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Editor's Letter

Dutch Caribbean, May 2018

The threat of invasive species is a recurring topic in BioNews, and for good reason, since invasive species pose a significant threat to the natural environment and native species on our islands. New work from St. Eustatius highlights the escalating threat to the endemic Lesser Antillean iguana (*Iguana delicatissima*) by non-native Green iguana (*Iguana iguana*). A study by RAVON has revealed evidence of hybridization between Lesser Antillean iguanas and non-native Green iguanas, which threatens the genetic integrity and longer-term survival of the native iguana.

Research is a key component of conservation efforts in the Dutch Caribbean. In this edition of BioNews, we report on advances in marine mapping and the availability of detailed bathymetric data for the leeward islands. Scientists aboard the NIOZ research vessel "R.V Pelagia" have been gathering data on Bonaire and Curaçao's mesophotic reefs, which required more accurate bathymetric maps than were currently available in order to locate these deep reefs. Dr. Henk de Haas (NIOZ) was able to produce detailed bathymetric maps of the deep-water environment around the islands thanks to state of the art equipment, which generates fast and accurate measurements of the sea floor. Sea Turtle Conservation Bonaire (STCB) has conducted standardized in-water surveys and tagging programs since 2003 to gather vital information on turtle abundance and distribution as well as annual population estimates. In order to optimize their survey methodology and improve protection of the island's sea turtles, STCB is now introducing a new and improved research methodology, which will include randomized repeat surveys to improve data robustness.

Last but by no means least, we are excited to present an overview of Bonaire's Rural Development Program (POP Bonaire). Funded by the Dutch Ministry of Agriculture's "Nature Fund", this important initiative aims to revitalize Bonaire's rural areas through entrepreneurship, self-reliance and sustainable agriculture. The key components of the project: sustainable goat husbandry, rural tourism development, strengthening of entrepreneurship and the future establishment of an important knowledge centre are presented here.

Happy reading!
The DCNA Team

Urgent Conservation Action Needed To Save The Lesser Antillean Iguana

By Thijs van den Burg

The Lesser Antillean Iguana is an endangered endemic reptile found in the Lesser Antilles whose population is rapidly decreasing. Although once also found on St. Maarten, St. Eustatius is currently the last stronghold in the Dutch Kingdom of this tree-dwelling iguana. Recent events could change its fate.

Early 2014 RAVON and STENAPA launched efforts to study and conserve the remaining population of the Lesser Antillean Iguana *(Iguana delicatissima)* on St. Eustatius. Data on nearly 300 iguanas were collected during several studies, and the majority of these iguanas were uniquely tagged to allow the collection of valuable data over time. A primary goal was to assess whether the population is genetically pure with respect to the wide-spread hybridization between non-native Green Iguanas (*Iguana iguana*) and native Lesser Antillean Iguanas that occur throughout the Lesser Antilles. Since the identification of hybrids can be made based on morphological (Breuil, 2013) and genetic differences (Stephen et al., 2013; Vuillaume et al., 2015; van den Burg et al., 2018), both methods were used. The results indicated that no hybrids or Green Iguanas were present in 2015, which suggests that they are absent on St. Eustatius (van den Burg, 2016).

The discovery of an adult female I. iguana in early 2016 and of the first individual with hybrid characteristics in mid-2016 is alarming. Genetic and morphological data has confirmed that this individual and several subsequently found iguanas are indeed *Iguana delicatissima* x *Iguana iguana* hybrids (Figure 1; van den Burg et al., 2018). Ongoing fieldwork performed by local organizations and collaborating partners (STENAPA, Ecological Professionals, and RAVON) has led to the discovery and capture of eight hybrid individuals to date in addition to two Green Iguanas. The Green Iguanas arrived by boat from St. Maarten, which is home to large numbers of these non-native reptiles. The size variation of the hybrids indicates that a minimum of two hybrid nests have successfully hatched on St. Eustatius. It is therefore extremely likely that more hybrid iguanas are present.

Based on the identification of hybridization and remaining presence of non-native iguanas, conservation management action is crucial to ensure the genetic integrity and longer-term survival of St. Eustatius's Lesser Antillean Iguana. Fortunately, a successful grant application with the Mohamed bin Zayed Species Conservation Fund will boost conservation work by providing accommodation to two experienced researchers on St. Eustatius. These scientists will perform a systematic survey of non-native iguana distribution and abundance, which will help visualize the current extent of the non-native invasion. Distribution knowledge of non-native iguanas will allow the identification of priority areas for removal actions in an effort to remove all non-native iguanas.

The progress of biological invasions and the potential for eradication can be visualized using an invasion curve (Figure 2), which is an interplay of three factors: 1) time since the invasion, 2) spread of the invasive species, and 3) costs for controlling the invasion. On St. Eustatius, the lack of hybrids in our initial large dataset and low number of discovered hybrid iguanas suggests the current invasion is of recent origin. It would

Figure 1 *- Iguanas on St. Eustatius. Left to right: Iguana iguana - hybrid - Iguana delicatissima.*
© Thijs van den Burg and Tim van Wagensveld

seem that there is only one small infested area which indicates that eradication at this stage is still feasible. This needs to be verified by thorough survey efforts. A similar situation to several other Lesser Antillean islands, where larger numbers of non-native iguanas are present, will however arise if no dedicated/committed action is taken at this point. Besides a loss of the native Lesser Antillean Iguana population, these non-native iguana can cause extensive economic damage as is evident from other islands, e.g. Grand Cayman.

