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BIONEWS

DCNAnature.org

Dutch Caribbean Nature Alliance
Safeguarding nature in the Dutch Caribbean

BIONEWS ISSUE 28

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Editor's Letter

Dutch Caribbean, November 2019

Since 2014, a new coral disease has been spreading through the reefs of the north Caribbean. Known as the Stony Coral Tissue Loss Disease (SCTLD), this disease appears to be fast spreading and extremely lethal. In August, experts met to discuss lessons learned from Florida's management of this disease and discuss best practices for identifying and treating infected corals for the future which has been summarized in DCNA's Stony Coral Tissue Loss Disease Management Letter for the Dutch Caribbean.

During the 2019 edition of the DCNA convention held on Bonaire end of October, biologists from the region met to thoroughly discuss coral restoration, the Coral Action Plan, the (citizen) science platform Observation.org and the next Dutch Organization for Scientific Research (NWO) call for research proposals. In addition to attending presentations and workshops, the biologists from, among others, the six national parks of the Dutch Caribbean also went on an excursion to gain first-hand experience on the coral restoration work of the Reef Renewal Foundation on Bonaire.

Hurricane Maria devasted several Caribbean islands in 2017. A major relief campaign was launched to help the affected population of the Commonwealth of Dominica. It has now been established that in addition to emergency aid, exotic invasive vertebrate species were introduced to Dominica. These famous exotics now threaten the survival of endemic species and urgent action is needed to protect them.

A recent report describes, for the first time in its history, the critically endangered Bonaire Palm. Although first documented in 1979, it took till 2019 before scientists identified this palm as native solely to Bonaire. With only 25 mature individuals remaining, conservation efforts must be taken immediately to ensure this species remains a part of the Bonairian landscape in the future.

Enjoy!
The DCNA Team

Cover photo: Cuban Tree Frog © Rusty Clark
Editor's Letter photo: Brain Coral by night © Marion Haarsma

Stony Coral Tissue Loss Disease Management Update

Since 2014, a new coral disease has been spreading from the reefs of Florida around the north Caribbean, resulting in mass causalities of stony corals. Known as the Stony Coral Tissue Loss Disease (SCTLD), this disease appears to be fast spreading and extremely lethal. Experts from around the Caribbean met early August to discuss lessons learned from Florida's Department of Environmental Protection (DEP)'s management of this disease and discuss best practices for identifying and treating infected corals.

The Disease

A new coral disease was first spotted off the coast of Florida in 2014. Since then, it has spread throughout much of the north Caribbean, including Mexico, Jamaica, Sint Maarten, the Dominican Republic, and the U.S. Virgin Islands (AGGRA, 2019). This disease is known as SCTLD and to date it has only been seen in stony corals and causes significant tissue loss within affected hosts. This disease spreads fast and can have devasting affects on the reef if not treated immediately (Florida DEP, 2019). Dr. Andy Bruckner, Research Coordinator at Florida Keys National Marine Sanctuary stated "*Stony Coral Tissue Loss Disease affects some of the slowest-growing and longest-lived reef-building corals, including the iconic brain corals, star corals and pillar corals.*"

Symptoms

When a coral contracts SCTLD it begins with visible lesions which spread out from around the edge. Here the coral tissue can become detached or completely removed, which leaves the coral structure as a bare skeleton typically becoming covered in algae within a week (Florida DEP, 2018). SCTLD can spread rapidly, at a pace of 20-40 cm2 a day for highly susceptible coral species and 5-10 cm2 a day for intermediately susceptible species (Martinelli, 2019). Without intervention, Florida has seen nearly a 100% mortality rate of infected corals with this disease (Martinelli, 2019).

Transmission

It is now believed the SCTLD is transmitted through direct contact and water circulation (Reef Resilience, 2019). To minimize its spread, officials are now recommending extreme caution for divers around infected corals, and urge divers to fully decontaminate their gear between dive sites to avoid spreading the disease (Florida DEP, 2019). In addition, it is strongly encouraged that if a coral is suspected of being infected, it should be reported to the appropriate authority immediately to begin increasing public awareness and direct intervention (Florida DEP 2019).

Knowledge Sharing

On August 1st of this year, a group of 22 experts from 17 countries met in Key West, Florida to share information and discuss how to best manage SCTLD outbreaks (GCFI, 2019). Participates were able to work directly with leading SCTLD experts from Florida and learn how to properly identify the disease and manage infected corals effectively. Florida has had positive results treating infected corals with a variety of antibiotic regimes; however, this is still being tested and regulatory frameworks concerning the use of such treatments varies between countries (Reef Resilience, 2019).

Protecting the Future

With harsher environmental conditions stressing corals, these species will continue to become more susceptible to disease in the future. SCTLD is of particular concern as it appears to be long lasting (present since 2014), easily spread over a wide area, it affects a high number of slow growing, reef building species and has been seen to result in total colony mortality once infected (Martinelli, 2019). Increasing public awareness and proper diving practices will be crucial for managing this disease. Researchers are continuing to test intervention methods to minimize the spread of this disease. Until this disease is better understood, it is crucial for divers and researchers to carefully track its progression. If you believe you've spotted an infected coral, please report its location, and if possible, a photograph, to your local marine park authority.

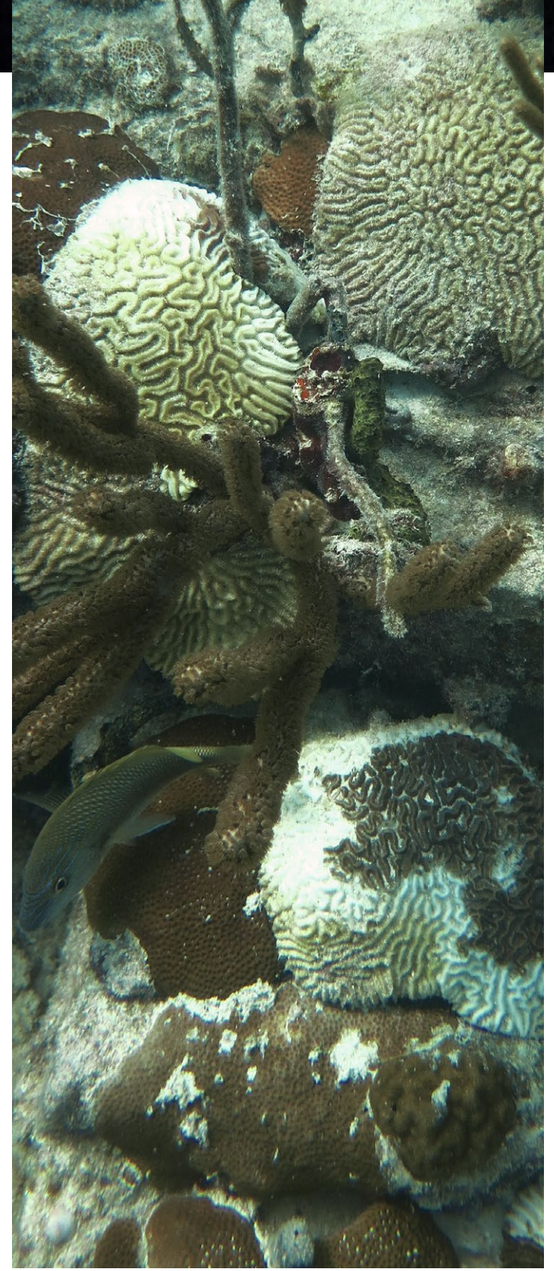

Photo by: © K. Neely

View the Stony Coral Tissue Loss Disease Management Letter:
https://www.dcnanature.org/wp-content/uploads/2019/11/SCTLDReport-Online.pdf

