

BIONEWS

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Editor's Letter

Dutch Caribbean, July 2018

Every year on Bonaire, dozens of dedicated volunteers wake up before dawn with one simple but important mission: count as many yellow-shouldered parrots (*Amazona barbadensis rothschildi*) as possible. In this BioNews edition we published an article on this year's twenty-third Lora count, which has been organized by Echo Bonaire with the help of STINAPA Bonaire and Bonaire's Department of Environment and Nature. In this article we also present the recent findings of another study by Rivera-Milán et al. in collaboration with STINAPA, US Fish and Wildlife Service and WILDCONSCIOUS on the population assessment of yellow-shouldered parrots on Bonaire.

Coral reefs in the Wider Caribbean Region have suffered considerable declines in health and abundance in recent decades. Climate change, overfishing and eutrophication seem to be the main drivers of the degradation of our reefs for the last decades. However, international scientists claim that impaired water quality by chemicals such as the UV filter oxybenzone in sunscreen products adds to the problems of already stressed reefs which undermines their resilience and ability to withstand and recover from e.g. global warming related impacts. Therefore, Wageningen Marine Research, Boneiru Duradero and World

Wide Fund for Nature the Netherlands started a project on Bonaire. In this edition of BioNews you can read about their recent Sunscreen Awareness Conference and their results on how to move towards an oxybenzone-free island.

We also proudly present the findings of several recent research projects that recently investigated the marine and terrestrial mollusc fauna of Aruba, Bonaire, Curaçao, Saba and St. Eustatius. What transpires is that the mollusc fauna of these islands is much richer than previously thought, with many rare and endemic species. The biodiversity of the Dutch Caribbean Islands is already recognized as rich and unique, but the findings on the islands' malacofauna indicate that there is still much to discover.

Lastly University of Applied Sciences Van Hall Larenstein (HVHL) invites you to the third annual AcroporaNet Symposium to be held in Leeuwarden, the Netherlands, on December 7th, 2018: A platform for scientists conducting fundamental and applied research into tropical marine biology.

Happy reading!
The DCNA Team

Bonaire's Yearly Parrot Count

Every year on Bonaire, dozens of dedicated volunteers wake up before dawn with one simple but important mission: count as many yellow-shouldered parrots (*Amazona barbadensis rothschildi*), or Loras as they are locally known in Papiamentu, as possible to estimate their numbers. This year marks Bonaire's twenty-third Lora count, which was organized by Echo Bonaire with the help of STINAPA Bonaire and Bonaire's Department of Environment and Nature (DRO). The Lora count started in 1980 and has contributed to the protection of this endangered and endemic sub-species of parrot.

The yearly monitoring event of Bonaire's yellow-shouldered parrots is made possible thanks to the contribution of volunteers. By involving locals in monitoring efforts, the count helps increase local awareness of the need to protect one of Bonaire's most iconic species. These citizen scientists receive training prior to the count to ensure that they can perform the tally to the best of their ability. This also helps guarantee that volunteers all apply the same methodology and know directions to the monitoring site they have been designated. As Loras are sometimes confused with brown-throated parakeets (*Aratinga pertinax*), volunteers are taught how to identify the parrots visually and vocally. Pre-roost counts begin in early January to work out how many volunteers will be needed per roost site on the day of the count. Newly identified roosts and those that have become re-active are added to the annual count.

When the last Saturday of January comes along it is time for the actual count to take place. Volunteers that have prior experience are sent to the most important roost sites. Each team has at least two counters so that data logged may be cross-checked.

The methodology used is simultaneous counting, during which all volunteers count the parrots at the same time in different places. Volunteers leave home before dusk to their designated site, wearing dark clothes to ensure minimal disturbance to the birds and are equipped with a

compass, binoculars and a watch. Once the Loras wake up, shrieking loud and flying up, the volunteers begin to fill out the data collection sheet. They record the number of observed parrots, their point of departure, flight direction, destination and time at which this happened, and complete an observation map. Once all the data has been collected, the organizers of the Lora count tally up the numbers to estimate the minimum number of Loras present at the surveyed roosts.

The yellow-shouldered parrot has a limited and distinct range with genetically isolated populations in Bonaire and Curaçao as well as northern Venezuela and the Venezuelan islands of Margarita and La Blanquilla. This parrot is endangered with a global population estimated at less than 8,000 individuals, and is classified by the IUCN Red List as Vulnerable (Birdlife International, 2018). On Bonaire, the population was once close to extinction due to poaching and habitat degradation. Therefore in 2002 DRO ringed and registered all existing pet Loras. Anyone after this campaign found in possession of an unringed parrot faces prosecution. Thanks to concerted and continued conservation efforts, legal protection and enforcement – the Lora receives local protection under the Island's Nature Ordinance - the yellow-shouldered parrot is now considered a flagship species for the island's dry forest ecosystem. The local non-profit organization Echo is working hard to protect the parrots on the island, find out more about their behavior and increase local awareness.

Information gathered over the years, thanks to the annual Lora count, suggests that the number of parrots at the surveyed roosts on Bonaire is increasing steadily. While numbers of parrots counted has fluctuated each year, the overall trend seems an upward one and, even though not statistically proven, might be related to the start of conservation efforts on the island, including population monitoring (Echo, STINAPA, DRO, Salba Nos Lora), nest site management (Echo), awareness campaign (STINAPA, Echo, Salba Nos Lora), rescue and release of injured birds (Echo),

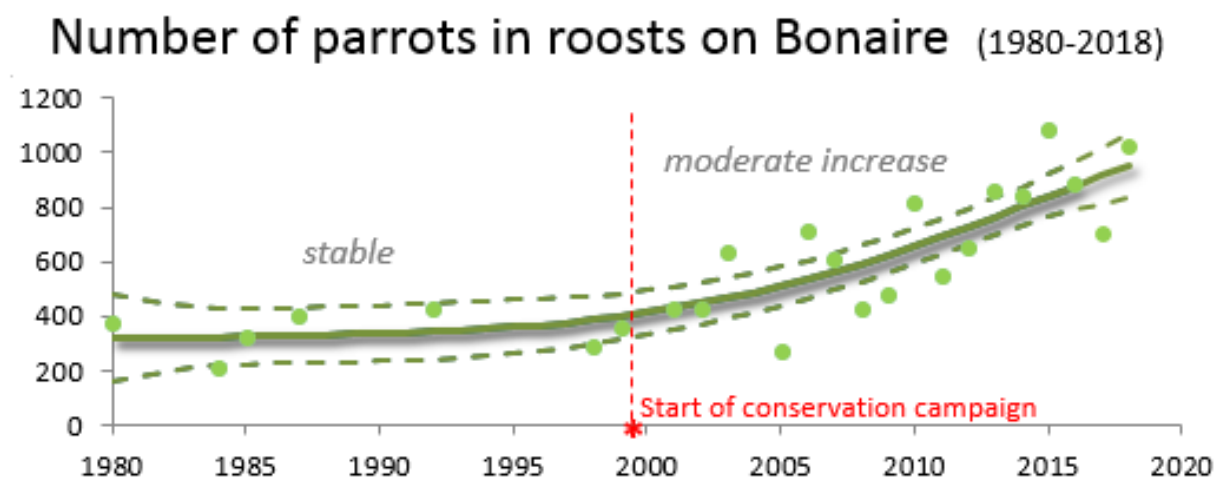
enforcement of protected status (STINAPA, Echo) and tree planting (Echo and Salba Nos Lora) [Graph 1]. In 2017, however, the number of Loras recorded was significantly lower than usual, with 700 Loras counted as opposed to 1,000 in previous years (Echo, 2017). It is speculated that this drop in numbers may not have been the result of fewer parrots on the island, but could be caused by a long period of drought followed by heavy rains that caused the parrots to spread out more across the island, making them harder to observe and count. Weather and food supply have been known to drastically affect the count and parrots periodically change roost locations. In the area of Sabadeco, just 11 parrots were counted compared to the previous year's 229, while in the Washington Slagbaai National Park, just 50 birds were recorded (Echo, 2017). This unpredictable behavior of the Loras makes it challenging for the participating volunteers to count them each year (Echo, 2017).