The Durrell Wildlife Conservation Trust is currently leading a Lesser Antillean Iguana breeding program in collaboration with several European Zoos, including Rotterdam Zoo. To this end, and following necessary health screenings, two animals of each sex were transported from St. Eustatius to the Rotterdam Zoo in early May. They will be displayed at the Zoo (after a quarantine period) to increase public awareness. Their offspring will eventually be crossed with breeding lines that originate from Dominica present in collaborating Zoos.

Sadly, similar declines in Lesser Antillean Iguana populations are taking place throughout the species' entire range (Anguilla to Martinique) as a result of hybridization, habitat destruction and poaching (Knapp et al., 2014). Besides St. Eustatius recent invasions of Green Iguanas on La Désirade and Dominica have also been reported. In fact, this species' distribution is predicted to have decreased by 87% by 2050 and only inhabit Dominica if the current rate of decline continues (van den Burg et al., accepted). As a result, the IUCN Red List status of the Lesser Antillean Iguana will change from "Endangered" to "Critically Endangered" (van den Burg et al., accepted). Conservation action along with increased biosecurity is urgently needed throughout the iguana's range to ensure that all remaining populations are preserved and that future invasions by Green Iguanas onto these last strongholds are prevented.

Grateful thanks to STENAPA, RAVON, CNSI, University of Amsterdam, San Diego Zoo Institute for Conservation Research, IRCF, FONA conservation (S151.65) and Mohamed bin Zayed Species Conservation Fund (150510459/172517158) for financial and/or logistical support of this project.

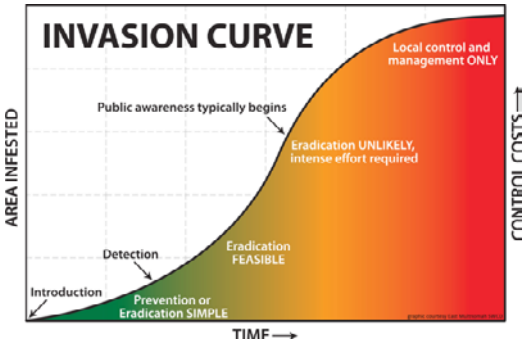


***Figure 2** - Invasion curve, © Protect Lake George; Davis (2009).*

Concerted Caribbean effort for Lesser Antillean Iguana

A team from St. Eustatius National Parks Foundation (STENAPA) laid the fundaments for a Caribbean conservation plan for the Lesser Antillean Iguana during a workshop in Anguilla in March 2018.

Representatives of the islands with remaining Lesser Antillean Iguanas shared their ideas during the workshop about how to build a bright future for their native iguana. All islands share the main threats to their native iguana, such as habitat loss due to roaming goats, predation by wild cats and rats, car accidents, poaching and the arrival of the invasive Green Iguana. Apart from that, the present iguana population in St. Eustatius is possibly not viable given its small size and fragmented distribution, however there is no genetic structure within this population (van den Burg et al., 2018). Therefore STENAPA works on improving connectivity, putting in place checks in the harbor of incoming containers, and decreasing the roaming goats and wild cats.

In Anguilla the situation with the iguana on the main island has become so critical that the Anguilla National Trust translocated the last individuals to a small-uninhabited island nearby, Prickley Pear East. During one of the night patrols in Anguilla last week, STENAPA's National Parks Ranger Rupnor Redan found one of the last remaining native iguanas. It has been put in quarantine and will be send to Prickely Pear East after genetic testing.

Besides Redan, the STENAPA team was represented by Director Clarisse Buma, Tim van Wagensveld (RAVON) and Sandra Bijhold (Rotterdam Zoo). Buma: "This workshop was very inspiring. We want to increase the corporation with especially Anguilla and St. Barths. We can learn from each other. Anguilla is interested to have an exchange with our ranger and do night patrols with them. And STENAPA can learn from St. Barths, where they made progress in the field of checking sea containers for invasive species. I am looking forward to bring our recovery plan a step further". The development of the recovery plan is supported by the EU Best 2.0 program for overseas territories.

NICO Expedition: Mapping the Sea Bottom

Researchers aboard the Pelagia research vessel have been collecting invaluable data on marine biomes in the Caribbean since January as part of the "Netherlands Initiative Changing Oceans (NICO)" expedition organized by the Royal Netherlands Institute of Sea Research (NIOZ) and NWO-Science (ENW). The research vessel has visited the Southern Caribbean where work focused on the mesophotic reefs (> 30m deep) of Bonaire and Curaçao. Bathymetric maps from the 1970s did not offer enough detail for the research team to locate the reefs and cyanobacterial mats, which were the focus of their studies. Detailed bathymetric data was absent for other Dutch Caribbean islands, including the Saba Bank and bathymetric maps will therefore be created. Dr. Henk de Haas, an acoustic researcher and data scientist of the research institute NIOZ who is onboard the Pelagia, has provided insight about how he goes about creating these maps that are so crucial to the success of among others research.

Bathymetry is the measurement of depth of water in oceans, seas, or lakes. Bathymetric maps provide a visual representation of the topography of the sea floor including the shape and elevation of underwater features like seamounts or ocean trenches. These maps are crucial to ocean research as they enable scientists to locate the specific ecosystems which are being investigated. For example, coral reefs are not found in areas with strong water currents and would therefore not be located in underwater valleys where water flow is powerful.