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Presentations, Workshops and Excursions Provide New Nature Conservation Drive in Participants

During the 2019 edition of the DCNA convention held on Bonaire end of October, biologists from the region met to thoroughly discuss coral restoration, the Coral Action Plan, the (citizen) science platform Observation.org and the next Dutch Organization for Scientific Research (NWO) call for research proposals. In addition to attending presentations and workshops, the biologists from, among others, the six national parks of the Dutch Caribbean also went on an excursion to gain first-hand experience on the coral restoration work of the Reef Renewal Foundation on Bonaire.

In-depth information on coral recovery

The park biologists are now better informed on when and how to apply coral restoration methods since the presentations and workshops represented a unique opportunity to learn from each other's knowledge and experiences. This newly gained knowledge will undoubtedly benefit the work carried out on the other islands.

"It is very inspiring to see what is already being done on Bonaire and to learn from the experiences of the other islands. It is also very insightful to learn about the available knowledge and how accessible it is made through the developed methodologies." Jessica Berkel (STENAPA-St Eustatius).

Public Lecture Creates Mixed Feelings amongst Attendees

The public lecture held on Monday night caused mixed feelings amongst those in attendance. Based on scientific standards, the status of the coral reefs in the Dutch Caribbean is moderate to very unfavorable. This means that urgent measures need to be taken. The main consideration is that the status of the coral reefs are crucial for the sustainable prosperity of the islands in the long term. The willpower to take action and prevent further decline of coral reefs is therefore very strong at this moment. In the coming years, the Dutch Caribbean Nature Alliance (DCNA) will also focus on coral recovery.

During the 2019 edition of the DCNA convention on Bonaire, biologists from local organizations such as Aruba National Park Foundation, STINAPA Bonaire, Reef Renewal Foundation Bonaire, CARMABI Curaçao, Saba Conservation Foundation, Sint Maarten Nature Foundation and EPIC, STENAPA and CNSI of Sint Eustatius were united on October 28 for a full day of workshops.

Photo by: © Skyview Bonaire

Citizens Can Help Report Animal and Plant Species

Hans Verdaat presented how the free website www.*DutchCaribbean.Observation.org* and apps could be used by the nature conservation organisations of the Dutch Caribbean. This free website and free apps can be used not only by biologists but by all citizens to report animals and plants and is available in more than 40 languages. It is now also being translated to Papiaments. The species reports by local communities are very valuable for the nature conservation organization to learn and protect the species on our islands. For more information, contact: *research@dcnanature.org*

Exploring Inter-Island Collaboration Possibilities

Arjan de Groene of World Wildlife Fund (WWF-NL) gave a workshop on the Nature Policy Plan including the Coral Action Plan that is under development for the BES islands. The workshop provided a valuable platform for the participants to give input on how to successfully implement this plan and for the other three Dutch Caribbean islands Aruba, Curaçao and St. Maarten to give input for possible future inter-island collaborations with the BES-islands.

Optimization of New Research Projects

Joseph Stuefer and Niels van den Berg from the Dutch Organization for Scientific Research (NWO) gave an update on the upcoming call for scientific research proposals in the Dutch Caribbean. This workshop also provided a valuable platform for local organizations to discuss the desired approach and results of research projects through which they can improve the management of nature parks and protect vulnerable areas and animals.

During the 2019 edition of the DCNA convention on Bonaire, Dr. Erik Meesters (WMR) gave a well-attended public talk on the status of the Dutch Caribbean reefs.

Presentations, Workshops and Excursions Provide New Nature Conservation Drive in Participants

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Emergency assistance contributes to the spread of invasive exotics

By Matthijs P. van den Burg (Natuurhistorisch museum Madrid)

Hurricane Maria devasted several Caribbean islands in 2017. A major relief campaign was launched to help the affected population of the Commonwealth of Dominica. It has now been established that in addition to emergency aid, exotic invasive vertebrate species were introduced to Dominica. These famous exotics now threaten the survival of endemic species and urgent action is needed to protect them.

Biosecurity

In general, both exporting and importing countries are responsible for preventing the spread of exotic species. Unfortunately, devastating natural disasters paralyze local governments and their economies, severely impacting infrastructure and services. The authors of a new publication, Biological Invasions, state that during natural disaster relief efforts, the responsibility to prevent the spread of exotics should lie with the assisting party / parties. Despite the urgency of providing rapid assistance, the removal of invasive exotics will be extremely costly in the long term, both physically and financially. For example, more than $5 million has been spent in the Cayman Islands to reduce the invasive green iguana population. As a result, more attention must be paid to biosecurity during relief operations in the aftermath of natural disasters.

Spread

It is known that species can spread on floating material that entered the sea as a result of hurricanes. Due to the fact that all locations on Dominica where exotics have been found are located on or directly next to ports, researchers find this method of distribution very unlikely. Two exotics also occur on nearby islands, from which most of the relief supplies arrived. These relief goods either came directly from these neighboring islands, or were kept there for several months at storage locations since the Dominican ports could not handle the large amount of aid at once.

The invasive exotics

Researchers have identified the presence of three exotic species, two of which have since established themselves with a large population. These species are the green iguana (*Iguana iguana*) and the Cuban tree frog (*Osteopilus septentrionalis*), both of which also occur as invasive exotic species on other Caribbean islands. The main threat caused by the Cuban tree frog is its explosive growth combined with predation of both vertebrate and invertebrate endemic species. The biggest environmental threat of the green iguana is oppression and hybridization with the sister species, the Antillean iguana. This seriously endangered species has already become extinct on several islands after the introduction of the green iguana. Originally the Antillean iguana was found on Sint Maarten but it is now extinct, and on Sint Eustatius, where the population is seriously threatened with extinction. Preventing against invasions of non-native speices can also help to protect damaged and recovering environments in areas that have experienced a natural disaster.

Photo by: © Charles R. Knapp

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A Critically Endangered Palm Found Only on Bonaire

A recent report describes, for the first time in its history, the critically endangered Bonaire Palm. Although first documented in 1979, it took till 2019 before scientists identified this palm as native solely to Bonaire. With only 25 mature individuals remaining, conservation efforts must be taken immediately to ensure this species remains a part of the Bonairian landscape in the future.