Recently, a study by Rivera-Milán et al. (accepted for publication) in collaboration with STINAPA, US Fish and Wildlife Service and

WILDCONSCIOUS found other results. Their systematic distance-sampling surveys in 2009-2017 show a slight decline in the population estimate for Lora's in Bonaire over the past years most probably because of the drought, although other factors cannot be discarded including an increase in human-induced mortality. They also conducted Bayesian state-space logistic model simulations to predict changes in abundance in 2018-2066. Rivera-Milán et al. consider Bonaire's parrot population vulnerable to the risk of extinction. That said, the parrot population has an estimated maximum population growth rate of 0.179 and under favorable conditions (consecutive wet years with food abundance, and low human-induced mortality) can recover through high survival and successful reproduction. As different methods are used, the involved organizations are now discussing the methodologies and possibility for cooperation with the same goal: adequately monitor the Loras to assess changes in abundance and the results of conservation actions taken to safeguard these parrots on Bonaire.

ⁱ Salba Nos Lora is no longer an active organization.

Graph 1: Population dynamics of the Yellow-shouldered Amazon parrot based on data collected by the yearly Lora count



The green dots on the graph show the actual annual population counts, while the green lines represent the trendlines (average, minimum and maximum) associated with it.

Would you like to share a news item?

Please e-mail us: research@DCNAnature.org

Sunscreen Awareness Bonaire

Moving towards an oxybenzone-free island

By Diana Slijkerman (WMR) & Sharon Bol (BD)

Wageningen Marine Research (WMR) and Boneiru Duradero (BD) supported by World Wide Fund for Nature the Netherlands (WWF-NL) organised a Sunscreen Awareness Conference, on March 21st 2018, inviting stakeholders from the government, NGO's and tourism sector on Bonaire to participate. The goal of the conference was twofold:

- 1. Educate participants about international sunscreen research and the studies that were implemented on Bonaire.**
- 2. Create "buy-in" and create partnerships by engaging stakeholders to develop an island wide sunscreen strategy for Bonaire.**

The conference started with a presentation by Diana Slijkerman (WMR), to inform participants on international sunscreen research and the studies that were implemented on Bonaire. Sunscreen research is relatively new and still ongoing, but one thing is very clear: the UV-filter oxybenzone has been identified as the major "culprit" harming corals.

Studies done in 2016 and 2017 on Bonaire showed that UV filters from sunscreens are present in the water of Lac Bay at levels that cannot exclude environmental effects on the organisms in the highly valuable ecosystems. The latest study also included nearly 400 interviews among beachgoers on Sorobon, asking the tourists where they are from, what sunscreen products they use, and whether or not it includes oxybenzone. Although the study was indicative, UV-filter levels and thus environmental risk seem to be related to tourist intensity, country of origin and product use. The levels of oxybenzone found in water samples were higher when more beachgoers used oxybenzone-products. These tourists, predominantly cruise tourists, were mostly originating from the US. Stay-over tourists from the EU show a relatively limited use of oxybenzone-based sunscreen products.

Dr. Slijkerman's problem analyses made clear that sunscreen pollution is neither the biggest nor the only threat to coral reefs. Climate change, over-fishing and eutrophication are the main drivers of the degradation of our reefs for the last decades. However, impaired water quality by chemicals such as UV filters adds to the problems of already stressed reefs which undermines their resilience and ability to withstand and recover from e.g. global warming related impacts.

Although not studied extensively, international scientist claim that sunscreen products containing UV-filters based on zinc and titanium are better alternatives. A positive and clear action perspective on the local scale makes it possible to improve water quality in order to make reefs more resilient.

Participants of the sunscreen conference agreed on the clear action perspective. *"When we convince tourists on Bonaire to use sunscreens without oxybenzone, every swimmer, snorkeler and diver can contribute to the improvement of water quality today"* Sharon Bol says.

There was a general consensus among all participants that action should be taken on Bonaire concerning potentially harmful sunscreens. The attendees of the conference participated in a lively discussion, and the following paths forward were identified:

- 1. Legal ban of oxybenzone-containing products.*
- 2. Changing consumer behaviour.*
- 3. An environmental tax for cruise tourist.*

Representatives from the tourism sector were mostly in favour of a legal ban. They feel that a legal ban on the UV-filter oxybenzone will make it easier to convince their customers of the harmful impact of sunscreens to our reef. In contrast, most NGO's and members of the government are opposed to a ban. They have concerns about the feasibility. In the first place, it would be very difficult to build a legal framework that covers all



Sunscreen Awareness Bonaire

arguments. Enforcement would also be an issue: *"We could try to prohibit the sale of sunscreens with oxybenzone on Bonaire, but it is impossible to control the sunscreen products tourists bring from home"*. A rule in the Bonaire National Marine Park management plan could, however, strengthen the communication about the subject.

The solution for reducing impact of sunscreens on the reef is largely connected to behavioural change. It is as simple as avoiding sunscreens with oxybenzone. That is why most participants of the sunscreen conference viewed awareness as the best way to move forward. Moreover, an awareness campaign can be implemented much faster than a law. Another advantage of sunscreen awareness is that it can help to reinforce Bonaire's positioning on the "vacation market". After all, we are striving to be a sustainable island. Participants agreed unanimously that there is a positive and clear action perspective. WMR and BD are in the process of developing communication materials for an island wide awareness campaign. This includes an educational poster and an animation video that should educate tourists and inhabitants on Bonaire about the effect that sunscreens with the UV-filter oxybenzone can have on corals.

The informative poster was finalised using the participants inputs, and distributed among dive shops and supermarkets. The online artwork of the poster reached 35.000 people through Facebook. The animation was also launched online and had 5000 views. It could be promoted further e.g. via Tourist TV and TV screens at airport, in hotel lobbies and restaurants.