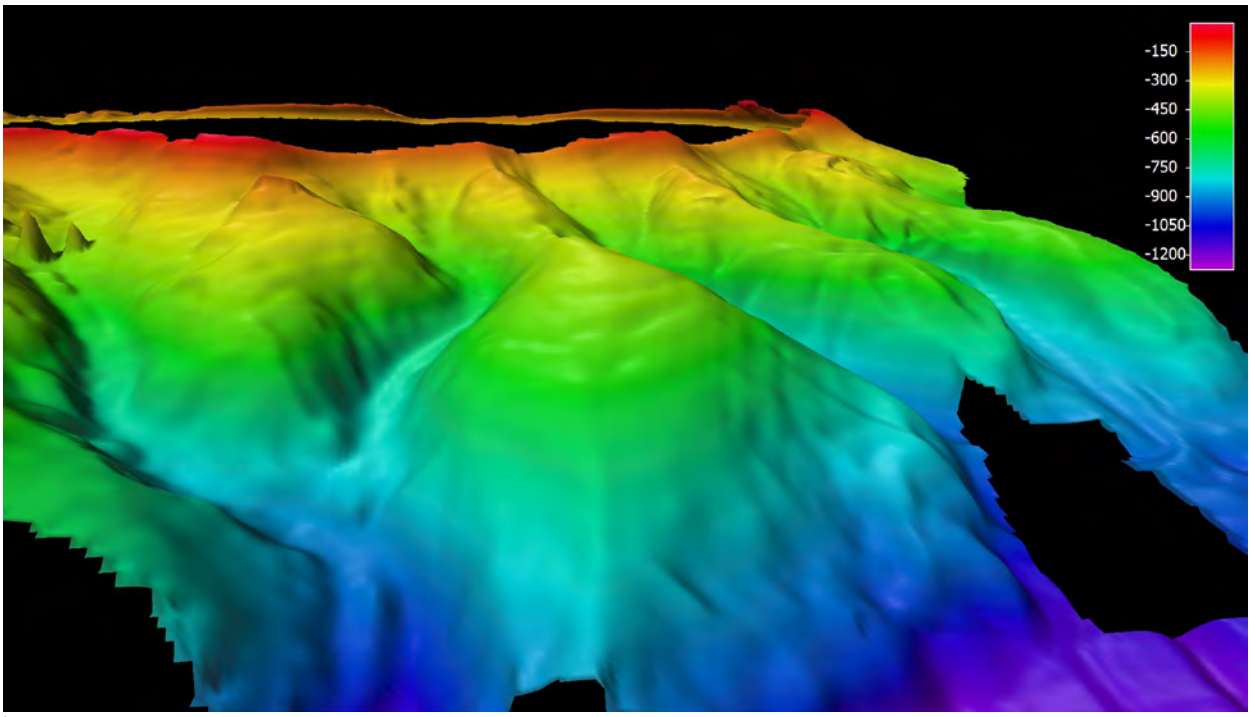
In the past, sea depth was measured using a type of sonar called an echo sounder. A sound pulse would be sent out by a transmitter located on the hull of the ship. The longer it took for sound to travel to the sea floor and back to the receiver on the ship, the deeper the ocean floor. The problem with this technique is that just one measurement can be taken at a time, making the mapping of the sea floor very labor intensive and not very accurate. *"We would very often have to sail lines back and forth to make a map of a piece of seabed"*, explains Dr. de Haas.

Nowadays, acoustic scientists use a modern multi-beam version of the echo sounder. The model installed underneath the Pelagia transmits 288 sound beams per pulse simultaneously in a fan shape instead of just one vertical pulse. The multibeam echo sounder generates fast and accurate bathymetric measurements and allows the creation of detailed topography maps. In fact, because many of the bundles take two measurements simultaneously, Dr. de Haas notes that the system on board the Pelagia allows for at maximum 432 depth measurements to be produced per sound pulse. The size of the area mapped is dependent on water depth - the width of the bundle is about five times the water depth, meaning that the bundle will be narrower in shallow waters. The multibeam echo sounder can also help determine the nature of the seabed and whether there is soft or hard sediment. If the sediment is hard, such as sand, the sonar signal will come back stronger. As explained by Dr. de Haas, *"a map of the strength of the reflected sound signal is actually a map of the sediment on the seabed".*