A New Palm Identified

A recently released publication clearly described, for the first time, a unique palm species found only on Bonaire. Sabal palms are a family of palm trees with 17 identified species (Zona, 1990, Goldman et al. 2012, Griffith et al. 2017). Although these palms have been identified in scientific literature within the Antillean islands before, it wasn't until 2017 that the first dedicated research was conducted on Bonaire (Griffith et al, 2017). Once these palms were more closely studied and compared, it soon became obvious that there was a clear distinction between the Sabal palms on Bonaire and those found on neighboring island Curacao. Thus, marking the first time Sabal lougheediana was identified and characterized.

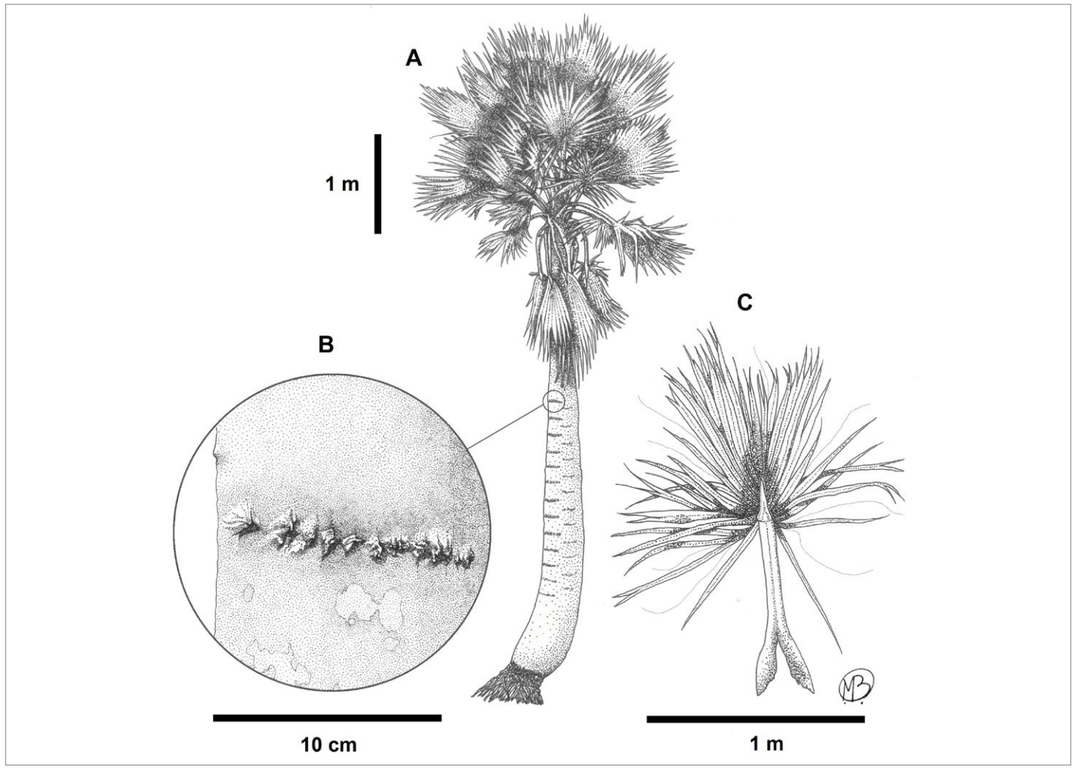

Figure 1: Sabal lougheediana (illustration: Barros). A. Habit. B. Detail of leaf scar. C. Leaf. (Griffith et al., 2019)

Distinction from Other Palms

Although similar to it's sister species Sabal antillensis, clear delineations can be made based on appearance. For example, the Bonairian Sabal or "Bonaire Palm" appears to be slightly taller than its' sister species and capable of holding up to 35 leaves at its crown. The leaves themselves are also quite different, with the Bonaire Palm having more spikey, stiff leaves when compared to the *S. antillensis* which has more flexible leaves. In addition, the Bonaire Palm has unique scaring, left from fallen leaves, which can be seen along the entire length of the trunk. Wild Bonaire Palms can only be found within a very small area, in the south of the island, west of Lac Bay and north of the Cargill Salt flats. It's ability to grow along the limestone flats is unique to this particular palm as its sister species is more notably found along the mudstone hills, at higher elevations. Its small range, coupled with the limited number of mature individuals has earned the *S. lougheediana* an IUCN Red List criteria rating of Critically Endangered. In fact, a 2018 survey identified only 25 reproductively mature individuals on the island (de Freitas et al., 2019).). It now inhabits only about 20% of the land it was found on during a

previous survey conducted in 1979 by Winkelman, highlighting the fact that this unique palm has a dwindling population. Conservationists are concerned that grazing pressures from herbivores are threatening the ability for the palm to repopulate (de Freitas et al., 2019).

Securing a Future for the Bonaire Palm

To ensure this unique and important Bonaire Palm has a place in the future, it is important that conservation efforts be put into place to protect it. To start, physically protecting these palms against herbivores, such as installing fencing will give new Bonaire Palms a chance to grow. In addition, efforts to cultivate and grow additional palms in other areas can help expand its habitat and population.

To serve as a beacon of hope, conservation efforts for the *S. antillensis* have seen positive growth trends in recent years, showcasing how an increased public awareness and proper environmental management can serve in protecting these species. Clearly distinguishing these two species was an important first step in fully protecting this exclusive palm on Bonaire. Heightened awareness and a concerted effort to protect these few remaining specimens may be all that is required to reverse this trend and ensure this palm has a place within the Bonairian landscape for generations to come.

Patrick Griffith and Quirijn Coolen with the Sabal Palm
Photo by: © Patrick Griffith