The fact that cruise tourists do not pay *any fee* for the use of the marine park is a concern to most participants of the sunscreen conference. Stay-over tourists and other users of the marine park pay an annual fee of 10 USD for water activities such as swimming or bathing but cruise tourists don't have to pay. Since cruise tourists that enter Bonaire's sea attribute to the decreased water quality too, an environmental tax for cruise ship visitors should be considered. This tax would allow Bonaire to continually fund awareness campaigns, educating tourists about the use of sunscreens and the unique value of Bonaire's coral reefs. Most importantly is that the cruise sector has to

be engaged, on a strategic island level. Cruise tourists should be made aware of the unique quality of Bonaire's nature and the fact that they are visiting protected areas. Furthermore, they should be informed NOT to bring oxybenzone-sunscreens to Bonaire while booking their trip.

During the conference, many remarks and questions were brought into the lively discussion. Among many things it was argued whether or not the current law already provides us the ability to prevent the use of oxybenzone inside the Bonaire National Marine Park via a revision or addition in the marine park management plan. The urgent need for more research was also expressed. Research should focus on additional water quality monitoring, and potential levels and effects of current proposed alternatives such as zinc and titanium. The conference concluded with a list of action points and possible opportunities for island-wide cooperation.

Soon after the conference, several positive steps forward were made by the public and private sector on Bonaire. Van den Tweel Supermarket Bonaire is one of the first supermarkets on Bonaire that removed sunscreens with the UV-filter Oxybenzone from their assortment. Furthermore, Jibe City did not hesitate and switched to selling a different brand of sunscreen. And, inspired by the recent decision of Hawaii to ban harmful sunscreens, the Island Council unanimously adopted a motion calling for a ban per January 1, 2021 for sunscreen product containing oxybenzone and octinoxate. The team is willing to share their knowledge and contribute to the steps to be taken in the process that lies ahead.

Coming year, the project team goes ahead with the Sunscreen Awareness project, focusing on both remaining research topics and awareness raising via various media.

Questions and remarks? Please contact the team via: Diana.Slijkerman@wur.nl and Sharon@bolholding.com

We thank Sabine Engel (STINAPA Bonaire), Olivier Kramer and Carolyn Caporusso for their assistance and support.

Molluscs of the Dutch Caribbean Islands

The journal of the Netherlands Malacological Society, *Vita Malacologica*, dedicated its December 2017 edition to the malacofauna of the Dutch Caribbean¹. The three articles presented in the edition report on the findings of several research projects that recently investigated the marine and terrestrial mollusc fauna of Saba, St. Eustatius and the ABC Islands (Aruba, Bonaire, and Curaçao). What transpires is that the mollusc fauna of these islands is much richer than previously thought, with many rare and endemic species. The biodiversity of the Dutch Caribbean Islands is already recognized as rich and unique, but the findings on the islands' malacofauna indicate that there is still much to discover.

A rich mollusc fauna

While previous assessments have been made of the mollusc fauna of the Dutch Caribbean, many of these took place decades ago and are incomplete. Thanks to the dedication of the authors who recently researched the malacofauna of Saba, St. Eustatius and the ABC Islands (Hovestadt and van Leeuwen, 2017; Hewitt, 2017; Hewitt and van Leeuwen, 2017), we now have a much better grasp of just how rich this fauna is.

ABC Islands

Detailed studies of the ABC Island's terrestrial malacofauna were carried out in the first half of the 20th century (Baker, 1924; Wagenaar Hummelinck, 1940). Since then, attempts have been made to create an updated checklist of the islands' terrestrial molluscs, but these were incomplete and at times unclear (Hovestadt & De Boer, 1982 and Hovestadt, 1987). To rectify this, Hovestadt and van Leeuwen carried out a complete overview of the terrestrial malacofauna of Aruba, Bonaire, and Curaçao². They compiled information for the study through 1) fieldwork they carried out on the islands between 1979 and 2016, 2) material collected by others and identified by Hovestadt, and 3) knowledge and data derived from previous publications (Hovestadt and van Leeuwen, 2017). They found that the ABC islands have "a very rich and diverse terrestrial

malacofauna both in numbers and in taxa" with a total of 65 taxa (species and subspecies) recorded (Hovestadt and van Leeuwen, 2017). Curaçao was the most species-rich island, and Klein Curaçao the poorest. Klein Bonaire had the highest diversity of species per km².

Saba

Very little attention has been given to Saba's marine malacofauna in the past. In 2009, Rosenberg listed 17 taxa for the island, most of which were subtidal species (Hewitt, 2013). Hewitt compiled photographs and information from 2010-2012, adding 38 taxa to this list (26 gastropods, 4 bivalves, 4 chitons and 4 cephalopods), bringing the total of marine mollusc taxa for Saba to 55 (Hewitt, 2013). Hewitt subsequently obtained more information from Rüdiger Bieler and others, and added another 40 new taxa to the list. As of 2018, the total of recorded shallow-water, marine malacofauna for Saba and the Saba Bank is 95³ (Hewitt, 2017).

St. Eustatius

Prior to 2015, the marine malacofauna of St. Eustatius had seldom been explored (Coomans, 1958; Kaas, 1972; Hewitt, 2010b). In 2015, Hewitt published the most comprehensive list to date of marine molluscs which had been observed by her and others from 2000 to 2011, for a total of 183 taxa (Hewitt, 2015). Also in 2015, the St. Eustatius Marine Biodiversity Expedition, organized by Naturalis Biodiversity Center and ANEMOON Foundation, took place. This three-week expedition surveyed the island's shallow (<30m) marine fauna and flora, and presented an unparalleled opportunity to record both the underwater and shoreline molluscs of St. Eustatius.

A total of 366 mollusc species in six classes were recorded during the course of the St. Eustatius Marine Biodiversity Expedition – 300 at dive sites and 177 at coastal sites, with 113 species being found at both (Hewitt and van Leeuwen, 2017). The marine mollusc faunal list for St. Eustatius now stands at 395 species. The dive site with the greatest recorded species diversity (129 species) was STENAPA Reef, due to the exceptionally

¹ Molluscs (phylum Mollusca) are invertebrate animals that include among others snails, slugs, clams, squids and octopi.

² This includes the satellite islands of Klein Bonaire and Klein Curaçao.

³ Of the 95 species, 93 are for Saba alone.

rich sediment sample collected there. The most widespread species found at dive sites were the flamingo tongue (*Cyphoma gibbosum* f. *gibbosum*), and queen conch (*Lobatus gigas*) (Hewitt and van Leeuwen, 2017). The coastal site with the greatest species diversity (99 species) was Crooks Castle. Some of the most common intertidal species were the West Indian top snail (*Cittarium pica*), green-based tegula (*Tegula excavata*), checked nerite (*Nerita tessellata*) and the marbled chiton (*Chiton marmoratus*) (Hewitt and van Leeuwen, 2017). Dive stations yielded richer and more varied results than the coastal stations (Hewitt and van Leeuwen, 2017). The research team also collected 130 individual molluscs from 53 species for DNA sampling. This was a contribution to Naturalis Biodiversity Center's Dutch Barcoding Project, and it also helped settle some questions of identity (Hewitt and van Leeuwen, 2017).