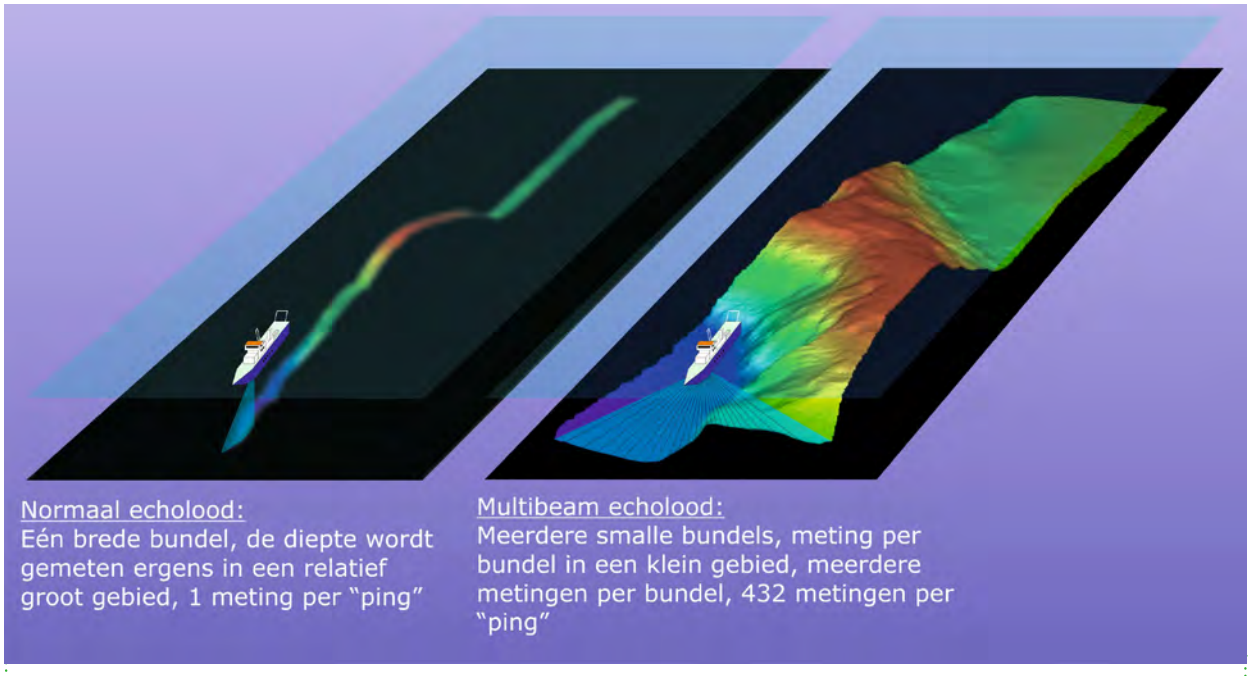
So every night, in cooperation with the crew member at the bridge Dr. de Haas stays up collecting data from the Pelagia's multibeam echo sounder while everyone else is sound asleep. The next morning, after checking the data, he is able to create the bathymetric maps that the research team needs to locate mesophotic reefs and cyanobacterial mats around Bonaire and Curaçao. So far, the maps have resulted in some exciting discoveries, notably the presence of deep channels around Curaçao. This was a real surprise as such deep channels are not always common for small islands. As Dr. de Haas concludes, *"there is still much to explore here".*

www.nico-expeditie.nl

You can track the journey of RV Pelagia here:
https://www.marinefacilitiesplanning.com/programme/map



3D image of a sea bottom area around Bonaire.
The colour bar presents the water depth in meters. Horizontal scale: the bottom of the deep channel in the front is about 250 meters wide. It is clear that the sea bottom is not flat and has many deep channel. Image credit: NIOZ/ WUR/UvA



Difference between a normal eco sounder and the modern version of the echo sounder, the multibeam echo sounder.

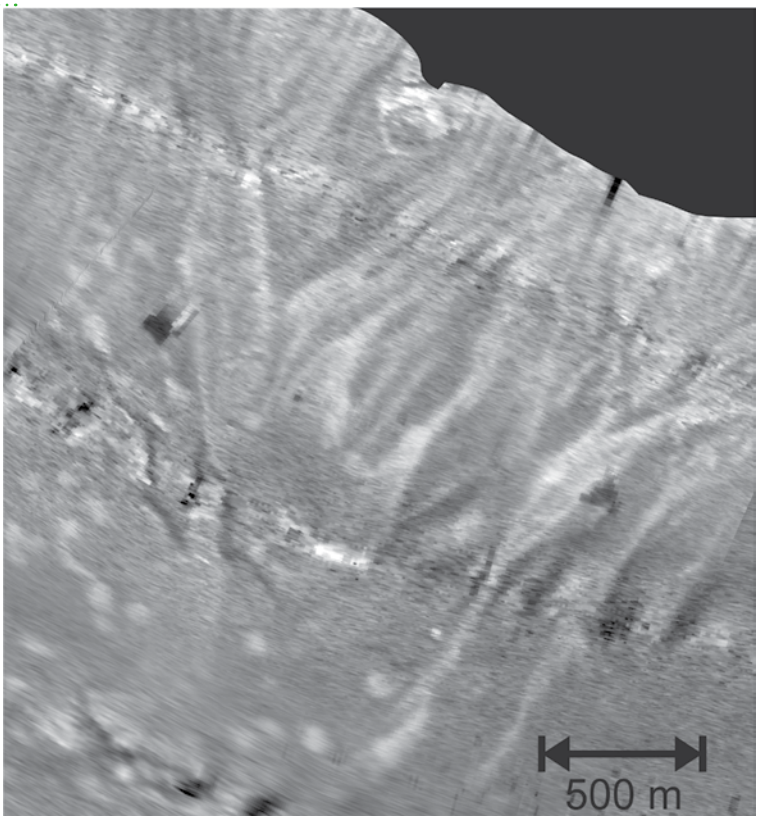
Normal echo sounder:Transmitting one sound pulse at once in a relative large area. One measurement per "ping".

Multibeam Echo sounder:
Transmitting several sounds pulses at once in a fan shape in relative small areas. The model installed underneath the Pelagia allows for 432 measurements per "ping". Image credit: Henk de Haas, NIOZ

Example of backscatter data: strength of the reflected sound signal of a sea bottom area.

Curaçao is located just above this image. So in this image from top to bottom it becomes deeper. The lighter the gray, the stronger the signal. The light gray, slightly curved tracks from the right corner above towards the left corner below are small channels on the sea bottom. Here the speed of the current is higher than in the surrounding areas (somewhat darker gray). The light color gray indicates that the sediment in the channels is somewhat more sandy (bounces the sound better back) than the more fine-grained sediment in the surrounding area. The round light gray points in the left corner are possibly blocks that have tumbled down from the steep slopes. The black in the right corner above indicates that here no measurements are taken.