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Research Projects

October 2019

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Bats	Impact of barriers in maternity caves	BON	**HAS:** Jilly Sarpong (student) **Wildconscience:** Fernando Simal **VISR:** Jafet Nassar
Birds	Suitability study and reforestation of exclosures facilitating the Yellow-shouldered Amazon Parrots (Amazona barbadensis)	BON	**Echo:** Julianka Clarenda
Birds	Perception of local people on the conservation of Yellow-Shouldered Amazon Parrot	BON	**WUR:** Younes Zian (student), Luuk Fleskens **Echo:** Julianka Clarenda
Climate change	Teatime4science (seagrass and mangroves http://www.teatime4science.org)	BON	**STINAPA:** Sabine Engel
Coral Reef Ecosystems	Cyanobacterial mats	BON	**WMR:** Erik Meesters, Lisa Becking, Danielle de Kool (student)
Coral Reef Ecosystems	Ecology and biology of the 2019 coral spawning	CUR	**CARMABI/ Secore/ Marhaver Lab**
Coral Reef Ecosystems	Factors effecting juvenile Diadema (longspine sea urchin) survival	SAB	**WUR:** Oliver Klokman (student) **SCF**
Coral Reef Ecosystems	Environments and circumstances for sea urchins to settlement	SAB	**VHL:** Tessa Volbeda (student) **SCF**
Coral Reef Ecosystems	AROSSTA project - artificial reefs (reef balls) and how different shapes are performing for fish, sessile organisms and stony corals.	SAB	**RUG:** Raven Cammenga (student) **SCF** **HVL:** Alwin Hylkema
Coral Reef Ecosystems	Fluid dynamics on reefs	CUR	**University of Illinois Urbana-Champaign:** Mark Levenstein **CARMABI**
Coral Reef Ecosystems	Larval biology of corals and reef microbiology	CUR	**MC**: Kristen Marhaver, **CARMABI**
Coral Reef Ecosystems	Parrotfishbehavior and population trends	BON	**Calpoly:** Hannah Rempel **Dive friends Bonaire** (citizen scientist)
Coral Reef Ecosystems	Marine biodiversity of Bonaire: a baseline survey	BON	**Naturalis:** Bert W. Hoeksema **ANEMOON Foundation, Bennekom,** **The Netherlands:** Godfried van Moorsel **STINAPA:** Caren Eckrich

Research Projects

October 2019

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Coral Reef Ecosystems	Iron limitation on Caribbean reefs	CUR	**WUR:** Mischa Streekstra, **CARMABI**
Environmental friendly alternatives	Industrial Compostable Alternatives for Styrofoam (Literature study Funded by WWF-NL)	BON, SAB EUX	**WWF-NL**: Arjan de Groene, Claudia Alessio
Fisheries	Market & Supply Chain Analysis study (Funded by WWF-NL)	BON, SAB EUX	**WWF-NL:** Pieter van Baren **The Good Fish Foundation**: Irene Kranendonk
Fisheries	Historical fisheries (Funded by WWF-NL)	BON, SAB EUX	**WWF-NL**: Pieter van Baren **Terramar Museum Bonaire:** Ruud Stelten
Fisheries	Co-management in small scale fisheries (Literature study Funded by WWF-NL)	BON, SAB EUX	**WWF-NL:** Pieter van Baren, Simaima Petzold, Philipp Pattberg
Fisheries	Testing and comparing various lionfish traps to study their potential use in a directed lionfish fishery (funded by WWF-NL)	SAB	**SCF (SBMU):** Ayumi Kuramae Izioka
Fish	Killifish Genome Size Variability	AUA	**FPNA:** Giancarlo Nunes **BU:** Nicholas Sakich
Fish	Shark telemetry project	BON	**STINAPA**: Caren Eckrich and Roxanne-Liana Francisca **HAS:** Brent Hoogervorst (student)
Marine gastropods	Rearing of Karko (Strombus gigas)	CUR	Michiel van Nierop, **CARMABI**
Marine gastropods	Karko (Strombus gigas) in the zone of -40 up to -60m	BON	**WMR**: Dolfi Debrot, Hans Verdaat
Microplastics		EUX	**Stenapa**: Jessica Berkel
Plants	Testing effective ways to grow native plants	BON	**Echo:** Johan van Blerk
Plants	Germination of seeds of indigenous trees of Curaçao	CUR	**CARMABI:** John de Freitas
Plants	Vegetation Christoffel Park	CUR	**CARMABI**: Erik Houtepen
Reptiles	Lesser Antillean iguana nest research (funded by WWF-NL)	EUX	**RAVON:** Tim van Wagensveld, Ronald Zollinger
Sargassum	Effect of sargassum brown tides on mangroves, seagrass beds and water quality in Lac Bay	BON	**WUR:** Mauk Westerman Holstijn (student) **RU:** Luuk Leemans
Sponges	Sponge ecology and energetics	CUR	**UvA**:Meggie Hudspith, **CARMABI**

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Anthropgenic impact	Anthropogenic Impact Analyses, Aruba National Park	AUA	**FPNA:** Giancarlo Nunes
Coral Reef Ecosystems	Deep Reef Observation Project (DROP) (ARMS: Autonomous Reef Monitoring Structures)	CUR	**Smithsonian:** Carole Baldwin
Coral Reef Ecosystems	Diadema Antillarum Population Assessment	EUX	**CNSI:** Kimani Kitson-Walters **VHL**: Alwin Hylkema **STENAPA:** Jessica Berkel
Coral Reef Ecosystems	Bloom dynamics of benthic cyanobacterial mats on coral reefs	BON	**FSU:** Ethan Cissell (Ph.D. student), Sophie McCoy
Coral Reef Ecosystems	The role of parrotfish behavior in structuring benthic coral reef communities	BON	**FSU:** Joshua Manning (Ph.D. student), Sophie McCoy
Coral Reef Restoration	Epigenetic responses to environmental stressors in Acropora corals, and applications to coral reef conservation	BON	**FIU (EEL)**: Serena Hackerott (PhD student), Jose Eirin-Lopez **RRFB:** Francesca Virdis
Coral Reef Restoration	St. Maarten's Coral Restoration Project	SXM	**NFSXM**: Melanie Meijer zu Schlochtern **CRF**
Coral Reef Restoration	Plant a million coral initiative (IntelliReefs)	SXM	**NFSXM**: Melanie Meijer zu Schlochtern **SeaLagacy, Reeflife Restoration** and **Sea to Sky ventures**
Coral Reef Restoration	Development of restoration methods for threatened Caribbean coral species	BON, CUR	**RRFB:** Augusto Montbrun, Francesca Virdis **SECORE Project** **CARMABI:** Mark Vermeij **Secore:** Valerie Chamberland
Coral Reef Restoration	Postsettlement dynamics of Caribbean corals & Reef restoration	CUR	**CARMABI:** Mark Vermeij **Secore:** Valerie Chamberland
Coral Reef Restoration	Artificial structures that encourage larvae settlement and discourage the growth of competitor species	CUR	**University of Illonois**: Amy Wagoner Johnson, Bruce Fouke, Gabriel Juarez **San Diego State University**: Forest Rohwer **CARMABI**: Kirsten Marhaver, Mark Vermeij
Database	Dutch Caribbean Species Register: Taxonomic knowledge system Dutch Caribbean (http://www.dutchcaribbeanspecies.org/)	All	**Naturalis:** Sander Pieterse, Hannco Bakker, Bert Hoeksema