New, rare, invasive and endemic species

All three studies yielded some very exciting discoveries, including new species for the islands and some very rare species. The ABC Islands are also a treasure-trove of endemic land snail species.

ABC Islands

Although no new species were found, two very rare species were observed on Sint Christoffelberg in Curaçao. The land snail *Guppya molengraaffi* had been observed only once before (Baker, 1924) however, nine specimens were found alive on Sint Christoffelberg. The land snail *Helicina dysoni* was recorded for the first time ever in its natural habitat on the same mountain. The uniqueness and genetic variation of the ABC Islands' malacofauna is highlighted by the large number of endemic species. In fact, 35 (20 species and 15 subspecies) of the island's 65 taxa are endemic (Hovestadt and van Leeuwen, 2017). Several endemic genera show significant variations related to their geographical distribution pattern.

All endemic species previously described by Baker (1924b) and by Hummelinck (1940c) were found again by Hovestadt and van Leeuwen (2017), meaning that none have become extinct over the past century, despite a significant increase in local threats (Hovestadt and van Leeuwen, 2017). Terrestrial molluscs typically inhabit

limestone-rich areas, and this has helped spare them from habitat loss due to the construction of resorts. Hovestadt and van Leeuwen (2017) did, however, identify one area on Curaçao which is seriously threatened by extensive mining for the building industry: Tafelberg near Santa Barbara, which is an important habitat for a number of endemic land snails (*Tudora pilsbryi*, *Tudora rupis rupis*, *Tudora r. newportensis* and *Brachypodella sanctaebarae*) (Hovestadt and van Leeuwen, 2017). Aruba appears to have the greatest decline in terrestrial mollusc species, with several species not found again, of which three are rare or/and have a restricted range (*Gastrocopta octonaria*, *Gastrocopta curacoana*, *Thysanophora crinita*).

Found on the ABC Islands were seven land snail species which had not been included in previous overviews by Baker (1924b), Wagenaar Hummelinck (1940c), and Hovestadt (1987): *Helicina fasciata fasciata*, *Leptinaria lamellata*, *Polygyra cereolus*, *Oleacina solidula*, *Bulimulus guadalupensis*, *Zachrysia provisoria* and *Lissachatina fulica* (Hovestadt and van Leeuwen, 2017). It is likely that these land snail species are introduced, and while their range is still very small, two of the species have the potential to spread rapidly and harm the islands' garden plants and agricultural produce: *Zachrysia provisoria* and *Lissachatina fulica* (Hovestadt and van Leeuwen, 2017).

Saba

Hewitt added 40 previously unreported records to the list of marine molluscs for the island, almost doubling the total. Uncommon sea snails recorded were *Polygona infundibulum*, *Hemipolygona* sp. and *Coralliophila salebrosa* (Hewitt, 2017).

St. Eustatius

Hewitt and van Leeuwen (2017) reported 207 species of marine molluscs that were new for St. Eustatius, some of which were not previously known to inhabit the Eastern Caribbean region. The recently described bivalve *Parvilucina latens* (2016) is a new record for the island and also for the Eastern Caribbean Region. It had only ever been recorded in Guadeloupe, and is therefore a 200 km range extension to the north-northwest (Hewitt and van Leeuwen, 2017). Two other new

records for the island and the Eastern Caribbean region represent much larger range extensions. The nudibranch *Melibe arianae* (2013) has only been recorded once, in Florida, USA, however, two live individuals were found at the dive site Twin Sisters, a range extension of over 2,000 km east-southeast. The invasive species *Doriprismatica sedna*, found at dive site Aquarium, is a new record for the Eastern Caribbean with a range extension of over 1,000 km to the east-southeast (Hewitt and van Leeuwen, 2017).

New observations for St. Eustatius include the sea snails *Arene tricarinata* and *Fossarus ambiguus*, the scallop species *Antillipecten antillarum* and *Caribachlamys ornata*, and the scaphopods *Polyschides tetraschistus* and *Graptacme semistriolata* (Hewitt and van Leeuwen, 2017). Numerous uncommon species were recorded, including several species that had previously not been reported, or only very rarely reported from the Eastern Caribbean ecoregion: the marine bivalve species *Gari circe*, *Pleurolucina hendersoni*, *Cratis antillensis*, *Tucetona sericata* and *T. subtilis*, the sea slugs *Elysia ornata* and *Flabellina verta*, and the sea snails *Fissurella punctata*, *Lucapina philippiana*, *Synaptocochlea picta*, *Turritella exoleta*, and *Bivetopsia rugosa* (Hewitt and van Leeuwen, 2017).

Next steps

The inventory of the malacofauna of the Dutch Caribbean is now much more comprehensive thanks to research carried out these past few years. It is, however, by no means complete.

There is still much to investigate, for example, a complete overview of the marine molluscs of the ABC islands has never been made. Improved knowledge is critical to the conservation of the islands' mollusc species, and will help identify sites that must be protected. Also the terrestrial mollusc fauna of St. Eustatius is not very well known. During the Statia Marine Expedition, a new species was discovered on the Quill. It was described as new to science and named *Glyphyalus quillensis* (De Winter, Van Leeuwen and Hovestadt, 2016). A complete overview of the terrestrial molluscs of the island is still work in progress. An inventory of the land molluscs of Saba was published in 2005 (Van Leeuwen, Boeken & Hovestadt, 2015). The marine mollusc fauna of Saba requires a great deal more investigation.

The special issue of *Vita Malacologica* on the Dutch Caribbean molluscs is available via www.conchbooks.de. A report with the preliminary results of the Statia marine expedition 2015 is available at: <http://www.repository.naturalis.nl/record/616970>.

AcroporaNet Symposium

University of Applied Sciences Van Hall Larenstein (HVHL) invites you to the third annual AcroporaNet Symposium to be held in Leeuwarden, the Netherlands, on December 7th, 2018!

AcroporaNet is a platform for scientists conducting fundamental and applied research into tropical marine biology.

HVHL welcomes all scientists, policy makers, lecturers, students and other parties interested in tropical marine ecosystems. They invite

participants to share new findings on the biology, conservation, management and sustainable use of tropical marine ecosystems during a talk or poster.

Registration is free and includes lunch and drinks. Please register via:

<https://www.hvhl.nl/acroporanet> before November 9th, 2018.

We hope to see you there!

