a single device with the exception of the East Coast of Guadeloupe and Bonaire where both a SoundTrap

and popup were deployed. A fourth SoundTrap was used in collaboration with the SEA Education Association during their "Colonization to Conservation in the Caribbean Program." During this program recordings were made on Saba Bank and Silver Bank. Three students on this trip used these recordings for their oceanography projects and presented their work while on board the SSV Corwith Cramer.

The recording devices that were deployed in December will be recovered by the team of collaborators and partners in May and June 2017. Once the recorders have been sent back, we will begin the hard work of going through the recordings to learn more about the humpback whales of the

Caribbean. We hope to redeploy the SoundTraps in December 2017 for a second year of CHAMP.

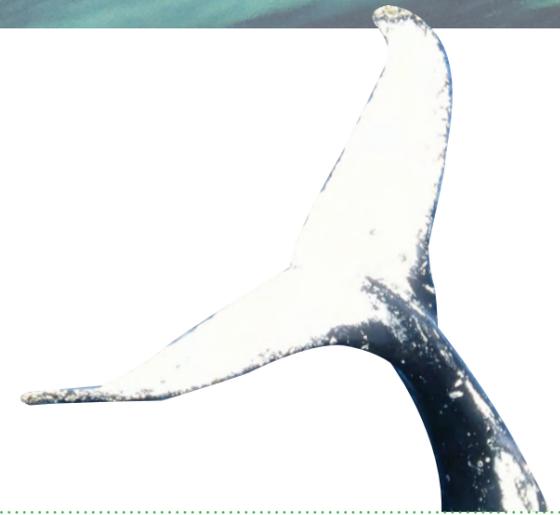
This project is supported by funding from the United States National Oceanic and Atmospheric Administration Northeast Fisheries Science Center as well as in-kind support from the Dominican Republic's National Authority for Maritime Affairs, the Aruba Marine Mammal Foundation, STINAPA Bonaire National Marine Park, National Office for the Caribbean Netherlands (RCN), the Dutch Caribbean Nature Alliance, the Observatoire des Mammifères Marins de l'Archipel Guadeloupéen (OMMAG), the National Park of Guadeloupe, the Natural Reserve of St. Martin and the Sea Education Association.

If you or others are interesting in learning more about CHAMP and the humpback whales we are studying please visit our website (text available in English, Spanish, and French).

<http://www.nefsc.noaa.gov/psb/acoustics/psbAcousticsCHAMP.html>

Additionally, if you or someone you know is interested in the CHAMP recordings or has any additional acoustic recordings from the region please contact **Dr. Heather Heenehan**.

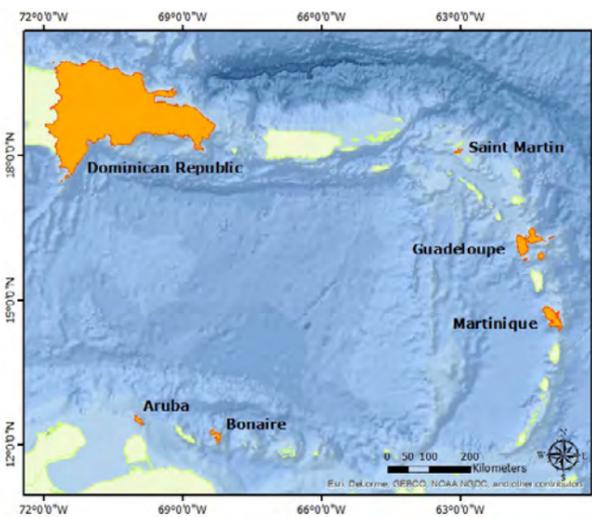
Email: [Heather.heenehan@noaa.gov](mailto:Heather.heenehan@noaa.gov)



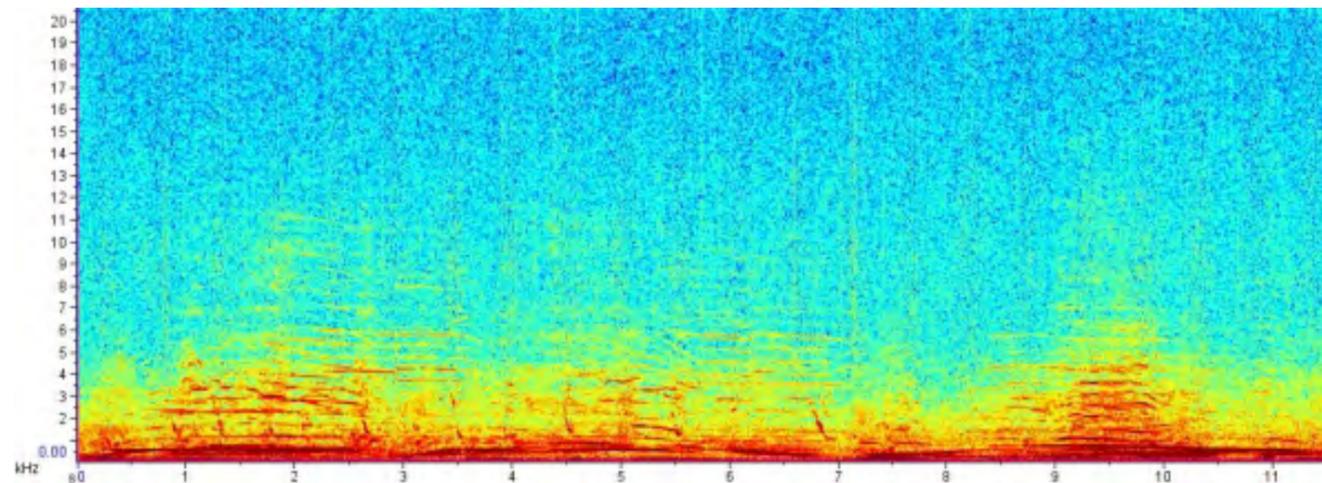
Logo by: © Julianne Gurnee (NOAA NEFSC)

Image by: © Heather Heenehan (NOAA) made with Raven Pro software

Image by: © Genevieve Davis (NOAA NEFSC)



A map of the 2016-2017 CHAMP monitoring locations



A visualization called a spectrogram of humpback whale song recorded on Silver Bank 3-Mar-2017. To listen to this clip of humpback whale song visit: [http://www.sea.edu/sea\\_currents/corwith\\_cramer/taking\\_time\\_to\\_listen](http://www.sea.edu/sea_currents/corwith_cramer/taking_time_to_listen)



Listening to the Caribbean's Humpback Whales with CHAMP

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# UV- filters in sun care products as an emerging risk for Caribbean coral reefs

By Dr. Diana Slijkerman- Iris Schaap (BSc) - Drs. Sabine Engel

**Beach goers and bathers in the Caribbean often apply sunscreen to protect themselves against skin cancer and skin aging. Of course this is of great importance. However, this could be affecting reefs and marine life due to the emission of UV-filters, which are part of sun care products.**

Researchers from the Wageningen Marine Research, under the leadership of water quality specialist and ecologist Dr. Diana Slijkerman, have been working on the question whether sun care products are an emerging risk for marine life in the Caribbean. More specifically, UV-filters in sunscreen, such as Oxybenzone, were subject of study since these were recently reported to be of serious concern for corals.