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Interstitial biodiversity	Moleculair biodiversity analysis of marine communities by metabarcoding	EUX	**Naturalis:** Arjen speksnijder **ANEMOON:** Niels Schrieken
Invasive species	Impact of Halophila stipulacea on the availability of benthic diatoms as a food source for a commercially important deposit	EUX	**CNSI:** Johan Stapel, Kimani Kitson-Walters, Anna Maitz
Mangrove ecosystems	Mangrove habitat compensation and reforestation	AUA	**FPNA:** Giancarlo Nunes
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**
Marine Park	Marine Park Aruba	AUA	**FPNA:** Sietske van der Wal **DNM:** Gisbert Boekhoudt
Marine Litter	Clean Coast Bonaire (Citizen science project, OSPAR methodology)	BON	**Boneiru Duradero**: Sharon Bol, Carolyn Caporusso
Plants	Botanical Garden Aruba	AUA	**FPNA:** Natasha Silva
Plants	Wildlife Garden Reserve	AUA	**FPNA:** Giancarlo Nunes
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)
Reforestation	Reforestation Project on St. Eustatius	EUX	**Mac & Field**: Tim van Wagensveld & Stacey Mac Donald **STENAPA**: Clarisse Buma **LVV:** Gershon Lopes
Reptiles	Behavior of the endemic Aruban Whiptail lizard	AUA	**FPNA:** Giancarlo Nunes **Eckerd College:** Jeff Goessling
Reptiles	Boa Life History	AUA	**FPNA:** Giancarlo Nunes **Eckerd College:** Jeff Goessling

Long Term Projects

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
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"
Sustainability	Sustainable Island Solutions through Science, Technology, Engineering and Mathematics	AUA	**University of Aruba, KU Leuven**
Threats and risks	Are human activities (related to an oil terminal and dive tourism) a risk for ecosystem services ?	EUX	**WUR:** Diana Slijkerman
NWO Projects in the Dutch Caribbean			
Bioproducts	Stand-alone production of algal products for food, feed, chemicals and fuels - Bioprospecting and directed evolution of microalgae from Bonaire	BON	**WUR:** R.H. Wijffels, Rin Barten, Rocca Chin-on, Robin Barten (PhD students) **Institute for Sustainable Technology:** Rita Peachey
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)
Invasive species	Global defaunation and plant invasion: cascading effects on seagrass ecosystem services	BON	**WUR:** Marjolijn Christianen, Fee Smulders (PhD student) **Smithsonian:** Justin Campbell (coordinator Caribbean wide research project) **STINAPA**: Sabine Engel, Jessica Johnson
BO-projects in the Dutch Caribbean (Min LNV)			
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)
DCBD	BO-43-021.04-001 - Expansion knowledge system Dutch Caribbean	AUA, BON, CUR, SAB, EUX, SXM	**WUR (Alterra):** Peter Verweij
Invasive species	Socio-ecological connectivity of tropical coastal ecosystems: how to enhance restoration and conservation of ecosystem services (Study on (1) carbon and nutrient fluxes between the mangroves, seagrass bed and coral reef at Lac Bay 2) the impact of Sargassum events on seagrass beds and mangroves in Lac Bay and 3) Lac Bay as a socio ecological system.)	BON	**RU:** Luuk Leemans (PhD student), Marieke van Katwijk **WUR:** Marjolijn Christianen
Fisheries	BO-43-021.04-006 - 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-43-021.04-007 –Marine mammals in the Dutch Caribbean	BON, SAB,	**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

Monitoring Overview

October 2019

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 Clarenda, Sam Williams
Birds	Aruban Brown-Throated Parakeet Conservation	AUA	**FPNA:** Giancarlo Nunes **ABC:** Greg Peterson
Birds	Aruban Burrowing Owl Conservation	AUA	**FPNA:** Giancarlo Nunes **ABC:** Greg Peterson **GLOW:** David Johnson
Birds	Yellow-shouldered Amazon parrot roost counts	BON	**Echo:** Julianka Clarenda **DRO:** Peter Montanus, Diego Marquez **STINAPA:** Albert Christiaan
Birds	Bird Monitoring (Caribbean Waterbird Census)	BON	**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:** Julianka Clarenda **STINAPA:** Paulo Bertuol, Caren Eckrich **STENAPA** **CNSI** **Curassavica:** Michelle da Costa Gomes **CARMABI:** Erik Houtepen **Nature Foundation**: Binkie van Es
Birds	Red-billed Tropicbird monitoring	SAB EUX	**STENAPA, SCF:** Kai Wulf **CNSI:** Hannah Madden
Birds	Pelican monitoring	SXM	**NFSXM:** Melanie Meijer zu Schlochtern, Saskia Werner

Monitoring Overview

October 2019

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
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:** Melanie Meijer zu Schlochtern **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 **NIOZ:** Fleur van Duyl, Rolf Bak
Environmental	Water quality testing	SXM	**NFSXM:** Melanie Meijer zu Schlochtern **EPIC:** Natalia Collier
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)	AUA BON CUR SAB SXM EUX	**WUR:** Erwin Winter, Dolfi Debrot, Martin de Graaf **FPNA:** Giancarlo Nunes **STINAPA:** Caren Eckrich **CARMABI:** Mark Vermeij **SCF(SBMU):** Ayumi Kuramae Izioka, Guido Leurs **STENAPA:** Jessica Berkel **NFSXM:** Melanie Meijer zu Schlochtern
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:** Kaj Schut
Hydrology	Hydrology Lac Bay	BON	**STINAPA:** Sabine Engel **WUR:** Klaas Metselaar
Insects	Bee tracking	BON	**Echo:** Julianka Clarenda **STINAPA**: Sabine Engel, Johan Blerk
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**

Monitoring Overview

October 2019

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
Invasive species	Lionfish abundance and control	BON CUR SXM SAB EUX	**STINAPA:** Paulo Bertuol (50 meter traps) **CARMABI:** Mark Vermeij **NFSXM:** Melanie Meijer zu Schlochtern **SCF (SBMU):** Ayumi Kuramae Izioka **STENAPA:** Jessica Berkel
Invasive species	Feral pig population assessment (trapping)	BON	**Echo**
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)	AUA SAB EUX SXM	**WUR:** Bart Noort, Dolfi Debrot **SCF (SBMU)**: Ayumi Kuramae Izioka **AMMF:** Angiolina Henriquez **STENAPA:** Jessica Berkel (sighting forms) **NFSXM**: Melanie Meijer zu Schlochtern (sighting forms) **SCCN**
Plants	Monitoring of tree growth and survivorship in reforestation areas	BON	**Echo**: Julianka Clarenda
Reptiles	Lesser Antillean Iguana: Monitoring population density & removing invasive Green Iguana and hybrids (Mohamed bin Zayed Species Conservation Fund)	EUX	**STENAPA:** Clarisse Buma **RAVON:** Tim van Wagensveld **UvA:** Thijs van den Burg
Reptiles	Boa Life History	AUA	**FPNA:** Giancarlo Nunes **Eckerd College**: Jeff Goessling
Reptiles	Behavior of the endemic Aruban Whiptail lizard	AUA	**FPNA** **Eckerd College:** Jeff Goessling

Monitoring Overview

October 2019

CATEGORY	SUBJECT	DC ISLANDS	ORGANIZATION(S): LEAD SCIENTIST(S)
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:** Melanie Meijer zu Schlochtern **CNSI:** Kimani Kitson-Walters
Seagrass ecosystems	Seagrass restoration BESE elements	BON	**STINAPA:** Sabine Engel **WUR:** Marjolijn Christianen
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:** Kaj Schut **STCC:** Sabine Berendse **STENAPA:** Jessica Berkel **SCF:** Kai Wulf **NFSXM:** Melanie Meijer zu Schlochterns, Saskia Werner

Monitoring and Research Wishlist

The Dutch Caribbean nature conservation organisations are in need for research projects on specific topics to safeguard biodiversity and promote the sustainable management of the natural resources of the islands.