Image credit: NIOZ/ WUR/UvA



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NICO Expedition: Mapping the Sea Bottom

Sea Turtle Conservation Bonaire (STCB) has worked tirelessly since 1991 to protect Bonaire's sea turtle population and to ensure a safe, protected environment for them on land and in the sea. Bonaire is home to three of the world's seven species of sea turtles: green turtles (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*) are found year-round, while loggerhead turtles (*Caretta caretta*) generally visit the island only during the nesting season. Set up as a non-profit organization, STCB began conducting standardized in-water surveys and tagging programs in 2003 to gather information on sea turtles in the waters surrounding the island. STCB staff and volunteers have tagged approximately 3,000 turtles and collected data on turtle abundance, health status, movement patterns, growth rates and preferred habitats. This invaluable information has helped to improve conservation efforts and build support for sea turtle conservation on the island. For example, monitoring efforts in Lac have highlighted the importance of this area to the green turtle population; green turtles that inhabit Lac have much higher growth rates than have been recorded elsewhere in the Caribbean.

STCB works with Population Ecologist and statistician Dr. Frank Rivera-Milán (US Fish & Wildlife Services) to analyze in-water transect counting, netting, and nesting data that STCB has collected over the years and to optimize their methodology for in-water and netting surveys. Together with Rivera-Milán, Wildconscience has also been contracted to help design an improved field methodology, which will result in more accurate yearly population estimates for Bonaire, critical to ensure well-informed management decision making. Enhanced methods will also help improve STCB's visibility as a premier partner, provide information to enhance research throughout the region through scientific publications and well-recognized scientific journals, and feed the regional pool of information to enhance sea turtle research in the Caribbean and – at the same time – work towards standardization of methods.

Survey Planning (2018)

1. State measurable objectives
2. Define the target population and sampling frame (list of sampling units)
3. Select a sampling scheme (systematic)
4. Define the parameters to be estimated and desired precision (CV N)
5. Select count methods for parameter estimation and modeling
6. Decide how to allocate resources (cost-effective sampling)

STCB's improved statistical design includes randomized surveys, repeated visits (same area, time and observer power), and the accurate measurement of the survey area and survey region. The four survey regions are Northwest Bonaire, Klein Bonaire, Southwest Bonaire and Southeast Bonaire. Data from the Southeast Bonaire survey region (Lac) will be analyzed separately as surveys there are not randomized but follow one fixed transect. STCB's new survey methodology also means that turtles are no longer caught to be tagged and measured onboard during the count surveys on the West coast. Instead, the "observers" record the species, number of individuals, and estimated length while the turtles are in the water. A number of environmental measurements are now also recorded during each survey to help understand if and how these environmental factors influence sea turtle abundance. Recorded covariates include visibility, wind direction, water temperature, abundance of jellyfish, rugosity, coral cover, depth, date and time as well as disturbance (boat and human presence in water) and the number of observers and their experience.

A very exciting development is that STCB's in-water surveys now also include the monitoring of a number of other species, notably sharks, barracudas, tarpons and marine mammals. There is some concern over the declining population of barracudas, and monitoring efforts will help gauge whether the population is healthy or not. Additionally, the number of boats as well as fishermen on shore will be tallied to better understand fishing pressure in the waters surrounding Bonaire. STCB has been central to the protection of Bonaire's exceptional biodiversity for close to three decades, and the improvement of their science for higher precision and accuracy of populations estimates will ensure that they remain a model of excellence for research and conservation for many years to come.

Four Survey Regions. Map by © STCB

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POP Bonaire: Rural Development Program: 2014-2018

Increasing concern over Bonaire's dependence on dive tourism and the importation of food products has led the government to push for the sustainable development of Bonaire's rural areas. The "2014-2027 Policy Vision for Agriculture, Livestock and Fisheries", developed at the request of the Public Entity Bonaire (Openbaar Lichaam Bonaire) highlights the pressing need for the expansion of the island's agricultural and fisheries sector (LVV)[1] in order to boost local food production as well as diversify the island's tourism product. While Bonaire's leeward shore has been developed to accommodate the thousands of tourists that visit the island each year, the rural areas have for the most part been overlooked. The neglected agricultural areas in the countryside are a stark contrast to the western coast fringed with hotels, shops and restaurants.

Agriculture on Bonaire has always been severely limited due to the island's dry climate and unpredictable rainy seasons. As a result each year 95% of the food needed to feed both locals and visitors is imported. Goat farming has dominated rural life throughout Bonaire's history, however currently more than half (65%) of the island's 32,000 goats roam free. Free-roaming goats and their endless appetite for young shoots and seedlings have emerged as one of the biggest threats to the island's natural biodiversity. Overgrazing not only threatens local vegetation and the fauna that relies on these plants, but the resulting wind and water erosion threatens the health of Bonaire's coral reefs.

Stakeholders and *"kunukeros"* (farmers) from two rural areas, Rincon and Bara di Karta, attended workshops organized by the Department of Spatial Planning and Development (DRO) and the Dutch Ministry of Agriculture (formerly the Ministry of Economic Affairs) in 2012 and 2013 to identify bottlenecks and opportunities for rural development. These workshops resulted in the development of the Rural Development Program (POP) for Bonaire, which is financed by the Dutch Ministry of Agriculture through their Nature Fund *(Natuurgelden)* initiative. The aim of POP Bonaire is to revitalize Bonaire's rural areas by stimulating entrepreneurship, self-reliance and sustainable agriculture. A total of forty projects are being carried out within four main categories: a knowledge center, sustainable goat husbandry, rural tourism development and strengthening of entrepreneurship. The Program is lead by Jan Jaap van Almenkerk (Wayaká Advies) and Sherwin Pourier (BAAB BV) and has broad support and cooperation of stakeholders such as Kriabon, TCB, Mangazina di Rei, SELIBON, Chamber of Commerce, Integral District Approach, and local schools.