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Birds	Suitability study and re-forestation of exclosures facilitating the Yellow-shouldered Amazon Parrots (<i>Amazona barbadensis</i>) on Bonaire	BON	Echo: Julianka Clarenda, Quirijn Coolen
Coral Reef ecosystems	Larval biology of corals and reef microbiology	CUR	Marhaverlab, Curacao: Kristen Marhaver CARMABI
Coral Reef ecosystems	Coral reproduction	CUR	CARMABI: Laurent Delvoye
Coral Restoration	3D Printing of reef restoration materials	CUR	University of Illinois: Haley Thoren CARMABI
Fish	Fish eye physiology and evolution	CUR	Smithsonian Tropical Research Institute, Panama: Michele Pierotti CARMABI
Geology	Geology of Saba and St. Eustatius	SAB EUX	VU: Pieter Vroon
Invasive species	Testing and comparing various lionfish traps to study their potential use in a directed lionfish fishery	SAB	Leiden University: Serena Rivero (student) WUR: Dolfi Debrot SCF (SBMU): Ayumi Kuramae Izioka 7Senses: Madelon van Eelderink & Evert-Jan van Hasselt
Invasive species	Research into mitigation measures for Sargassum Seaweed	SXM	NFSXM: Tadzio Bervoets Government of St. Maarten
Plants	Testing effective ways to grow native plants	BON	Echo: Quirijn Coolen, Johan van Blerk
Plants	Germination of seeds of indigenous trees of Curaçao	CUR	CARMABI: John de Freitas
Reptiles	A population assessment of the Red-bellied racer snake in The Quill-Boven National Park	EUX	UU: Kevin Verdel CNSI: Hannah Madden
Reptiles	The impact of recreational SCUBA divers on the abundance of sea turtles (Part of STCB's new in-water surveys)	BON	VHL: Mavelly Velandia (student) STCB: Mabel Nava Wildconscience: Fernando Simal, Frank F. Rivera-Milan
Sponges	Sponge ecology and energetics	CUR	Uva: Jasper de Goeij CARMABI

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Coral Reef Ecosystems	Deep Reef Observation Project (DROP) (ARMS: Autonomous Reef Monitoring Structures)	CUR	Smithsonian: Carole Baldwin
Coral Reef Ecosystems	St. Maarten's Coral Restoration Project	SXM	NFSXM: Tazio Bervoets, Melanie Meijer zu Schlochtern CRF
Coral Reef Ecosystems	Development of restoration methods for threatened Caribbean coral species	BON, CUR, SAB	CRF Bonaire: Augusto Montbrun, Francesca Virdis SECORE Project CARMABI: Mark Vermeij UvA: Valerie Chamberland
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	Waitt Institute (Blue Halo Curaçao): Kathryn Mengerink
Database	Dutch Caribbean Species Register: Taxonomic knowledge system Dutch Caribbean (http://www.dutch-caribbeanspecies.org/)	All	Naturalis: Sander Pieterse, Hanco Bakker, Bert Hoeksema
Interstitial biodiversity	Moleculair biodiversity analysis of marine communities by metabarcoding	EUX	Naturalis: Arjen speksnijder ANEMOON: Niels Schrieken
Invasive species	Global Register of Introduced and Invasive Species GRIIS	All	IUCN Invasive Species Specialist Group ISSG: Shyama Pagad
Invasive species	CIRCULATIONS (Connectivities between Islands Alters Traveling Invasive Seagrasses)	BON	Development and Knowledge Sociology, ZMT: Rapti Siriwardane Mangrove Ecology, ZMT: Lucy Gillis Algae and Seagrass Ecology, ZMT: Inés González Viana
Marine ecosystems	Taxonomy and biodiversity in Lac Bay	BON	STINAPA Sabine Engel, Caren Eckrich Ecosub: Godfried van Moorsel CEAB: Daniel Martin
Marine ecosystems	Marine species discoveries in the Dutch Caribbean	All	Naturalis: Bert Hoeksema CNSI CARMABI

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Molluscs	Population dynamics and role in the food chain of the Queen Conch <i>Lobatus gigas</i> in the Dutch Caribbean Territories	EUX, SAB, SXM	WUR: Aad Smaal, Leo Nagelkerke, Martin de Graaf Erik Boman (PhD candidate) SCF (SBMU): Ayumi Kuramae Izioka CNSI
Public Health	DNA waterscan: Monitoring disease vectors in the Caribbean (mosquitoes and midges)	CUR EUX	Naturalis: Klaas-Douwe B. Dijkstra ECPHF: Teresa Leslie CBHRI: Delia-Maria Goilo (NWO DUCAMID project)
Sponges	Bioerosion of reefs by coral-excavating sponges	BON, CUR, SAB, EUX	NIOZ: Fleur van Duyl WUR: Erik Meesters, Didier de Bakker (PhD student)
Sponges	The role of sponges as key ecosystem engineers of coral reef ecosystems Pumping iron: can iron availability fuel the sponge loop and affect coral reef community structure? (Misha Streekstra)	CUR	Uva: Jasper de Goeij, Benjamin Mueller CARMABI: Mark Vermeij PhD students: WUR: Misha Streekstra UvA: Sarah Campana*, Meggie Hudspich*, Niklas Korner* * Part of the ERC project "SPONGE ENGINE — Fast and efficient sponge engines drive and modulate the food web of reef ecosystems"
Terrestrial biodiversity	Baseline assessments and DNA barcoding of biodiversity of St. Eustatius	EUX	Naturalis: Michael Stech, Berry van der Hoorn, Jeremy Miller STENAPA CNSI
NWO Projects in the Dutch Caribbean			
Bioproducts	Stand-alone production of algal products for food, feed, chemicals and fuels	BON	WUR: R.H. Wijffels CIEE: 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	NIOZ: Fleur van Duyl, Steven van Heuzen (PostDoc), Alice Webb (PhD student) STENAPA CNSI

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
NWO Projects in the Dutch Caribbean			
Coral Reef Ecosystems	Seawater chemistry of CO ₂ system and nutrients as drivers of benthic community structure and carbon metabolism of coral reef ecosystems of different trophic status in the Caribbean	SAB, SABA BANK	NIOZ: Gert Jan Reichart, Lennart de Nooijer, Alice Webb (PhD student) WUR: Didier Bakker
Coral Reef Ecosystems	Benthic-pelagic coupling on coral reefs of the Saba Bank and Saba	SAB, SABA BANK	NIOZ: Fleur van Duyl
Coral restoration	Artificial Reefs On Saba and Statia (AROSSTA)	SAB EUX	VHL: Alwin Hylkema, Marlous Heemstra WUR: Dolfi Debrot STENAPA: Jessica Berkel, Erik Houtepen SCF: Kai Wulf, Aymi Kuramae Izioka CNSI: Johan Stapel Students: Marijn van der Laan, Daniel Heesink, Marit Pistor, Callum Reid, Jan Koschorrek
Environmental	Caribbean island biogeography meets the anthropocene	AUA, BON, CUR, EUX, SXM	VU: Jacintha Ellers, Matt Helmus, Wendy Jesse (PhD. Student), Jocelyn Behm (Postdoc) CNSI
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	KITLV, Leiden University: Gert Oostindie (Project director) KITLV, Leiden University: 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	UU: Henk Dijkstra, NIOZ: Peter Herman, Rebecca James (PhD student) TU Delft: Julie Pietrzak STENAPA CNSI