1. Coastal water quality/nutrients and interaction with groundwater:

Note: Recently during the NICO expedition researchers looked at this around Bonaire and Curaçao.

- *Possible link to fish diseases/incidence of Fibropapillomatosis in green turtles in Lac, Lagoon and Curaçao can be used to determine the linkages with water quality, pollutants in sediments, etc serving as indicators, or sentinels for the health of these important ecosystems.*
- *Pollutants (oil, heavy metals, pesticides, endocrine disruptors, plastics, microbial etc) entering coastal waters (subterraneously) from land and their effects on marine organisms (Curaçao).*
- *Quantifying terrestrial hydrological controls on nutrient and sediment fluxes into shallow seas (Bonaire).*
- *Stoichiometric aspects of nutrient enrichment on Caribbean reefs (Curaçao).*
- *What do coral communities do "well" in places where they are not expected? What makes corals cope with more nutrients, warmer waters etc? (Curaçao)*
- *Design of cheap but effective waste water systems (using waste to generate biomass, energy etc.) (Curaçao)*
- *Water quality & pollutants in sediment of Spanish Lagoon (Aruba).*
- *Economical and feasible waste and waste water management options (St. Maarten).*
- *Water quality testing and impacts of poor water quality on marine life (St. Maarten).*
- *Monitoring the sedimentation on the reefs around Saba.*

2. Climate Change

- *Evaluation of the most probable effects of climate change and sea level rise (all islands), including risk analysis in coastal zones including coral reefs and recommendations for coastal zone management and climate proofing.*
- *Effects on sea turtles and their nesting beaches.*
- *Effects of changing temperatures and hurricane damage on cloud forest of Saba.*
- *Develop an effective terrestrial monitoring program to enable hurricane damage and recovery assessment.*
- *Island specific mitigation measures for climate change effect (St Maarten).*

3. Hydrology

- *Mapping of groundwater levels and flows [Bonaire].*
- *Nearshore-offshore mixing (Curaçao).*
- *A thorough study of Simpson Bay 's hydrology and water quality, particularly related to land-based sources of pollution. Identify key sources of pollution and track them back to their source (St. Maarten).*

4. Morphodynamics

(near shore coastal hydrodynamics, current models):

- *Currents and sand transportation (and production from Halimeda) in Lac (Bonaire) – very important to management of this Ramsar site.* ***Note:*** *HVL student has started to investigate this*
- *Investigate all sand producing organisms to better understand where sand (and beaches) come from (Curaçao).*
- *Effects on beach accretion and depletion Statia and potential of reef restoration/beach restoration.*
- *Sedimentation rates (St. Maarten).*

5. Yarari Sanctuary

- *Marine mammals: aerial survey (SSS islands (Saba Bank and waters surrounding Saba, St. Maarten and St. Eustatius), seasonal presence, isolation and abundance as well as seasonal migratory destination(s) and population history of humpback and Bryde's whales in the Dutch Caribbean.*
- *Sharks: Ecological role of Saba Bank for sharks (nursery for nurse sharks, tigersharks, silky sharks?).*
- *Analyze 10 year dolphin sighting database (Bonaire)*
- *Ecological role of the Saba Bank passage (between Saba and Saba Bank) for deepwater sharks (e.g. dog fish).*

Monitoring and Research Wishlist

The Dutch Caribbean nature conservation organisations are in need for research projects on specific topics to safeguard biodiversity and promote the sustainable management of the natural resources of the islands.

6. Invasive species:

- *Follow up studies of impact of rats (and cats) on nesting tropic birds.*
- *The effects of the invasive seagrass Halophila stipulacea on the native seagrasses in the area of Lac Bay, St. Eustatius and St. Maarten, and the ecological impacts (e.g on green turtles feeding in Lac [and Lagun], Bonaire and St. Eustatius; on conch feeding and recruitment [aggregations of juvenile conch under Halophila in Statia], sea urchins, etc.)* ***Note:*** *NWO funded Projects by Marjolijn Christianen (WUR) looked at this in relation to sea turtles. Also Erik Boman (WUR) & CNSI looked at this in relation to conch.*
- *Scaevola taccada (White inkberry/Beach naupaka) spread and potential impact on sea turtle nesting on Klein Bonaire.*
- *Donkey, cat, pig population size distribution and grazing impact on Bonaire.* ***Note:*** *Echo is working on a pig control programme.*
- *Management of Corallita* ***Note:*** *A running NWO project looked at this.*
- *Trapping lionfish in deep waters.* ***Note:*** *A project is running by WUR and WNF on the Saba Bank.*
- *Impact and potential management plans for invasive species. This includes: monkeys, iguanas, mongoose, african land snail, racoons, red eared slider (St. Maarten).*
- *Invasive species (size, distribution, threat management): boa, rubber vine, tilapia, goats, rats, cats, dogs, cane toad (Aruba).*

7. Birds

- *Migratory birds – patterns, habitat use with an emphasis on nesting species (Bonaire).*
- ***Yellow shouldered parrot:***
  - ◊ *Genetics of yellow shouldered parrot (establish uniqueness of Bonairean Parrot as compared to Venezuelan islands).*
  - ◊ *What is the effective (i.e., breeding) population size of lora as compared to the total population.*
- ***Flamingos***
  - ◊ *Ecology of the flamingos, in particular the Pekelmeer and flamingo sanctuary. Food availability and fluctuations and effects on breeding success.*

Photo by: © Miro Zumrik

8. Carrying capacity/management effectiveness

- *BNMP reef carrying capacity and implications for management (only old and dubious data available, urgent need for an update under current circumstances and how carrying capacity is influenced by management, e.g. can carrying capacity be increased with proper management. Consider also new types of recreation such as kite surfing and assess actual effects).*
- *Effectiveness of nature management, both marine and terrestrial (is management having an effect and what management actions should be improved or instated?)*
- *Saba/Statia trails (effects of use, potential mitigation measures?)*
- *Assess effectiveness of restoration efforts (e.g. reforestation, are the right species being planted, is the focus on rare species correct or counterproductive?* **Note***: Echo is working on this on Bonaire). Aruba would like to see reforestation of native, endangered, and key fauna supporting flora.*
- *Study the difference between cruise tourism and stay-over tourism regarding their pressure on the terrestrial and marine environment, taking into consideration the infrastructure needed to accommodate these types of*

Monitoring and Research Wishlist

The Dutch Caribbean nature conservation organisations are in need for research projects on specific topics to safeguard biodiversity and promote the sustainable management of the natural resources of the islands.