Marine nature areas on Bonaire support various touristic and recreational activities, including diving, kayaking, surfing, swimming and snorkeling, whereby the majority of these activities depend on the quality of the ecosystems. Amongst others, Lac Bay consists of unique and environmental important habitats, including mangroves and seagrass beds which function as nursery hot spots, inhabiting a variety of life. The last years, the number of tourists at Sorobon in Lac Bay has been increasing especially due to growth of cruise

ship visits. The growing numbers of tourists may lead locally to significant sunscreen emissions. Alarmed by the study of Downs et al., in 2015, in which was demonstrated that field concentrations of UV filters might affect corals, STINAPA and Directie Ruimtelijke Ontwikkeling Bonaire (DROB) asked IMARES, now Wageningen Marine Research, what the risk of UV-filters for Bonairean ecosystems could be.

Restricted in funding, a limited study was set up with volunteers (Sabine Engel and co-workers) and the effort of student Iris Schaap, aimed to construct an environmental risk analysis. The study consisted of literature research, calculations on the predicted environmental concentrations at Lac Bay and measured samples at different locations at Lac Bay. More specifically, the study aimed at organic UV filters. By reviewing the physico-chemico- specifications of UV-filters, for example the lipophilicity of the chemical, an insight is provided in which ecosystem compartment the compounds most likely end up. The application of type of products per country was assessed to estimate which emissions are likely to occur in Bonaire. Studies describing the various types of effects of UV filters on different organisms were evaluated and used to prepare an environmental risk assessment.

Two field-sampling moments at Sorobon, near the mangroves, and Cai (figure 1) were selected to measure the concentrations in the water. Sorobon is assumed to be the busiest beach at Bonaire occasionally, and served in this study as a worst-case scenario situation since it is more or less a secluded area by i.a. reef. The sampling moments correspond with cruise ship visits in August (1 ship, 23rd of August) and in November (3 ships in few days, sampled at November 18th) 2016. With these two visits we anticipated on sampling during coral spawning (and thus a possible ecological worst case situation) and differences in UV filter levels between these moments. The latter is assumed because UV filters are considered to be stable and not easily break down. A built up in concentration was thus expected in November.

The findings of the literature study revealed that UV filters are distributed widely, and can sorb to organic matter and accumulate into organisms tissues- depending on the type of filter and organism. UV filters can consequently have a diversity of effects on the marine ecosystem in various ways. The marine environment can be affected directly and indirectly by UV filter toxicity. Besides reported developmental toxicity on coral planulae, various other effects are described to

result from exposure to UV filters such as narcosis, genotoxicity, endocrine disruption, reproductive and developmental toxicity to marine life. The range of effect concentrations varies per studied organism and ecosystem (e.g. fresh water or marine) by which the marine species tend to be more sensitive towards UV-filter exposure than fresh water species. Furthermore, sunscreen (products) releases additionally nitrogen and phosphorus components, which could potentially contribute to the risk of (local) eutrophication, and indirectly by algae blooms and food abundance.

Based on previous questionnaire studies found in literature, the majority of the visitors at Lac Bay are assumed to originate from the USA, UK and the Netherlands. Therefore, the study focussed on a specific selection of organic UV filters, which are predominantly applied in sunscreen products originated from these countries. The UV-filters of interest in Lac Bay are: octocrylene (OC),



Photo by: © Dimitris Vetsikas

Figure 1: Field-sampling locations at Sorobon, near the mangroves, and Cai to measure the concentrations of UV- filters in sun care products in the water. The sampling moments correspond with cruise ship visits and coral spawning.



Photo by: © Sabine Engel

4-Methylbenzylidene camphor (4-MBC), Benzophenone-3, also known as oxybenzone (BP<sub>3</sub>), and Benzophenone-4 (BP<sub>4</sub>).

The basic field study showed that two out of the four selected UV filters were detected in both the surface micro layer (SML) and 30 cm below water level. In August, measured concentrations at Cai were too low for a quantitative detection. However, this does not imply that there is not a reason for concern, since several toxic effect concentrations for Caribbean corals are below the limit of detection. BP<sub>3</sub> concentrations in the SML near the mangrove rim were detected at levels indicating some risk. However, at Sorobon Beach, BP<sub>3</sub> was found in much higher concentrations within the surface layer (0.72 µg/L) and the water layer (1.23 µg/L). Additionally, significant concentrations of OC were detected with a highest concentration in the surface layer (1.23 µg/L) and a lower concentration in the water layer (0.51 µg/L). These concentrations seem low, but are of significant large amplitude considering sunscreen biomonitoring studies worldwide. Furthermore, the toxic effect concentrations are in the same order of magnitude. The risk estimation is performed on a limited set of reported effect data, and thus an uncertainty factor (or assessment factor) was applied to correct for this. The combination of low environmental concentrations in relation to equivalent effect concentrations resulted in a high estimated risk for this location. Estimated environmental risk factors are very high for both OC and BP<sub>3</sub> and confirm the concerns for environmental effects at the local level at Sorobon.

The expected built up of concentrations in November was not seen. Surprisingly, lower concentrations were found than in August, however the heavy showers around the time of sampling could explain this. Rainfall largely reduced the number of expected visitors to Sorobon, and it is known that rain also affects the concentrations of UV filters by dilution and water distribution. Since tourism is a major industry at Bonaire, healthy ecosystems are of great importance for the Bonairean society in terms of

financial as well as human wellbeing. A precautionary approach is advised because of the fringing coral reef of Lac Bay and the nursery function of its mangroves and seagrassbeds. Emissions can be reduced easily: e.g. wearing long sleeved shirts instead of using sunscreen while bathing will reduce the amount of UV filters largely up to an estimated of roughly 50% per person (shower or wipe off applied lotion first). Distribution and local supply of environmental friendly brands lacking these types of filters would be beneficial too.