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
NWO Projects in the Dutch Caribbean			
Geomorphological	4D crust-mantle modelling of the eastern Caribbean region: toward coupling deep driving processes to surface evolution - Reconstructing past climate change	EUX	UU: Wim Spakman NIOZ: Lennart de Nooijer Alfred Wegener Institute Germany CNSI
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	BON, SAB, EUX	(1) UU: Jetske Vaas (PhD student), Peter Driessen, Frank van Laerhoven and Mendel Giezen (2) UU: Elizabeth Haber (PhD student), Martin Wassen, Max Rietkerk, Maarten Eppinga. CNSI
Invasive species	Global defaunation and plant invasion: cascading effects on seagrass ecosystem services	BON	WUR: Marjolijn Christianen, Fee Smulders (PhD student) Smithsonian: Olivier Kramer STINAPA: Sabine Engel
Reptiles	Ecology and conservation of green and hawksbill turtles in the Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	RuG: Per Palsbøll, Jurjan van der Zee (PhD student) WUR: Lisa Becking, Marjolijn Christianen STCB: Mabel Nava STINAPA CARMABI STENAPA CNSI
Tourism and sustainable development	Vulnerability is dynamic: Enhancing adaptive governance to climate change for Caribbean tourism through interactive modelling	CUR	WUR: Jillian Student, Machiel Lamers UOC: Filomeno A. Marchena
BO-projects in the Dutch Caribbean (Min EZ)			
Coral Reef Ecosystems	BO-43-021.04-003 – Inventory corals Includes monitoring and research of the longest coral reef time-series in the world (since 1973)	BON, CUR	WUR: Erik Meesters

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
BO-projects in the Dutch Caribbean (Min EZ)			
DCBD	BO-43-021.04-001 - Expansion knowledge system Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	WUR (Alterra): Peter Verweij
Environmental Hazards	BO-43-021.04-008 - Sunscreen and risks for coral reefs	BON	WUR: Diana Slijkerman
Fisheries	BO-11-019.02-006 - Fish stocks and fisheries Caribbean Netherlands	EUX, SAB, BON	WUR: Dolfi Debrot CNSI: Kimani Kitson-Walters PiskaBon, STINAPA SCF: Kai Wulf, Ayumi Kuramae
Marine biodiversity	BO-43-021.04-002 – Saba Bank – Marine biodiversity	SAB	WUR: Erik Meesters (benthic communities), Dolfi Debrot, Thomas Brunel, Leo Nagelkerke (fish stocks)
Marine mammals & sharks	BO-43-021.04-005 – Management plan marine mammal and shark sanctuary Yarari	SAB, EUX	WUR: Dolfi Debrot, Dick de Haan, Meike Scheidat, Ayumi Kuramae Izioka SCF (SBMU): Ayumi Kuramae Izioka
Marine mammals	BO-43-021.04-009 Acoustic monitoring of cetacean distribution	SAB	WUR: Dolfi Debrot, Dick de Haan, Hans verdaat SCF: Kai Wulf, Ayumi Kuramae
Marine mammals	BO-43-021.04-007 – Marine mammals in the Dutch Caribbean	BON, SAB, EUX	WUR: Dolfi Debrot, Dick de Haan, Meike Scheidat
World Heritage nomination	BO-43-021.04-004 – World Heritage nomination Bonaire National Marine Park	BON	WUR: Dolfi Debrot Wolfs Co.: Esther Wolfs UNESCO: Josephine Langley DRO: Frank v Slobbe CARMABI: Mark Vermeij, John de Freitas Curacao Footprint Foundation: Leon Pors
"Nature Funding" Projects in the Dutch Caribbean (Min EZ)			
Coastal ecosystems (Lac Bay: Mangroves and seagrass beds)	Ecological restoration Lac Bay and South coast, Bonaire	BON	STINAPA: Sabine Engel WUR: Klaas Metselaar STCB: Mabel Nava DRO: Frank van Slobbe

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
"Nature Funding" Projects in the Dutch Caribbean (Min EZ)			
Sustainable Agriculture	The sustainable agriculture and rural development program (POP Bonaire)	BON	Bonaire Agri & Aqua Business BV: Sherwin Pourier Wayaká Advies BV: Jan Jaap van Almenkerk DRO: Frank van Slobbe
Invasive species	Feral Pig Control	BON	Echo: Julianka Clarenda DRO: Frank van Slobbe
Reforestation	Reforestation Project	BON	Echo: Julianka Clarenda, Quirijn Coolen DRO: Frank van Slobbe
Invasive species	Goat eradication and control in Washington Slagbaai National Park	BON	STINAPA DRO: Frank van Slobbe
World Heritage nomination	World Heritage Nomination Bonaire Marine Park and/or other interconnected sites	BON	Wolfs Company: Esther Wolfs, Boris van Zanten, Amilcar Guzman, Viviana Lujan DRO: Frank van Slobbe
Terrestrial ecosystems	Combating Erosion and Nature Restoration on Bonaire	BON	Bonaire Agri & Aqua Business BV: Sherwin Pourier Wayaká Advies BV: Jan Jaap van Almenkerk DRO: Frank van Slobbe
Terrestrial ecosystems	Cave and karst nature reserve	BON	DRO: Frank van Slobbe CARIBSS: Fernando Simal
Nature communication	Campaign environment and nature on Bonaire	BON	DRO: Frank van Slobbe, Peter Montanus
Agriculture	Horticultural Project	SAB	Government of Saba: Randall Johnson
Recreation	Hiking trails	SAB	Government of Saba: Robert Zagers
Pollution	Tent Reef Protection	SAB	Government of Saba: Robert Zagers
Invasive species	Goat buy-back program	SAB	Government of Saba: Randall Johnson
	Yacht mooring project	SAB	Government of Saba SCF: Kai Wulf
	Saba national park	SAB	Government of Saba SCF: Kai Wulf SABARC: Ryan Espersen
	Crispeen trail project	SAB	Government of Saba: Robert Zagers SCF: Kai Wulf