9. Fisheries research

- **Conch:** *vertical (depth) migration of conch.*
- **Commercial fish species:** *identify reproductive season or peak spawning period and area and assess connectivity between islands.*
- ***Saba Bank:***
  - ◊ *carrying capacity of main target species (red snappers and lobster (also part of BO program) Feasibility of habitat restoration/artificial habitat for lobster fisheries on the Saba Bank.*
  - ◊ *Unused stocks: identify potential and sustainability of currently unused fish stocks such as diamond-back squid, swimming crabs.*

Photo by: © Mark Vermeij

10. Sociological study of nature perception in the community

- *How does the local community perceive nature and nature conservation and to what degree do they enjoy nature, how might this be improved? How effective is current communication, if any, to improve enjoyment of nature in the community and perception of the need to protect nature?*
- *Sustainable tourism – perception/expectations of tourists and residents as tourism grows (Bonaire).*
- *Invasive species control on islands where free-roaming livestock is a cultural norm – changing traditions in a changing world (Bonaire).*
- *Sociological/anthropological study of the cultural value of the endangered Lesser Antillean iguana Iguana delicatissima. How often is it caught? Perceived as a delicatesse? (St. Eustatius)*
- *Assess the extent of current pollution from land by plastic bags, styrofoam and other plastic debris. How willing are people to change their behavior vis a vis plastic bags, and what would be needed to effectively curb the continued generation of this type of marine debris.*
- *Sustainable development opportunities for tourism dependant islands (St. Maarten).*

11. DNA barcoding to monitor biodiversity

(is already running on St Eustatius by Naturalis)

- *Biodiversity inventory: terrestrial. (St. Maarten and Aruba (also marine))*
- *Endemic, Endangered, and Keystone species (size, distribution, conservation management): Shoco (continue program), Bats (continue program), Prikichi, Santanero, Cascabel (renew program), Pollinators, Key fauna supporting flora (Aruba).*
- *Natural history Flora and Fauna distribution.*

12. Improve baseline data on sharks

(continue Shark research, especially shark tagging, movement and abundance).

Photo by: © Stan Shea

Monitoring and Research Wishlist

The Dutch Caribbean nature conservation organisations are in need for research projects on specific topics to safeguard biodiversity and promote the sustainable management of the natural resources of the islands.

13. Coral reefs

- *Which herbivores can be used to reverse coral to algal phase shifts? Which algae are consumed and which ones aren't? (Curaçao)*
- *Effects of habitat fragmentation and its effect on gene flow on coral reefs (Curaçao).*
- *The contribution of waterflow to reef health (Curaçao).*
- *Shipping impacts to nearshore coral reef environments (Bonaire).*
- *GCRMN reef monitoring (St. Maarten needs funding for long-term project).*
- *To battle and research the impact of stony coral tissue loss disease (St. Maarten)*
- *Coral restoration, as we lost about 60% of our corals or more in the last 2 years (St. Maarten).*

14. Economic valuation of key habitats

(St. Maarten)

15. Environmental impact assessment landfill

(St. Maarten)

16. Anthropogenic stressors:

- *Effects, potential mitigation measures: Off-road vehicles (Aruba).*
- *Carrying capacity of (1) Off-road vehicles, (2) Conchi – (3)Natural Pool, Caves (Aruba).*

17. Sargassum and Seagrass:

- *Sargassum predictions, impacts, management (All).*
- *Sea grass research such as abundance, distribution and status (St. Maarten).*

18. Turtles:

- *Fibropapillomatosis in green turtles: cause, spread and severity of the disease (Bonaire, Curaçao).*
- *Sea Turtle Research (St. Maarten).*

19.Mangrove Restoration

(St. Maarten)

Photo by: © Brenda Kirkby

Monitoring and Research Wishlist

The Dutch Caribbean nature conservation organisations are in need for research projects on specific topics to safeguard biodiversity and promote the sustainable management of the natural resources of the islands.

Additional notes:

The following are research questions from previous years and still very much valid for Aruba, Curaçao and St. Maarten. They are mostly completed or underway on the Caribbean Netherlands' islands but some are still valid.

Collection and evaluation of baseline data

including species inventories and production/updating of habitat maps for key habitats and species including:

- ***Marine environments***
  (coral reefs, seagrass beds, mangrove forests):
  - ◊ ***Habitat maps*** *for all marine ecosystems: Aruba, Bonaire (windward side), Saba [done], Saba Bank, St Eustatius [done], St Maarten*
  - ◊ *Revised habitat maps for the leeward shore: Bonaire [done], Curacao [note that there are habitat maps for Bonaire and Curaçao produced by Fleur van Duyl but these are now decades out of date. Recently a report from WUR came out (Mücher et al. Hyperspectral Coral Reef Classification of Bonaire). During the NICO expedition bathymetric data has been collected by Dr. Henk de Haas (NIOZ) for the Dutch Caribbean islands but this data still needs to be analyzed.*
- ***Terrestrial environments:***
  - ◊ ***Habitat maps*** *for Aruba [habitat maps produced and ground truthed by CARMABI exist for all islands except Aruba]*
  - ◊ ***Species inventories*** *(all islands) [Statia starting soon]*
  - ◊ *Cost effective methods for assessing terrestrial habitat change [remote sensing is now being proposed for monitoring]*
  - ◊ *Detailed inventories and mapping for **key ecosystems** including*
    - › *Cactus habitats (Bonaire)*
    - › *Elfin forest (Saba)*
    - › *Boven forest types (Statia)*
  - ◊ *Baseline data and population dynamics (including reproductive biology and conservation ecology) for **key species** including:*
    - › *Caribbean coot*
    - › *Northern Caracara*
    - › *Red bellied racer (Saba, Statia)*