Knowledge Center "Sembra Futuro"

The knowledge centre, "Sembra Futuro", which is under development, is intended to become a hub of activity, information and education for agriculture, horticulture and livestock farming. Based at a site owned by the Ministry of Agriculture, where twenty hectares of good soil will allow plots of land to be leased to agricultural entrepreneurs for the production of fruit, vegetables or cattle fodder. Farmers will not only benefit from access to cultivable land and water but will also be encouraged to join forces and share expertise, equipment and surveillance. Knowledge about agriculture and horticulture is being made accessible through a series of workshops as well as practical handbooks. To date eight workshops have been organized providing information on the small-scale cultivation of fruit and vegetables. An estimated 300 school children have attended horticulture workshops organized in collaboration with Mangazina di Rei. Several unemployed youngsters have also received training in agriculture and the use of agricultural machinery in collaboration with the Society and Care Directorate.

Sustainable Goat Farming

Since 2015 researchers from the University of Wageningen have been evaluating the potential for sustainable goat husbandry.

[1] *The LVV (Agriculture, Livestock, Fisheries) department is a government department within the Spatial Planning and Development Department.*

Recommendations include the professionalization of goat husbandry in order to make it sustainable. The resulting action plan - which has the support of local kunukeros - includes improved management of goats through a central registration, improved breed selection, production of quality meat products labelled "*Platina di Boneiru*", production of a central cattle feed and fenced-in goats and will take 5 years to implement. Fifty of Bonaire's 175 goat farmers have already attended workshops on goat management and lamb production, and 14 participants have attended a course on professional goat farming. Access to high quality feed is an essential component towards sustainability as it will allow kunukeros to keep goats fenced instead of letting them graze freely. POP Bonaire has carried out a high-quality feed pilot project over the past few years with the participation of eight local goat farmers. Two of the eight grasses tested for fresh cattle feed and hay show promise.

Rural Tourism Development

Bonaire's rural areas - Bara di Karta, Rincon and Tras di Montaña - have great potential in attracting tourists if they are revitalized and made accessible. Rincon is the island's oldest village and has a strong cultural identity. Bara di Karta has a typical Bonairean agrarian landscape with many kunukus and some historic plantations. POP Bonaire aims to facilitate the economic development of the countryside through the creation of tourist routes and by supporting the refurbishment of old farms into tourist attractions. Several tourist routes were set up in cooperation with kunukeros and include four car routes, eight walking trails and five mountain bike routes [see map]. Paper maps that highlight these routes and provide information about the culture and nature in the area are being distributed to visitors. POP Bonaire also supports a number of projects that are making the region more attractive to tourists such as the clean-up of debris and car wrecks along tourist routes and the installation of traditional cactus fences. Farmers have begun to renovate farms due to an increase in visitors in the island's countryside. Several attractions are now offered, including a kunuku tour and a tea house.

Strengthen entrepreneurship

Many locals in Bonaire's rural areas have ideas for their own business in agriculture or kunuku tourism, but the vast majority do not have the funds or expertise to turn these ideas into successful businesses. POP Bonaire aims to stimulate rural economic development by offering entrepreneurs advice and support in the development and implementation of their business plan. So far, 115 consultations have been held with entrepreneurs, and 10 business plans have been approved and supported with an in-kind donation. As many entrepreneurs lack the necessary funds to start up a business, POP Bonaire has set up an Entrepreneurs fund which is managed by Stichting Ondernemersfonds Bonaire. Entrepreneurs with an approved business plan can request a loan. To be selected, entrepreneurs must bring onto the market an innovative and commercial product. Punta Blanku Farms, which delivers daily fresh free-range eggs to island supermarkets, received money from the fund to purchase a machine that converts seawater into drinking water for its chickens.

POP Bonaire is an ambitious initiative, but with clear objectives and the support of local stakeholders its chances of success are very high. The next step towards the completion of this Program will be the set-up of the "Sembra Futuro" knowledge center and the implementation of the plans for the professionalization of goat farming. The goal of producing 40% of all fresh fruit and vegetables consumed on the island may take many years to reach, but the encouragement towards self-sufficiency and sustainable development within the island's rural areas is already showing promise.

Would you like to stay up-to-date?

You can follow POP Bonaire on Facebook @POPBonaire.

You can also follow all the Nature fund projects on Bonaire on Facebook @NTBDN.

For more information about the hiking, biking and car trails on Bonaire, please visit: *http://www.explore-bonaire.com*

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Research Overview

April - May 2018

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Algae	Ecology of Loborphora species	CUR	**Gent University, Belgium:** Christian Stolpe **CARMABI**
Birds	Suitability study and reforestation of exclosures facilitating the Yellow-shouldered Amazon Parrots	BON	**Echo:** Lauren Schmaltz, Quirijn Coolen
Coral Reef ecosystems	Larval biology of corals and reef microbiology	CUR	**Marhaverlab, Curacao:** Kristen Marhaver **CARMABI**
Cyanobasteria	Cyanobacteria on reefs	CUR	**UvA**: Petra Visser **CARMABI**
Fish	Red Hind population on the Saba Bank	SAB	**SCF (SBMU):** Ayumi Kuramae Izioka **WUR:** Dolfi Debrot **HAS:** Yosha Bakkers (student)
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**
Mosquitos	Mosquito mapping	SAB EUX SXM	**Naturalis:** Klaas-Douwe Dijkstra, Maarten Schrama **ECPHF**: Teresa Leslie **Students**: Maud Kok, Sam Boerlijs, Loes Busscher, Delia Goilo,Jordy van der Beek
Multidisciplinary scientific expedition	National Initiative Changing Oceans (NICO) expedition (NWO-Science & NIOZ) The multidisciplinary scientific expedition aimed at providing the Netherlands with a better understanding of changing seas and oceans, crucial for climate stability and sustainable	All	See article on page 6