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
"Nature Funding" Projects in the Dutch Caribbean (Min EZ)			
Community outreach	Nature Awareness project	EUX	Government of St Eustatius STENAPA: Clarisse Buma CNSI: Johan Stapel, Hannah Madden
Nature management	Strengthening management of nature	EUX	Government of St Eustatius STENAPA: Clarisse Buma
Invasive species	Rodent assessment and control	EUX	Government of St Eustatius CNSI: Johan Stapel, Hannah Madden ECPHF: Teresa Leslie
Coral ecosystems	Coral restoration	EUX	Government of St Eustatius STENAPA: Jessica Berkel CNSI: Johan Stapel
Erosion	Erosion control	EUX	Government of St Eustatius CNSI: Johan Stapel
EU-BEST funded Projects in the Dutch Caribbean			
Marine ecosystems	Marine Park Aruba	AUA	Directie Natuur en Milieu: Gisbert Boekhoudt TNO: Kris Kats
Coral Reef Restoration	Scaling-up efforts to rehabilitate threatened coral communities using recruits reared from wild-caught gametes	CUR	CARMABI: Mark Vermeij
Coral Reef Restoration	Pop-Up Nursery and Coral Restoration (Oil Slick Leap)	BON	CRF: Francesca Virdis
Coral Reef Restoration	Restoration Ecosystem Services and Coral Reef Quality (Project RESCQ)	SAB, EUX	WUR: Erik Meesters SCF (SBMU): Ayumi Kuramae Izioka STENAPA: Clarisse Buma Turks & Caicos Reef Fund
Conservation	Watershed & Biodiversity Conservation of Roi Sangu valley	BON	Echo: Julianka Clarenda, Quirijn Coolen

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
EU-BEST funded Projects in the Dutch Caribbean			
Ecosystem services	MOVE, Facilitating MAES (Mapping and Assessing the state of Ecosystems and their Services) to support regional policy in OVerseas Europe: mobilizing stakeholders and pooling resources	AUA, BON, SAB, EUX	Fundo Regional para a Ciência e Tecnologia, Portugal (consortium leader) Wolfs Company: Esther Wolfs
Reptiles	Enacting a news regional recovery plan for the Lesser Antillean iguana: an endangered ecological keystone species	EUX	STENAPA: Clarisse Buma
Terrestrial ecosystems	North Saba National Park, Phase I	SAB	Government of Saba: Menno van der Velde SCF: Kai Wulf SABARC

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CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Birds	Flamingo Abundance	BON	DRO: Frank van Slobbe Cargill STINAPA: Paulo Bertuol
Birds	Monitoring vulnerable parrot nests (remote camera sensing work)	BON	Echo: Julianka Clarendo, Sam Williams
Birds	Yellow-shouldered Amazon parrot roost counts	BON	Echo: Julianka Clarendo DRO: Peter Montanus STINAPA: Paulo Bertuol
Birds	Bird Monitoring (Caribbean Waterbird Census)	BON SXM	STINAPA: Paulo Bertuol EPIC: Adam Brown
Birds	Tern monitoring (artificial nesting islands)	BON	STINAPA: Paulo Bertuol Cargill DRO WUR: Dolfi Debrot
Birds	Terrestrial Bird and Habitat Monitoring	BON CUR SAB SXM EUX	Echo STINAPA STENAPA Curassavica: Michelle da Costa Gomes Nature Foundation: Binkie van Es
Birds	Red-billed Tropicbird monitoring	SAB EUX	STENAPA SCF: Kai Wulf
Birds	Pelican monitoring	SXM	NFSXM: Melanie Meijer zu Schlochtern
Coral reef ecosystems	Global Coral Reef Monitoring Network	BON CUR SAB EUX SXM	STINAPA: Caren Eckrich CARMABI: Mark Vermeij SCF (SBMU): Ayumi Kuramae Izioka STENAPA: Jessica Berkel NFSXM: Tadzio Bervoets CNSI: Johan Stapel, Kimani Kitson-Walters
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	WUR: Erik Meesters, Didier de Bakker (PhD student) NIOZ: Fleur van Duyl, Rolf Bak
Environmental	Water quality testing	SXM	NFSXM: Tadzio Bervoets EPIC: Natalia Collier

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Environmental	Nutrient (phosphate, ammonium, nitrate and nitrite) monitoring of St Eustatius' coastal waters	EUX	CNSI: Johan Stapel
Fish	Shark monitoring: - Shark sightings - Shark Abundance, distribution and movements (tagging, acoustic telemetry)	BON CUR SAB SXM EUX	WUR: Erwin Winter, Dolfi Debrot, Martin de Graaf STINAPA: Caren Eckrich CARMABI: Mark Vermeij SCF(SBMU): Ayumi Kuramae Izioka, Guido Leurs STENAPA: Jessica Berkel NFSXM: Tadzio Bervoets
Fish	Spawning monitoring: Red hind surveys on Moonfish Bank	SAB	SCF (SBMU): Ayumi Kuramae Izioka
Fish	Fish and fishery monitoring (Barracuda's, sharks and eagle rays, tarpons, marine mammals, (fishing) boats, fisherman)	BON	STCB: Mabel Nava
Insects	Bee tracking	BON	Echo: Julianka Clarenda
Invasive species	Goat and/or donkey removal: - Washington Slagbaai National Park - Lac Bay area (exclusion plots) - Quill National Park (exclusion plots)	BON EUX	STINAPA: Paulo Bertuol WUR: Dolfi Debrot DRO: Frank van Slobbe STENAPA
Invasive species	Lionfish abundance and control	BON CUR SXM SAB EUX	STINAPA: Paulo Bertuol (50 meter traps) CARMABI: Mark Vermeij NFSXM: Tadzio Bervoets SCF (SBMU): Ayumi Kuramae Izioka STENAPA: Jessica Berkel
Invasive species	Monkey Monitoring: abundance and distribution	SXM	NFSXM: Tadzio Bervoets
Invasive species	Feral pig population assessment (trapping)	BON	Echo

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Mammals	Bat monitoring	AUA BON	FPNA WildConscience: Fernando Simal, Linda Garcia
Mammals	Dolphin monitoring (since 1999)	BON	Ron Sewell
Mammals	Marine Mammal Monitoring (noise loggers Saba Bank)	SAB	WUR: Dick de Haan, Dolfi Debrot SCF (SBMU): Ayumi Kuramae Izioka
Molluscs	Conch (<i>Strombus gigas</i>) on St. Eustatius, Saba Bank, Anguilla	SAB EUX	WUR: Martin de Graaf, Erik Boman (PhD student) SCF (SBMU): Ayumi Kuramae Izioka
Plants	Monitoring of tree growth and survivorship in reforestation areas	BON	Echo: Quirijn Coolen
Plants	Terrestrial Habitat Monitoring Program for Bonaire	BON	Echo: Julianka Clarenda
Reptiles	Lesser Antillean Iguana: Monitoring population density & removing invasive Green Iguana and hybrids	EUX	STENAPA: Clarisse Buma RAVON: Tim van Wagenveld
Reptiles	Boa and Cascabel Monitoring	AUA	FPNA Toledo Zoological Society: Andrew Odum
Reptiles	Red-bellied racer snake monitoring	EUX	CNSI: Kimani Kitson-Walters
Reptiles	Behavior of the endemic Aruban Whiptail lizard	AUA	FPNA Auburn University: Jeff Goessling
Seagrass and mangrove ecosystems	Seagrass and mangrove monitoring (BON: also conch and benthic fauna)	BON EUX SXM	STINAPA: Sabine Engel, Caren Eckrich WUR: Klaas Metselaar NFSXM: Tadzio Bervoets CNSI: Kimani Kitson-Walters
Reptiles	Sea turtle monitoring: -Satellite tracking -Nest monitoring -In water surveys (BON, CUR, SXM) -Fibropapillomatosis presence (BON)	AUA, BON, CUR, SAB, EUX, SXM	TurtugAruba Foundation STCB: Mabel Nava CARMABI (STCC): Sabine Berendse STENAPA: Jessica Berkel SCF: Kai Wulf NFSXM: Tadzio Bervoets