Currently, the results are further processed and submitted to a peer-reviewed journal in order to share the results to a larger audience.

Additional monitoring would strengthen the proposed precautionary approach to take measures for example in the field of coral restoration programs. As world tourism is expected to grow, the prognosis of the emission and exposure of UV filters in the Caribbean is unfortunately predicted to increase too. An annual tourism growth of roughly 2% leads to approximately an estimated additional load of 747-5,979 mg EHMC, 498-3,986 mg OC, 467-3,737 mg 4-MBC, and 249-1,993 mg BP<sub>3</sub> and BP<sub>4</sub> around noon per day in Lac Bay (based on extrapolations on numbers of bathers at Sorobon beach, sun screen products applied and fractions washed off).

We aim to study the actual presence of these compounds in more detail along a larger spatial-temporal scale, and to define environmental effects of sun care products in order to contribute to the protection of the marine life of the Caribbean and more specifically Bonaire.

***We invite interested partners to contribute to this effort with additional ideas or funds. Please contact: Diana Slijkerman at [Diana.Slijkerman@wur.nl](mailto:Diana.Slijkerman@wur.nl)***

## UV- filters in sun care products as an emerging risk for Caribbean coral reefs

# Volunteers will count endangered species of St. Eustatius

By Sylvia van Leeuwen, Niels Schrieken and Susan J. Hewitt

The Dutch Caribbean island of St. Eustatius is home to a particularly rich marine life. Since 1996, the waters surrounding the island have been protected as a Marine Park and managed by STENAPA (St. Eustatius National Parks). However, marine organisms are still under pressure from human activities.

The ANEMOON Foundation is a Dutch volunteer organization of citizen scientists who are interested in sea life. The Foundation has started a project to make an inventory of the underwater life of St. Eustatius, using citizen scientists as recorders. In 2015, an excellent start was made by the St. Eustatius Marine Biodiversity Expedition 2015. During this expedition, the ANEMOON Foundation, together with Naturalis Biodiversity Center (of Leiden in the Netherlands), and some local partners on St. Eustatius, surveyed the underwater life of the Marine Park. In three weeks, over 1,150 different species of plants and animals were observed.

In order to be able to develop sustainable management techniques for marine life in the future,

it will be crucial to monitor changes and the distribution of species over time.

In the Netherlands, ANEMOON has for many years run successful long-term projects to monitor marine wildlife using an extensive network of volunteers who are active citizen scientists. The Foundation hopes to set up a similar long-term project on St. Eustatius. This project, developed in close collaboration with STENAPA, intends to recruit tourists, expats and locals to record endangered and exotic marine species. By giving workshops and supporting volunteers in other ways, ANEMOON plans to achieve greater public awareness of the spectacular underwater life of St. Eustatius. We hope this awareness will in turn result in more volunteers participating in the project.

Everyone who goes diving or snorkeling off St. Eustatius can contribute by using an Observation Card created by ANEMOON Foundation and STENAPA. The card has images of twelve easily recognizable species, which together serve as a good indicator of the health of the marine life around the island. The species shown on the card include sea turtles, a shark, and a ray. Although these creatures are vulnerable everywhere in the Caribbean, the likelihood of your seeing them around St. Eustatius is currently still excellent.

After a dive or snorkel trip, you can simply mark on the card which species you saw.

Around the island there is of course much more to see underwater than the 12 species on the card. A wide variety of species with extraordinary colours and shapes are shown in a strikingly beautiful publication, "Field Guide to the Marine Life of St. Eustatius." This field guide showcases 234 species, all photographed in the waters off the island. A free download of the guide is available at [www.anemoon.org/eux](http://www.anemoon.org/eux).

More extensive information about the marine species of the Dutch Caribbean is available on the ANEMOON Foundation's website. And, for more dedicated divers, snorkelers, and beach combers, an extended observation form, which includes 150 species, is also available.

More information about the project of the ANEMOON Foundation can be found at [www.anemoon.org/euxnl](http://www.anemoon.org/euxnl) (in Dutch) and [www.anemoon.org/eux](http://www.anemoon.org/eux) (in English). For more information about STENAPA and the Marine Park, go to [www.statiapark.org](http://www.statiapark.org).

***This project was supported by the Caribbean Department of the Prins Bernhard Cultuurfonds.***



Photos by: © Marion Haarsma



Photographs exclusively taken in the waters off St. Eustatius

# Field Guide to the Marine Life of St. Eustatius

Niels Schrieken and Sylvia van Leeuwen (eds.)



Field Guide to the Marine Life of St. Eustatius

## Field Guide to the Marine Life of St. Eustatius

**Editors:** Niels Schrieken and Sylvia van Leeuwen

**Authors:** Floris Bennema, Jessica Berkel, Jaap de Boer, Kalli De Meyer, Glenn Faires, Adriaan Gmelig Meyling, Marion Haarsma, Mike Harterink, Susan J. Hewitt, Bert Hoeksema, Eseld Imms, Sylvia van Leeuwen, Luna der Loos, Godfried van Moorsel, Niels Schrieken, John Stack and Mark Yokoyama.

**Photographers:** Marco Faasse, Glenn Faires, Jaaziel, García-Hernández, Marion Haarsma, Mike Harterink Bert Hoeksema, Yee Wah Lau, Sylvia van Leeuwen, Luna van der Loos, Godfried van Moorsel, James Reimer, Niels Schrieken, Frank R. Stokvis and James Thomas.

**Size:** 21.5 x 28.0 cm.

**Number of pages:** 84

**Publisher:** ANEMOON Foundation

**PDF Price:** Free download at [www.anemooon.org/euxnl](http://www.anemooon.org/euxnl) and [www.anemooon.org/eux](http://www.anemooon.org/eux)

**Printed book:** € 19.99 through [www.amazon.com](http://www.amazon.com)

**Publication Date:** December, 2016

The photos of the St. Eustatius Marine Biodiversity Expedition 2015 by Marion Haarsma and Sylvia van Leeuwen have been donated to DCNA and can be found in DCNA's smugmug: <https://dcna.smugmug.com/St-Eustatius/All-St-Eustatius-Photos/>

*We would like to thank them for sharing these beautiful pictures with us!*

Volunteers will count endangered species off St. Eustatius



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Photo by: © Marion Haarsma

# Sustainable Island Management students visit Statia in a 2-week fieldtrip

By Marlou Heemstra and Alwin Hylkema

**Last November 10 students and 2 lecturers from Van Hall Larenstein, University of Applied Sciences exchanged Leeuwarden for a 2-week fieldtrip to St. Eustatius. The fieldtrip was organised in the context of their Sustainable Island Management course (also "minor").**

The 6-month during minor runs this schoolyear (2016-2017) for the first time and is part of the BSc program Coastal and Marine Management.