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Plants	Testing effective ways to grow native plants	BON	**Echo:** Quirijn Coolen, Johan van Blerk
Plants	Factors influencing growth analysis of planted native trees in herbivore free exclusion areas.	BON	**Echo:** Quirijn Coolen, Lauren Schmaltz **WUR:** Pieter Zuidema **VHL:** Anko Stilma **WUR:** Nils Buisman (student) **VHL:** Bram Dicou (student)
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
Seagrass	Local and regional drivers of fish assemblages associated to seagrass meadows in the Caribbean following varying levels of protection	BON	**Swansea University:** Alex Bartlett
Sponges	Sponge community ecology	CUR	**NIOZ and WUR:** Didier de Bakker **CARMABI**
Sponges	Sponge ecology and energetics	CUR	**Uva:** Jasper de Goeij **CARMABI**

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Long Term Projects

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Coral Reef	Deep Reef Observation	CUR	**Smithsonian:** Carole Baldwin
Coral Reef Eccosystems	St. Maarten's Coral Restoration Project	SXM	**NFSXM**: Tadzio 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.dutchcaribbeanspecies.org/)*	All	**Naturalis:** Sander Pieterse, Hannco 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**

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Molluscs	Population dynamics and role in the food chain of the Queen Conch Lobatus gigas 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	Bioersion 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 **UvA:** 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**

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
NWO Projects in the Dutch Caribbean			
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**
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**

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
NWO Projects in the Dutch Caribbean			
Invasive species	Global defaunation and plant invasion: cascading effects on seagrass ecosystem services	BON	**WUR:** Marjolijn Christianen **Smithsonian**: Olivier Kramer
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) **RU**: Marjolijn Christianen, **WUR:** Lisa Becking **STCB:** Mabel Nava **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
DCBD	BO-43-021.04-001 - Expansion knowledge system Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	**WUR (Alterra):** Peter Verweij
Envirnomental Hazards	BO-43-021.04-008 - Sunscreen and risks for coral reefs	BON	**WUR**: Diana Slijkerman
Fisheries	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)

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
BO-projects in the Dutch Caribbean (Min EZ)			
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
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:** Lauren Schmaltz, Quirijn Coolen **DRO:** Frank van Slobbe
Invasive species	Goat eradication and control in Washington Slagbaai National Park	BON	**STINAPA** **DRO:** Frank van Slobbe
Coral ecosystems	Coral Restoration	BON	**CRF Bonaire:** Augusto Montbrun **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

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
"Nature Funding" Projects in the Dutch Caribbean (Min EZ)			
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	Horicultural 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
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

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
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 rared from wild-caught gametes	CUR	**CARMABI**: Mark Vermeij
Coral Reef Restoration	Pop-Up Nursery and Coral Restoration (Oil Slick	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** **Students:** Ginger Fairhurst en Mirka Fontijn
Conservation	Watershed & Biodiversity	BON	**Echo:** Lauren Schmaltz, Quirijn Coolen
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**
Terrestrial habitat restoration	Restoration of Key Biodiversity Areas of St. Maarten	SXM	**EPIC (Project lead)**: Kippy Gilders **Subcontractors:** **Les Fruits des Mer**: Mark Yokoyama (reptile, amphibian, and invertebrate assessment) **The Leon Levy Native Plant Preserve, Bahamas**: Ethan Freid (plant assessment)

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Monitoring Overview

April - May 2018

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Birds	Flamingo Abundance	BON	**DRO:** Frank van Slobbe **Cargill** **STINAPA:** Paulo Bertuol
Birds	Monitoring vulnerable parrot nests (remote camera sensing work)	BON	**Echo:** Laura Schmaltz, Sam Williams
Birds	Yellow-shouldered Amazon parrot roost counts	BON	**Echo:** Lauren Schmaltz **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 Monitoring Program	BON	**Echo:** Lauren Schmaltz **STINAPA** **STENAPA**
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)	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
Environmental	Nutrient (phosphate, ammonium, nitrate and nitrite) monitoring of St Eustatius' coastal waters	EUX	**CNSI:** Johan Stapel

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
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	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:** Lauren Schmaltz
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:** Nathan Schmaltz, Sam Williams
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

CATEGORY	SUBJECT	ISLANDS	ORGANIZATION(S): LEAD SCIENTIST
Molluscs	Conch (Strombus gigas) on St. Eustatius, Saba Bank, Anguilla	SAB EUX	**WUR:** Martin de Graaf, Erik Boman (PhD student) **SCF (SBMU):** Ayumi Kuramae Izioka
Natural resource use	Fishery monitoring (including lionfish, shark bycatch and marine mammal sightings) (* Part of BO-11-019.02-055 – Fisheries Dutch Caribbean)	SAB EUX	**SCF (SBMU):** Ayumi Kuramae Izioka, Guido Leurs **Gem City Consulting:** Erik Boman **LVV:** Kiman Kitson-Walters **WUR:** Dolfi Debrot, Fedor den Elzen (student), Ivo (student) Damen
Plants	Monitoring of tree growth and survivorship in reforestation areas	BON	**Echo**: Quirijn Coolen, Nicholas Verhey
Plants	Terrestrial Habitat Monitoring Program for Bonaire	BON	**Echo**: Lauren Schmaltz
Reptiles	Lesser Antillean Iguana: Monitoring population density & removing invasive Green Iguana and hybrids	EUX	**STENAPA:** Clarisse Buma **RAVON:** Tim van Wagensveld **EcoPro/ CNSI:** Hannah Madden
Reptiles	Boa and Cascabel Monitoring	AUA	**FPNA** **Toledo Zoological Society:** Andrew Odum
Reptiles	Red-bellied racer snake	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