List of Acronyms

AUA	Aruba	Naturalis	Naturalis Biodiversity Center, The Netherlands
BON	Bonaire	NIOZ	NIOZ Royal Institute for Sea Research, the Netherlands
CUR	Curaçao	NWO	NWO Netherlands Organisation for Scientific Research
SAB	Saba	RAVON	Reptielen Amfibieën Vissen Onderzoek Nederland
EUX	St. Eustatius	RuG	University of Groningen, the Netherlands
SXM	St. Maarten	RU	Radboud University Nijmegen, the Netherlands
AMMF	Aruba Marine Mammal Foundation	SABARC	Saba Archaeological Center
BEST	Biodiversity and Ecosystem Services in Territories of European overseas	SBMU	Saba Bank Management Unit
BO project	Policy Supporting Research project	SCF	Saba Conservation Foundation
CARIBSS	Caribbean Speleological Society	Smithsonian	Smithsonian's National Museum of Natural History
CARMABI	Caribbean Research and Management of Biodiversity Foundation	STCB	Sea Turtle Conservation Bonaire
CEAB	The Blanes Centre for Advanced Studies, Spain	STCC	Sea Turtle Conservation Curacao
CRF	Coral Restoration Foundation	STENAPA	St. Eustatius National Parks Foundation
DCNA	Dutch Caribbean Nature Alliance	STINAPA	National Parks Foundation Bonaire
DCBD	Dutch Caribbean Biodiversity Database	UsA	University of St. Andrews, Scotland
DRO	Directorate of Spatial Planning and Development, Bonaire	UU	University of Utrecht, the Netherlands
DLVV (Santa Rosa)	Department of Agriculture, Livestock, Fishery and Farmers market (Santa Rosa), Aruba	UvA	University of Amsterdam, the Netherlands
EcoPro	Ecological Professionals Foundation	VHL	University of Applied Sciences VHL, the Netherlands
ECPHF	Eastern Caribbean Public Health Foundation	VU	VU University Amsterdam, the Netherlands
EPIC	Environmental Protection in the Caribbean	Wildconscience	Wildlife Conservation, Science and Education
FPNA	Fundacion Parke Nacional Arikok, Aruba	WNF	World Wide Fund for Nature
HAS	HAS University of Applied Sciences, the Netherlands	WUR	Wageningen University and Research Centre, the Netherlands
LVV	Department of Agriculture, Animal Husbandry & Fisheries, St. Eustatius	WUR (Alterra)	Wageningen Environmental Research, the Netherlands
MinLNV	Ministry of Agriculture, Nature and Food Quality		
NFSXM	Nature Foundation St. Maarten		

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.

"Baldwin, C.C., Tornabene, L., Robertson, D.R.(2018)

Below the Mesophotic. Scientific Reports 8."

"Bosker, T., Guatita, L., Behrens, P. (2018).

Microplastic pollution on Caribbean beaches in the Lesser Antilles. Marine Pollution Bulletin 133: 442-447."

"Darío Montoya, R., Menendez, M., Osorio, A.F. (2018).

Exploring changes in Caribbean hurricane-induced wave heights. Ocean Engineering 163: 126-135."

"Christianen, M.J.A. et al. (2018).

Megaherbivores may impact expansion of invasive seagrass in the Caribbean. Journal of Ecology, accepted."

"CNSI (2018).

Caribbean Netherlands Science Institute Annual Report 217. 1-68."

"Engene, N., Tronholm, A., Paul, V.J. (2018).

Uncovering cryptic diversity of Lyngbya: the new tropical marine cyanobacterial genus Dapis (Oscillatoriales) Uncovering cryptic diversity of Lyngbya: the new tropical marine cyanobacterial genus Dapis (Oscillatoriales). Journal of Phycology, accepted."

"García-Hernández, J.E. (2018).

Antagonistic behavior between two honeycomb cowfish, *Acanthostracion polygonius* Poey, 1876, at Curaçao. Coral Reefs"

"Starr, C.R. (2018)

The number of insect species on a small oceanic island: two solutions to a Fermi problem. entomologische berichten 78 (1): 7-9."

"Thorpe, R.S., Barlow, A., Surget-Groba, Y., Malthotra, A. (2018).

Multilocus phylogeny, species age and biogeography of the Lesser Antillean anoles. Molecular Phylogenetics and Evolution, 1-30."

Student Reports

"Brefeld, D., Meyer, L. (2018)

Growth assessment of *Acropora cervicornis* and *Acropora palmata* fragments using in-situ coral nurseries, Saba – Dutch Caribbean. 1-44."

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 DCBD. *Please e-mail us: research@DCNANature.org*

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Calendar

More events to add to this calendar?
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July

16-27	Meeting	the 13th meeting of the CITES Animals Committee, Geneva, Geneva, Switzerland.
16-20	Meeting	4th Meeting of the Scientific & Technical Advisory Ctee of the Land-Based Sources of marine pollution Protocol (LBS STAC), Jamaica
25-27	Congress	Latin America and Caribbean Congress for Conservation Biology (LACCCB), Trinidad & Tobago.
26	Event	International Day for the Conservation of the Mangrove Ecosystem

August

20-23	Meeting	Latin American & Caribbean Climate Week, Uruguay.
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September

15	Event	World Cleanup Day
18	Event	World Water Monitoring Day
25-4 Oct	Workshop	Coral reproduction and restoration workshop, SCORE, Curaçao.

October

29-1 Dec	Meeting	RedLAC meeting, Santa Cruz de la Sierra, Bolivia.
Dates tbc	Meeting	15th meeting of the Scientific Committee of the Inter-American Sea Turtle Convention (IAC). Honduras
1-5	Meeting	Seventieth meeting of the CITES Standing Committee (SC70), Sochi, Krasnodar, Russian Federation
4	Event	World Animal Day
13	Event	International Migratory Bird Day
13	Event	International Day for Disaster Reduction (IDDR)
19-21	Conference	3rd bi-annual Global Invertebrate Genomics Alliance Conference and Workshop (GIGAIII), Curaçao
21-29	Meeting	13th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP13), Dubai, United Arab Emirates
29-30	Meeting	DCNA Board meeting, Aruba.
24	Event	Sustainability Day
24	Event	International Day of Climate Action



The International Coral Reef Initiative (ICRI) has declared 2018 the third International Year of the Reef (IYOR 2018)

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