Lecturer Marlou Heemstra explains that in recent years, the Caribbean have become increasingly interesting for their students to carry out internships. This can be largely attributed to the fact the islands St. Eustatius, Saba and Bonaire opted as special municipalities of the Netherlands. Many questions regarding sustainable management of the islands and its surrounding waters arose and generated an increase in research. Our students have been assisting in ecological research, and productive working relations between Van Hall Larenstein and local scientists and managers have developed.

We visited St. Eustatius for the first time in 2014 and upon return the idea for this unique minor and excursion came to life. Students work intensively on small islands and their threats, challenges, opportunities and solutions that are an every day's business there.

In collaboration with local stakeholders we developed an interesting fieldtrip program. Accommodated at the CNSI, students gained experience in carrying out research, they spoke with many people on the island and visited different

organisations such as Stenapa, the Tourism Foundation and NuStar. We joined different researchers in their fieldwork such as ringing tropic birds, looking out for the invasive and native iguanas and tagging snakes on the Quill. Also underwater research was done in collaboration with the local dive shop.

Besides gaining fieldwork experience the students also carried out assignments for Stenapa to work on. One of the assignments was about the invasive green iguana. To gather as much as information as possible we have had discussions with different organisations. On the basis of all the information the students work out different scenarios with their respective pros and cons.

This first fieldtrip was a great success and we are very much looking forward visiting the island again in the end of this year.

Another icing on our cake of collaboration with local partners is a project that got approved in December. In this project, called AROSSTA (Artificial reefs on Saba and Statia), we want to build artificial reefs made of local rock, which if everything goes according to plan will be a suitable substrate for coral and in turn will form itself into a real reef.

If you are interested in our activities and / or wish further information please feel free to contact:

- Marlou Heemstra – coordinator Sustainable Island Management minor (via: [Marlou.heemstra@hvhl.nl](mailto:Marlou.heemstra@hvhl.nl)); or
- Alwin Hylkema – project leader AROSSTA (via: [alwin.hylkema@hvhl.nl](mailto:alwin.hylkema@hvhl.nl))

**Website:** [www.vhluniversity.com](http://www.vhluniversity.com).

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Photos by: © Marlou Heemstra



# Research Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Birds	Suitability study and reforestation of exclosures facilitating the Yellow-shouldered Amazon Parrots ( <i>Amazona barbadensis</i> ) on Bonaire.	BON	<b>Echo:</b> Lauren Schmaltz
Cnidaria	Spawning Aggregations of the box jellyfish, <i>Alatina alata</i>	BON	<b>CIEE:</b> Rita Peachey, Austin Lin
Coral Reef ecosystems	Status of <i>Diaderma antillarum</i> on Caribbean Reefs	All	<b>Scripps institution of oceanography:</b> Stuart Sandin <b>CARMABI:</b> Kelly Latijnhouwers
Coral Reef ecosystems	Screening of UV filter presence in Lac Bay and ecological risk assessment	BON	<b>WUR:</b> Diana Slijkerman, Iris Schaap (student) <b>STINAPA:</b> Sabine Engel
Coral Reef ecosystems	Distribution and impact of the invasive reef coral <i>Tubastraea coccinea</i> on the coral reefs of Curaçao	CUR	<b>Naturalis:</b> Bert Hoeksema <b>Leiden University:</b> Auke-Florian Hiemstra (student) <b>CARMABI</b>
Coral Reef ecosystems	Distribution and impact of the aggressive ascidian <i>Trididemnum solidum</i> on the coral reefs of Curaçao	CUR	<b>Naturalis:</b> Bert Hoeksema <b>Leiden University:</b> Gabriël Olthof (student) <b>CARMABI</b>
Coral Reef ecosystems	Cyanobacteria on reefs	CUR	<b>UvA:</b> Petra Visser <b>CARMABI</b>
Economics of ecosystems	The Economics of Ecosystems and Biodiversity (TEEB) on Aruba	AUA	<b>Wolfs Company:</b> Esther Wolfs, Boris van Zanten <b>VU:</b> Pieter van Beukering <b>YABI consultancy:</b> Francielle Laclé
Fish	Baited Remote Underwater Video (BRUV) to study sharks	AUA	Martin de Graaf <b>Aruba Reef Care:</b> Byron Boekhoudt, Miranka van Breugel (student), Gian Nunes (student)
Interstitial fauna	Interstitial fauna of Curacao shallow marine waters	CUR	<b>Naturalis:</b> Ronald Vonk <b>Leiden University:</b> Ton Weber (student) <b>CARMABI</b>
Invasive species	Research into mitigation measures for Sargassum Seaweed	SXM	<b>NFSXM:</b> Tadzio Bervoets <b>Government of St. Maarten</b>

# Research Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Invasive species	Invasive seagrass-sea turtle interactions (*Part of NWO project: Ecology and conservation of green and hawksbill turtles in the Dutch Caribbean)	BON	<b>STCB:</b> Mabel Nava <b>RuG:</b> Marjolijn Christianen <b>WUR:</b> Lisa Becking, Miriam Loth (student), Thijs Wijckhuijsen (student)
Invasive species	Environmental DNA (eDNA) of lionfish in Lac Bay: A tool for detecting the invasive species in complex habitats (mangroves)	BON	<b>CIEE:</b> Rita Peachey <b>Indiana University:</b> Stephen Glaholt
Management	Assessment of Klein Bonaire	BON	<b>WUR:</b> Eva van Voskuijlen (Msc. student), Judith van Leeuwen <b>STINAPA:</b> Wijnand de Wolf
Mangrove ecosystems	Pilot-scale testing and evaluation of mangrove ecosystem intervention options (fish fauna, epibionts on mangrove prop roots) *Part of Natuurgelden Project: Ecological restoration Lac Bay and South coast, Bonaire	BON	<b>WUR:</b> Dolfi Debrot, Lisa Becking, Franka de Raad (student), Yorick de Beer (student) and Renate Reitsma (student) <b>STINAPA:</b> Sabine Engel <b>DRO</b>
Molluscs	Conch ecology	CUR	<b>NIOZ:</b> Fleur van Duyl
Nature Policy Planning	Developing a nature policy plan for Bonaire	BON	<b>Wolfs Company:</b> Boris van Zanten, Esther Wolfs <b>DRO</b>
Plants	Germination of seeds of indigenous trees of Curacao	CUR	<b>CARMABI:</b> John de Freitas
Plants	Testing effective ways to grow native plants	BON	<b>Echo:</b> Quirijn Coolen, Johan van Blerk
Zooplankton	UV light effects on zooplankton diversity and density in Lac Bay	BON	<b>CIEE:</b> Rita Peachey, Sara Buckley, James Emm

# Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Coral Reef Ecosystems	Deep Reef Observation Project (DROP) (ARMS: Autonomous Reef Monitoring Structures)	CUR	<b>Smithsonian:</b> Carole Baldwin
Coral Reef Ecosystems	Environmental factors driving recruitment success in Caribbean corals	CUR	<b>UvA:</b> Valerie Chamberland (PhD candidate) <b>CARMABI</b> <b>SCORE International</b>
Coral Reef Ecosystems	Bioerosion of reefs by coral-excavating sponges	BON,CUR, SAB, EUX	<b>NIOZ:</b> Fleur van Duyl <b>WUR:</b> Erik Meesters, Didier de Bakker (PhD student)
Coral Reef Ecosystems	Development of restoration methods for threatened Caribbean coral species	BON, CUR, SAB	<b>CRF Bonaire:</b> Augusto Montbrun, Francesca Virdis <b>SCORE Project</b> <b>CARMABI:</b> Mark Vermeij <b>UvA:</b> Valerie Chamberland (PhD candidate) <b>SCF, Sea Saba, Samford University:</b> Jennifer Rahn
Coral Reef Ecosystems	Developing a plan to manage the waters around Curaçao sustainably, profitably, and enjoyably for this and future generations - including mesophotic reef dropcam project	CUR	<b>Waait Institute (Blue Halo Curaçao):</b> Kathryn Mengerink
Database	Dutch Caribbean Species Catalog: Taxonomic knowledge system Dutch Caribbean ( <a href="http://www.dutchcaribbeanspecies.org/">http://www.dutchcaribbeanspecies.org/</a> )	All	<b>Naturalis:</b> Sander Pieterse & Berry van der Hoorn
Environmental	Sustainable ecosystem management and use by marine communities in two exemplary regions (TripleP@Sea Program)	BON, EUX	<b>WUR:</b> Linde van Bets (PhD student); Arthur Mol, Jan van Tatenhove; Machiel Lamers <b>WUR:</b> Han Lindeboom <b>CNSI</b>
Environmental	Effects of dispersants on the fate of oil in realistic conditions (C-IMAGE consortium, TripleP@Sea Program)	EUX	<b>WUR:</b> Tinka Murk, Marieke Zeinstra-Helfrich (PhD student) <b>CNSI</b>
Environmental	Ecotoxicological aspects of rational application of chemicals in response to oil spills to reduce environmental damage (C-IMAGE consortium, TripleP@Sea Program)	EUX	<b>WUR:</b> Tinka Murk, Justine van Eenennaam (PhD student) <b>CNSI</b>
Environmental	Ecotoxicological aspects of rational application of chemicals in response to oil spills to reduce environmental damage Development of an area specific net environmental and economic benefit analysis (NEEBA) to support oil spill mitigation decisions; with St. Eustatius as example	EUX	<b>WUR:</b> Tinka Murk, Sophie Vonk (PhD student) Lei Wageningen UR: Stijn Reinhard <b>CNSI</b>

# Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Interstitial biodiversity	Moleculair biodiversity analysis of marine communities by metabarcoding	EUX	<b>Naturalis:</b> Arjen speksnijder <b>ANEMOON:</b> Niels Schrieken
Invasive species	Combatting the economic and ecological impacts of overgrazing on inhabited islands	BON	<b>UsA:</b> Michaela Roberts (PhD student)
Marine ecosystems	Taxonomy and biodiversity in Lac Bay	BON	<b>STINAPA</b> Sabine Engel, Caren Eckrich <b>Ecosub:</b> Godfried van Moorsel <b>CEAB:</b> Daniel Martin
Marine ecosystems	Marine species discoveries in the Dutch Caribbean	All	<b>Naturalis:</b> Bert Hoeksema <b>CNSI</b> <b>CARMABI</b>
Molluscs	Population dynamics and role in the food chain of the Queen Conch <i>Lobatus gigas</i> in the Dutch Caribbean Territories	EUX, SAB	<b>WUR:</b> Aad Smaal, Leo Nagelkerke, Martin de Graaf Erik Boman (PhD student) <b>SCF (SBMU)</b> <b>CNSI</b>
Public Health	DNA waterscan: Monitoring disease vectors in the Caribbean (mosquitoes and midges)	EUX	<b>Naturalis:</b> Kevin Beentjes <b>ECPHF:</b> Teresa Leslie
Sustainability	Sustainable development Dutch Caribbean (TripleP@Sea Program) - Are human activities a risk for ecosystem services? - Green Statia or how to regain balance between nature and agriculture?	EUX	<b>WUR:</b> Diana Slijkerman <b>WUR (Alterra):</b> Rene Henkens <b>CNSI</b>
Terrestrial biodiversity	Baseline assessment and DNA barcoding of specimens	EUX	<b>Naturalis:</b> Michael Stech, Berry van der Hoorn <b>STENAPA</b> <b>CNSI</b>
Terrestrial biodiversity	Testing surrogates to establish conservation priorities	EUX	<b>Naturalis:</b> Jeremy Miller <b>STENAPA</b>

# Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
NWO Projects in the Dutch Caribbean			
Bioproducts	Stand-alone production of algal products for food, feed, chemicals and fuels	BON	<b>WUR:</b> R.H. Wijffels <b>CIEE:</b> Rita Peachey
Coral Reef Ecosystems	Caribbean coral reef ecosystems: interactions of anthropogenic ocean acidification and eutrophication with bioerosion by coral excavating sponges - Bioerosion and climate change	BON, SAB, EUX	<b>NIOZ:</b> Fleur van Duyl, Steven van Heuzen (PostDoc), Alice Webb (PhD student) <b>STENAPA</b> <b>CNSI</b>
Environmental	Caribbean island biogeography meets the anthropocene	AUA, BON, CUR, EUX, SXM	<b>VU:</b> Jacintha Ellers, Matt Helmus, Wendy Jesse (PhD Student), Jocelyn Behm (Postdoc) <b>CNSI</b>
Environmental psychology	Confronting Caribbean Challenges: Hybrid Identities and Governance in Small-scale Island Jurisdictions - Behavioral differences between/within the BES islands when it comes to nature conservation and cultural heritage.	BON, SAB, EUX	<b>KITLV, Leiden University:</b> Gert Oostindie (Project director) <b>KITLV, Leiden University:</b> Stacey Mac Donald (PhD student)
Geosciences	Stability of Caribbean coastal ecosystems under future extreme sea level changes (SCENES) - The effects of climate change on calcifying algae	BON, EUX, SXM	<b>UU:</b> Henk Dijkstra, <b>NIOZ:</b> Peter Herman, Rebecca James (PhD student) <b>TU Delft:</b> Julie Pietrzak <b>STENAPA</b> <b>CNSI</b>
Geomorphological	4D crust-mantle modelling of the eastern Caribbean region: toward coupling deep driving processes to surface evolution - Reconstructing past climate change	EUX	<b>UU:</b> Wim Spakman <b>NIOZ:</b> Lennart de Nooijer <b>Alfred Wegener Institute Germany</b> <b>CNSI</b>
Invasive species	Exotic plant species in the Caribbean: foreign foes or alien allies? (1) Socio-economic impacts of invasive plant species (2) Ecological impacts of invasive plant species-Utrecht University	BON, SAB, EUX	<b>(1) UU:</b> Jetske Vaas (PhD student), Peter Driessen, Frank van Laerhoven and Mendel Giezen <b>(2) UU:</b> Elizabeth Haber (PhD student), Martin Wassen, Max Rietkerk, Maarten Eppinga. <b>CNSI</b>

# Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Reptiles	Ecology and conservation of green and hawksbill turtles in the Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	<b>RuG:</b> Per Palsbøll, Marjolijn Christianen, Jurjan van der Zee (PhD student) <b>WUR:</b> Lisa Becking <b>STCB:</b> Mabel Nava <b>CARMABI</b> <b>STENAPA</b> <b>CNSI</b>
BO-projects in the Dutch Caribbean (Min EZ)			
Coral Reef Ecosystems	BO-11-019.02-038– Analysis photomaterial coral reefs	BON, CUR	<b>WUR:</b> Erik Meesters
Coral Reef Ecosystems	BO-11-019.02-022 –Inventory corals Includes monitoring and research of the longest coral reef time-series in the world (since 1973)	BON, CUR	<b>WUR:</b> Erik Meesters
Conservation	BO-11-019.02-060 – Status of nature conservation of the Caribbean Netherlands (for new nature policy plan)	BON, SAB, EUX	<b>WUR:</b> Dolfi Debrot
DCBD	BO-11-019.02-002 - Expansion knowledge system Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	<b>WUR (Alterra):</b> Peter Verweij
Fisheries	BO-11-019.02-055 – Fisheries Dutch Caribbean	SAB, EUX	<b>WUR:</b> Dolfi Debrot
Marine biodiversity	BO-11-019.02-008 – Saba Bank – Marine biodiversity	SAB	<b>WUR:</b> Erik Meesters
Marine mammals & sharks	BO-11-019.02-054 – Yarari marine mammal and shark sanctuary	BON, SAB	<b>WUR:</b> Dolfi Debrot

# Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
World Heritage nomination	BO-11-019.02-050 – World Heritage nomination Bonaire National Marine Park	BON	<b>WUR:</b> Dolfi Debrot
“Nature Fund” Projects in the Dutch Caribbean (Min EZ)	See page 4-8		
EU-BEST funded Projects in the Dutch Caribbean			
Marine ecosystems	Marine Park Aruba	AUA	<b>Directie Natuur en Milieu:</b> Gisbert Boekhoudt <b>TNO:</b> Kris Kats
Coral Reef Ecosystems	Restoration Ecosystem Services and Coral Reef Quality (Project RESCQ)	SAB, EUX, SXM	<b>WUR:</b> Erik Meesters <b>SCF</b> <b>STENAPA</b> <b>NFSXM</b> <b>Turks &amp; Caicos Reef Fund</b> <b>Students:</b> Niels Wagenaar, Silvan Allard, Pam Engelberts, Roxanne Francisca, Lotte Staat, Carmen Carpendale, Daniela Simal, Emma Louise Pratt, Renate Olie, Amber Mulder
Conservation	Watershed & Biodiversity Conservation of Roi Sangu valley	BON	<b>Echo:</b> Lauren Schmaltz

# Monitoring Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Birds	Flamingo Abundance	BON	<b>DRO:</b> Frank van Slobbe <b>Cargill</b> <b>STINAPA:</b> Paulo Bertuol
Birds	Monitoring vulnerable parrot nests (remote camera sensing work)	BON	<b>Echo:</b> Nathan Schmaltz
Birds	Yellow-shouldered Amazon parrot roost counts	BON	<b>Echo:</b> Lauren Schmaltz <b>DROB:</b> Peter Montanus <b>STINAPA:</b> Paulo Bertuol
Birds	Bird Monitoring (Caribbean Waterbird Census)	AUA BON	<b>FPNA</b> <b>DLVV:</b> Tatiana Becker <b>STINAPA:</b> Paulo Bertuol
Birds	Tern monitoring (artificial nesting islands)	BON	<b>STINAPA:</b> Paulo Bertuol <b>Cargill</b> <b>DROB</b> <b>WUR:</b> Dolfi Debrot
Birds	Terrestrial Bird Monitoring Program for Bonaire	BON	<b>Echo:</b> Nathan Schmaltz <b>STINAPA</b>
Birds	Red-billed Tropicbird monitoring	SAB EUX	<b>STENAPA</b> <b>SCF:</b> Kai Wulf <b>WUR:</b> Dolfi Debrot
Birds	Pelican monitoring	SXM	<b>NFSXM:</b> Melanie Meijer zu Schlochtern
Coral reef ecosystems	Coral Bleaching Monitoring	SXM	<b>NFSXM:</b> Tadzio Bervoets