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List of Acronyms

AUA	**Aruba**
BON	**Bonaire**
CUR	**Curaçao**
SAB	**Saba**
EUX	**St. Eustatius**
SXM	**St. Maarten**
AMMF	Aruba Marine Mammal Foundation
BEST	Biodiversity and Ecosystem Services in Territories of European overseas
BO project	Policy Supporting Research project
CARIBSS	Caribbean Speleological Society
CARMABI	Caribbean Research and Management of Biodiversity Foundation
CEAB	The Blanes Centre for Advanced Studies, Spain
CRF	Coral Restoration 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
MinLNV	Ministry of Agriculture, Nature and Food Quality
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
RU	Radboud University Nijmegen, the Netherlands
SABARC	Saba Archaelogical Center
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
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 Universitwy and Research Centre, the Netherlands
WUR (Alterra)	Wageningen Environmental Research, the Netherlands

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.

"Aptroot, A., Stech, M. (2018).
An updated checklist of the lichens of St. Eustatius, Netherlands Antilles. MycoKeys 33: 69-84."

"Boussarie, G. et al. (2018).
Environmental DNA illuminates the dark diversity of sharks. Science Advances 4: eaap9661."

"Bowling, R.D., Everett, J.C.L. (2018).
Resolving Carbonate Platform Geometries on the Island of Bonaire, Caribbean Netherlands through Semi-Automatic GPR Facies Classification. Physical Journal Internal."

"Kennedy, M.S., Clapham, P.J. (2017).
From Whaling to Tagging: The Evolution of North Atlantic Humpback Whale Research in the West Indies. NOAA 79(2): 23-37."

"Mücher, S., Suomalainen, J., Stuiver, J., Meesters, E. (2017).
Hyperspectral Coral Reef Classification of Bonaire. Wageningen, Wageningen Marine Research (University & Research centre), Wageningen Marine Research report C062/17."

"Nelson, H.P., Devenish-Nelson, E.S., Rusk, B.L., Geary, M., Lawrence, A.J. (2018).
A call to action for climate change research on Caribbean dry forests. Regional Environmental Change, 1-6."

"Olthof, G., Becking, E.L., Fransen, C.H.J.M. (2018).
On a collection of deep-water shrimp (Crustacea, Decapoda) from the Dutch Caribbean, with the description of a new species of Pseudocoutierea. Zootaxa"

"Overeem, R., Riemens, M. (2018).
Antigonon Leptopus (Corallita) on St Eustatius an Integrated Pest Management approach: Proposal for an Integrated Pest Management (IPM) approach. Plant Research International, part of Wageningen UR, Report number 759, 1-23. "

"Ritger, A.L., Curtis, A.M., Chen, C.Y. (2018).
Bioaccumulation of mercury and other metal contaminants in invasive lionfish (Pterois volitans/miles) from Curaçao. Marine Pollution Bullerin 13`: 38-44."

"Vertigo Lab (2017).
Innovations for coral finance. ICRI publication, 80 p."

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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March

2-4	Workshop	Caribbean Sargassum and Oil Spills Monitoring Pilot Project Workshop, Mexico.
12-21	Course	Chemistry of the Coral Reef. Vanderbilt University, CNSI, St. Eustatius.
12	Event	World Migratory Bird Day
13-16	Conference	World Conference on Marine Biodiversity, Montréal, Canada.
15-17	Meeting	CRFM Minetrial Meeting, Belize.
16-18	Meeting	1st WECAFC Data and Statistics Working Group meeting, Barbados.
17	Event	International Recycling Day
19	Event	Endangered Species Day
22	Event	World Biodiversity Day
28-1 June	Workshop	3rd Caribaea Initiative Research & Conservation Workshop, Guadeloupe.
28-1 June	Workshop	GCRMN-Caribbean Data workshop, St. Martin.

April

2-8	Symposium	4th International Symposium on the Effects of Climate Change on the World's Oceans, Washington, D.C., USA
5-8	Working Group	3rd meeting of the Regional Working Group on IUU Fishing, Barbados.
5-9	Meeting	9th Ordinary Steering Committee Meeting of RAC/ REMPEITC-Caribe, Curaçao.
5	Event	World Environment Day
8	Event	World Oceans Day
9	Event	Coralpalooza by CRF, Bonaire
9-17	Event	4th edition of the "Save Our Sharks" week, the Netherlands and Dutch Caribbean.
15	Event	Global Wind Day
16	Event	World Sea Turtle Day
17-22	Conference	Mesophotic Coral Reef Ecosystems, Bates College, Maine, USA.
18-20	Meeting	CLME + Steering Committee Meeting, Panama.
24-29	Congress	International Marine Conservation Congress in Kuching, Sarawak
25-27	Meeting	BIOPAMA Protected Areas Management Effectiveness, TBD.
26-29	Conference	EMA CWWA Waste Management Conference, Trinidad & Tobago.
27-29	Meeting	Regional Forum on Disaster Risk Reduction and Meeting of the Council of Ministers of Caribbean Disaster Emergency Management Agence (CDEMA), Jamaica.

IYOR 2018
INTERNATIONAL YEAR OF THE REEF

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

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References

Urgent conservation action needed to save the Lesser Antillean Iguana

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