Photo by: © Diego Marquez

List of Acronyms

AUA	**Aruba**
BON	**Bonaire**
CUR	**Curaçao**
SAB	**Saba**
EUX	**St. Eustatius**
SXM	**St. Maarten**
ABC	Aruba Birdlife Conservation
AMMF	Aruba Marine Mammal Foundation
BEST	Biodiversity and Ecosystem Services in Territories of European overseas
BO project	Policy Supporting Research project
BU	Brock University, Canada
Calpoly	Canadian Institute for Advanced Research, Canada
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
DNM	Directie Natuur en Milieu, Aruba
DRO	Directorate of Spatial Planning and Development, Bonaire
EcoPro	Ecological Professionals Foundation
ECPHF	Eastern Caribbean Public Health Foundation
EPIC	Environmental Protection in the Caribbean
ETH	ETH Zürich, Switzerland
FIU (EEL)	Florida International University Environmental Epigenetics Lab
FSU	Florida State University
FPNA	Fundacion Parke Nacional Aruba
GLOW	Global Owl Project
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
MC	Marhaverlab, Curacao
MARUM	MARUM – Center for Marine Environmental Sciences, Bremen
NFSXM	Nature Foundation St. Maarten
Naturalis	Naturalis Biodiversity Center, Leiden, The Netherlands
NEV	Dutch Elasmobranch Association
NIOZ Sea Research	Royal Netherlands Institute for Sea Research
NTU	Nottingham Trent University, UK.
NWO	Netherlands Organisation for Scientific Research
RAVON	Reptielen Amfibieën Vissen Onderzoek Nederland
RRFB	Reef Renewal Foundation Bonaire
RuG	University of Groningen, the Netherlands
RU	Radboud University Nijmegen, the Netherlands
SCCN	Southern Caribbean Cetacean Network
SABARC	Saba Archaelogical Center
Scripps	Scripps Institution of Oceanography, U.S.A.
SDSU	San Diego State University, U.S.A.
SBMU	Saba Bank Management Unit
SCF	Saba Conservation Foundation
SECORE	SECORE International, U.S.A.
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
SU	Swansea University, UK
TU	Temple University, USA
UIU	University of Illinois Urbana-Champaign, U.S.A.
UC	University of California, Berkeley, U.S.A
UU	University of Utrecht, the Netherlands
UvA	University of Amsterdam, the Netherlands
VHL	University of Applied Sciences VHL, the Netherlands
VISR	Venezuelan Institute of Scientific Research
VU	VU University Amsterdam, the Netherlands
Wildconscience	Wildlife Conservation, Science and Education
WNF	World Wide Fund for Nature
WMR	Wageningen Marine Research, the Netherlands
WUR	Wageningen University and Research Centre, the Netherlands
WUR (Alterra)	Wageningen Environmental Research, the Netherlands
ZMT	Das Leibniz-Zentrum für Marine Tropenforschung, Bremen

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.

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*

"Brunet, T. et al. (2019).
Light-regulated collective contractility in a multicellular choanoflagellate. CELL BIOLOGY"

"Crewsn S.C., Debrot, A.O. et al. (2019).
The Arachnids (Arachnida) of Aruba, Bonaire, and Curaçao. Caribbean Journal of Science 49(2-3), 125-140."

"Eckert, K., Eckert, A. (2019).
An Atlas of Sea Turtle Nesting Habitat for the Wider Caribbean Region. WIDECAST Technical Report No. 19. Godfrey, Illinois. 230 pages, plus electronic Appendices."

"Haines, L.J., Coté, I.M. (2019)
Homing decisions reveal lack of risk perception by Caribbean damselfish of invasive lionfish. Biological invasions 21 (5): 1657-1668."

"Vermeij et al. (2019).
Historical changes (1905-present) in catch size and composition reflect altering fisheries practices on a small Caribbean island. PLOS one 14(6): e0217589."

Photo by: © Jannie Koning

Calendar

November

4-8	Conference	72nd Annual conference of the Gulf and Caribbean Fisheries Institute, Dominican Republic.
11-20	Workshop	Financial Sustainability Workshop, St. Eustatius, Saba, St. Maarten (DCNA, WNF, WolfsCompany)
15	Symposium	4th annual AcroporaNet Symposium, Texel, the Netherlands
21	Event	World Fisheries Day

December

12	Conference	2nd World Marine Mammal Science Conference, Barcelona, Spain
10	Meeting	Fisheries Commission BES meeting, Saba
11	Meeting	EEZ commmittee meeting, Saba

More events to add to this calendar?
Please e-mail us: research@DCNAnature.org

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References

The reports and publications on biodiversity related subjects in the Dutch Caribbean 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.

Stony Coral Tissue Loss Disease Management Update

AGGRA. "Where Is This Occurring?" AGRRA, 2019, www.agrra.org/where-is-this-occurring/.

Florida DEP. "Case Definition: Stony Coral Tissue Loss Disease (SCTLD)." Florida , Florida Department of Environmental Protection, 2 Oct. 2018.

Florida DEP. "Stony Coral Tissue Loss (SCTL) Disease Response." Florida Department of Environmental Protection, 2019, floridadep.gov/rcp/coral/content/stony-coral-tissue-loss-sctl-disease-response.

GCFI. Experts Share Knowledge to Tackle Stony Coral Tissue Loss Disease - Key West, August 1-2, 2019. AGGRA, 5 Aug. 2019, www.agrra.org/coral-disease-outbreak/experts-share-knowledge-to-tackle-stony-coral-tissue-loss-disease-key-west-august-1-2-2019/.

Martinelli, Maurizio. "Florida's Ongoing Coral Disease Outbreak: Current Status, Research Findings, and Management Response." Florida Sea Grant. 2019.

Reef Resilience. "Stony Coral Tissue Loss Disease." Reef Resilience, 2019, reefresilience.org/managing-for-disturbance/managing-coral-disease/stony-coral-tissue-loss-disease/.

A Critically Endangered Palm Found Only on Bonaire

de Freitas, J., Camilleri, J,. van Eijk, S., Posno, V., Valdes, I., Coolen, Q., van Blerk, J. & Griffith., M.P. (2019) Sabalpalm (Sabal antillensis) recovery over 40 years: lessons for successful palm conservation. Palms 63: 57–68.

Goldman, D.H., Klooster, M R., Griffith, M.P., Fay, M.F. & Chase, M.W. (2012) A preliminary evaluation of the ancestry of aputative Sabal hybrid (Arecaceae: Coryphoideae), and the description of a new nothospecies, Sabal × brazoriensis. Phytotaxa 27: 8–25. https://doi.org/10.11646/phytotaxa.27.1.2

Griffith, M.P., J. de Freitas, J., Barros, M. & Noblick, L.R. (2017) Sabal antillensis (Arecaceae): a new palmetto species from the Leeward Antilles. Phytotaxa 303: 56–64. https://doi.org/10.11646/phytotaxa.303.1.4

Griffith, M. P., Coolen, Q., Barros, M. Noblick, L.R. "Sabal Lougheediana (Arecaceae), a Critically Endangered, Endemic Palm Species from Bonaire." Phytotaxa, vol. 420, no. 2, 10 Oct. 2019, pp. 95–101., doi:10.11646/phytotaxa.420.2.1.

IUCN. (2012) IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv+ 32 pp.

Winkelman, J.E. (1979) Inventarisatie Sabal spec. (Cabana) (fam. Palmae) op Curaçao en Bonaire N. A. Thesis. Landbouwhogeschool, Wageningen, 14 pp.

Zona, S. (1990) A monograph of Sabal (Arecaceae: Coryphoideae). Aliso 12: 583–666. Https://doi.org/10.5642/aliso.19901204.0

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