# Monitoring Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Coral reef ecosystems	Global Coral Reef Monitoring Network	BON CUR SAB EUX SXM	<b>STINAPA:</b> Caren Eckrich <b>CARMABI:</b> Mark Vermeij <b>SCF (SBMU):</b> Jens Odinga <b>STENAPA:</b> Jessica Berkel <b>NFSXM:</b> Tadzio Bervoets <b>CNSI</b>
Corals reef ecosystems	Doobies Crack reef damage recovery survey	EUX	<b>STENAPA:</b> Erik Houtepen
Corals reef ecosystems	Staghorn coral field monitoring survey	EUX	<b>STENAPA:</b> Jessica Berkel
Coral reef ecosystems	Monitoring and research of the longest coral reef time-series in the world (since 1973) (Part of BO-11-019.02-022 –Inventory corals)	BON CUR	<b>WUR:</b> Erik Meesters, Didier de Bakker (PhD student) <b>NIOZ:</b> Fleur van Duyl, Rolf Bak
Ecosystems	Seagrass and mangrove monitoring (BON: also conch and benthic fauna)	BON SXM	<b>STINAPA:</b> Sabine Engel, Caren Eckrich <b>WUR:</b> Klaas Metselaar <b>NFSXM:</b> Tadzio Bervoets
Environmental	Water quality testing	SXM	<b>NFSXM:</b> Tadzio Bervoets <b>EPIC:</b> Natalia Collier
Environmental	Nutrient (phosphate, ammonium, nitrate and nitrite) monitoring St Eustatius' coastal waters	EUX	<b>CNSI:</b> Johan Stapel
Fish	Shark monitoring: -Shark sightings - Shark Abundance, distribution and movements (tagging, acoustic telemetry)	BON CUR SAB SXM EUX	<b>WUR:</b> Martin de Graaf, Erwin Winter <b>STINAPA:</b> Caren Eckrich <b>CARMABI:</b> Mark Vermeij <b>SCF(SBMU):</b> Jens Odinga <b>STENAPA:</b> Jessica Berkel <b>NFSXM:</b> Tadzio Bervoets
Fish	Spawning monitoring: Red hind surveys on Moonfish Bank	SAB	<b>SCF (SBMU):</b> Jens Odinga <b>WUR:</b> Martin de Graaf
Insects	Bee tracking	BON	<b>Echo:</b> Nathan Schmaltz

# Monitoring Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Invasive species	Goat and/or donkey removal: -Washington Slagbaai National Park - Lac Bay area (exclusion plots) - Quill National Park (exclusion plots)	BON EUX	<b>STINAPA</b> <b>WUR:</b> Dolfi Debrot <b>DROB</b> <b>STENAPA</b>
Invasive species	Lionfish abundance and control	BON CUR SXM SAB EUX	<b>STINAPA:</b> Paulo Bertuol (50 meter traps) <b>CARMABI:</b> Mark Vermeij <b>NFSXM:</b> Tazio Bervoets <b>SCF (SBMU):</b> Jens Odinga <b>STENAPA:</b> Jessica Berkel
Invasive species	Monkey Monitoring: abundance and distribution	SXM	<b>NFSXM:</b> Tazio Bervoets
Invasive species	Feral pig population assesment (trapping)	BON	<b>Echo:</b> Nathan Schmaltz, Sam Williams <b>UsA:</b> Michaela Roberts
Mammals	Bat monitoring	AUA BON	<b>FPNA</b> <b>WildConscience:</b> Fernando Simal, Linda Garcia
Mammals	Dolphin monitoring (since 1999)	BON	Ron Sewell
Mammals	Caribbean Humpback Acoustic Monitoring Programme (CHAMP)	BON, AUA	<b>NOAA:</b> Heather Heenehan, Sofie Van Parijs, Peter Corkeron, Fred Wenzel <b>STINAPA:</b> Wijnand de Wolf <b>AMMF:</b> Angiolina Henriquez <b>RCN:</b> Paul Hoetjes
Mammals	Marine Mammal Monitoring (noise loggers Saba Bank)	SAB	<b>WUR:</b> Dick de Haan <b>SCF (SBMU):</b> Jens Odinga
Molluscs	Conch ( <i>Strombus gigas</i> ) on St. Eustatius, Saba Bank, Anguilla	SAB EUX	<b>WUR:</b> Martin de Graaf, Erik Boman (PhD student) <b>SCF (SBMU):</b> Jens Odinga

# Monitoring Overview

February - March 2017

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Natural resource use	Fishery monitoring (including lionfish, shark bycatch and marine mammal sightings)	SAB EUX	<b>WUR:</b> Martin de Graaf <b>SCF (SBMU):</b> Jens Odinga <b>Gem City Consulting:</b> Erik Boman
Plants	Reforestation Klein Bonaire	BON	<b>STINAPA:</b> Johan van Blerk
Plants	Phenology of bats in cacti landscapes of Aruba	AUA	<b>WildConscience:</b> Linda Garcia, FPNA
Reptiles	Lesser Antillean Iguana: Monitoring population density & removing invasive Green Iguana and hybrids	EUX	<b>STENAPA</b> <b>RAVON:</b> Tim van Wagenveld <b>EcoPro:</b> Hannah Madden
Reptiles	Boa and Cascabel Monitoring	AUA	<b>FPNA, Toledo Zoological Society:</b> Andrew Odum
Reptiles	Sea turtle monitoring: -Satellite tracking -Nest monitoring -In water surveys (BON, CUR, SXM) -Fibropapillomatosis presence (BON)	AUA, BON, CUR, SAB, EUX, SXM	<b>TurtugAruba Foundation</b> <b>STCB:</b> Mabel Nava <b>CARMABI (STCC):</b> Sabine Berendse <b>STENAPA:</b> Jessica Berkel <b>SCF:</b> Kai Wulf <b>NFSXM:</b> Tadzio Bervoets

# List of Acronyms

AUA	Aruba
BON	Bonaire
CUR	Curaçao
SAB	Saba
EUX	St. Eustatius
SXM	St. Maarten
AERES	Agricultural, Educational, Rural, Environmental Sciences, Hogeschool in the Netherlands
AMMF	Aruba Marine Mammal Foundation
ANEMOON	Analyse Educatie en Marien Oecologisch Onderzoek
ASDF	Aruba Sustainable Development Foundation
BEST	Biodiversity and Ecosystem Services in Territories of European overseas
BO project	Policy Supporting Research project
BU	Bangor University, United Kingdom
CARMABI	Caribbean Research and Management of Biodiversity Foundation
CEAB	The Blanes Centre for Advanced Studies, Spain
CIEE	Council of International Educational Exchange, Bonaire
CRF	Coral Reef Foundation
DCNA	Dutch Caribbean Nature Alliance
DCBD	Dutch Caribbean Biodiversity Database
DRO	Directorate of Spatial Planning and Development, Bonaire
DLVV (Santa Rosa)	Department of Agriculture, Livestock, Fishery and Farmers market (Santa Rosa), Aruba
EcoPro	Ecological Professionals Foundation
ECPHF	Eastern Caribbean Public Health Foundation
EPIC	Environmental Protection in the Caribbean
FPNA	Fundacion Parke Nacional Arikok, Aruba
HAS	HAS University of Applied Sciences, the Netherlands

LVV	Department of Agriculture, Animal Husbandry & Fisheries, St. Eustatius
NFSXM	Nature Foundation St. Maarten
Naturalis	Naturalis Biodiversity Center, The Netherlands
NIOZ	NIOZ Royal Institute for Sea Research, the Netherlands
NWO	NWO Netherlands Organisation for Scientific Research
RAVON	Reptielen Amfibieën Vissen Onderzoek Nederland
RuG	University of Groningen, the Netherlands
SBMU	Saba Bank Management Unit
SCF	Saba Conservation Foundation
Smithsonian	Smithsonian's National Museum of Natural History
STCB	Sea Turtle Conservation Bonaire
STCC	Sea Turtle Conservation Curacao
STENAPA	St. Eustatius National Parks Foundation
STINAPA	National Parks Foundation Bonaire
TUD	Delft University of Technology, the Netherlands
UsA	University of St. Andrews, Scotland
UU	University of Utrecht, the Netherlands
UvA	University of Amsterdam, the Netherland
VHL	University of Applied Sciences VHL, the Netherlands
VU	VU University Amsterdam, the Netherlands
Wildconscience	Wildlife Conservation, Science and Education
WNF	World Wide Fund for Nature
WUR	Wageningen University and Research Centre, the Netherlands
WUR (Alterra)	Wageningen Environmental Research, the Netherlands



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# Reports and Publications Overview

Below you will find an overview of the reports and publications on biodiversity related subjects in the Dutch Caribbean that have recently been published.

## **"Bjorndal et al. (2017)**

Ecological regime shift drives declining growth rates of sea turtles throughout the West Atlantic, *Global Change Biology*, doi: 10.1111/gcb.13712"

**"Calhoun, S.K., Haas, A.F., Takeshita, Y., Johnson, M.D., Fox, M.D., Kelly, E.L.A., Mueller, B., Vermeij, M.J.A., Kelly, L.W., Nelson, C.E., Price, N.N., Roach, T.N.F., Rohwer, F.L., Smith, J.E. (2017)**  
Exploring the occurrence of and explanations for nighttime spikes in dissolved oxygen across coral reef environments. *PeerJ Preprints* 5:e2935v1."

## **Chatfield-Taylor, W. (2017)**

Caribbean Audubon's shearwaters puffinus Lherminieri choose nesting locations that improve male and female pre-laying exodus foraging strategies, *Marine Ornithology* 45: 103–106.

## **"Derek, R.R.W.M.(2016)**

The history of resource exploitation in Aruba, *Landscape series* 2."

## **"Griffith, M.P., de Freitas, J., Barros, M., Noblick, L.R. (2017)**

*Sabal antillensis* (Arecaceae): a new palmetto species from the Leeward Antilles, *Phytotaxa* 303 (1): 056-064."

## **"Mueller, B. (2017)**

First documentation of encrusting specimen of *Cliona delitrix* on Curaçao: a cause for concern?, *Marine Biodiversity Records*"

## **"Nagelkerken, I., Huebert, K.B., Serafy, J.E., Grol, M.G.G., Dorenbosch, M., Bradshaw, C.J.A. (2017)**

Highly localized replenishment of coral reef fish populations near nursery habitats, *Mar Ecol Prog Ser* (568): 137-150."

## **"Reijnen, B.T., van der Meij, S.E.T. (2017)**

Coat of many colours - DNA reveals polymorphism of mantle patterns and colouration in Caribbean *Cyphoma Röding*, 1798 (Gastropoda, Ovulidae). *PeerJ* 5: e3018."

## **"Trembanis, A.C., Forrest, A., Keller, B., Patterson, M. (2017)**

Mesophotic coral ecosystems: a geoaoustically derived proxy for habitat and relative diversity for the leeward shelf of Bonaire, Dutch Caribbean. *Frontiers in Marine Science*, 4, 51."

## **"Villamizar G., E.Y., Cervigón, F. (2017)**

Variability and sustainability of the Southern Subarea of the Caribbean Sea large marine ecosystem, *Environmental Development*, <http://dx.doi.org/10.1016/j.envdev.2017.02.005>"

## Student Reports

### **"Ruijs, N. (student) & M. De Graaf (student) (2017)**

Baited Remote Underwater Video (BRUV) survey of elasmobranchs on Bonaire's reef"

### **"George, E.E. (Msc. student) (2016)**

Coral Reef Geometry wars: using coral geometry to predict coral competitive outcomes "

These reports and publications can be found in the Dutch Caribbean Biodiversity Database (DCBD) (<http://www.dcbd.nl>). The DCBD is a central online storage facility for all biodiversity and conservation related information in the Dutch Caribbean.

If you have research and monitoring data, the DCNA secretariat can help you to get it housed in the Dutch Caribbean Biodiversity Database (DCBD). Please e-mail us: [research@DCNAnature.org](mailto:research@DCNAnature.org)



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# Calendar

## May

20	Event	Endangered Species Day
22	Event	International Day for Biological Diversity
22-26	Event	38th Scientific Conference, Association of Marine Laboratories in the Caribbean, Yucantán, Mexico

## June

3-11	Event	Dutch Caribbean Shark Week (Save Our Sharks Project)
4	Event	Open House Washington-Slagbaai National Park, STINAPA, Bonaire
5	Event	World Environmental Day
8	Event	World Oceans Day
13-16	Congress	9th Mexican Coral Reef Congress, Chetumal, Quintana Roo, Mexico
16	Event	World Sea Turtle Day
28-30	Conference	8th Conference of Parties of the IAC, Buenos Aires, Argentina

## July

14-Oct	Conference	"Island Invasives Conference, Dalhousie Building, University of Dundee, Scotland ( <a href="http://www.islandinvasives2017.com">http://www.islandinvasives2017.com</a> )"
17-21	Workshop	R statistical programming for biological science, CARMABI, Curacao

## August

5-12	Workshop	Coral Reef Ecology Workshop Series, Bonaire (Dream Weaver Travel)
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## September

4	Congress	4th International Marine Protected Areas Congress (IMPAC4), La Serena-Coquimbo, Chile
6	Vacation	Bonairedag

**More events to add to this calendar?**  
Please e-mail us: [research@DCNAnature.org](mailto:research@DCNAnature.org)



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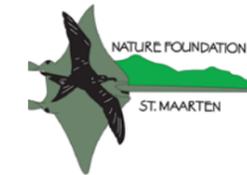
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