



2021

ANNUAL REPORT

CARMABI FOUNDATION

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Annual report 2021

FROM THE DIRECTOR

In 2021 the global Covid pandemic continued. But 2021 was also the year vaccination started giving us a powerful tool to beat the virus. Nevertheless, our income from different sources including the parks remained very low during the first half of 2021, especially during the April – May lockdown. We survived financially by using our reserves and both the NOW and TVL subsidies. During the second half of 2021 everything changed for the best and our income jumped to above 2019 levels. Curacao was considered a safe destination and people in general broke out of their houses in which they had been locked up for long periods of time and rediscovered nature.

We want to thank the government, especially regarding the NOW and TVL subsidies, other NGO's, volunteers, donors, and private persons, who assisted us in these difficult times. And of course our staff. Without all of you it would not have been feasible to achieve our objectives.

Despite of the local and international Covid measures a total of 48 scientists visited Carmabi, to conduct a wide variety of research projects. In addition, 115 students participated in various courses that were taught at Carmabi bringing the total number of visitors to our science center to 163. In total 39 scientific publications were published based on work done at Carmabi. Notwithstanding the epidemic the occupancy rate of our Science Center was 53%, almost the 2019 pre-Covid rate.

The Terrestrial Parks Department has done well. A total number of 52.502 visitors were welcomed in the Christoffel National Park in 2021. This is an increase of 56% compared to 2020. A total number of 53.890 visitors visited the Shete Boka National Park in 2021. This is an increase of 31% compared to 2020. In 2021 a total of 33.805 people visited the Hato Caves, a decrease of 5% compared to the year before. The Open Day of the Christoffelpark took place this year on the 7th of November.

Work on the new National Park Rif St. Marie – Hermanus, which will be managed by the terrestrial parks department at Savonet, has continued in 2021. Management agreements have been signed with Refineria di Korsou (RdK), the Government and the Stichting Monumentenzorg Curaçao. A bridge and a camping place have been constructed. We still need a central place for selling the tickets.

On the 27th of November 2020 a management agreement was signed with the Government for the management of the Curacao Marine Park at Oostpunt. In 2021 a new department was therefore established at Carmabi, the Marine Parks Department, which soon will also encompass the Curacao Rif Mangrove Park. In 2021 a Department Head and two rangers were recruited. Work has already started including the purchase of a vehicle, the renovation of a boat and the design and production of buoys. The mangrove park infrastructure which is built by the Government has been completed except for the Visitor Center. We are now waiting for a temporary infrastructure for the sale of tickets to be installed.

Annual report 2021

FROM THE DIRECTOR

This year, 2021, was a successful year for the Carmabi Education Department. Despite the restrictions due to the Covid-measures in the first half of 2021, substantially more children have participated in an Education Program of the Carmabi Education Department compared to recent years. A total of 14.421 schoolchildren took part in an education program for primary education. In addition, all schools and other interested parties have received the teaching methods 'Coral Heroes' and 'Nos Medio Ambiente (our environment)'. These multilingual, ready-to-use methods can be used in the classroom and enrich nature and environmental education in schools. The newly developed programs on mangroves for Elementary Schools and the program on wastewater for Secondary Education will also contribute to a greater awareness.

The Advice and Consultancy department implemented various consultancies in 2021. The income from these consultancies was needed due to the drop in income during the first half of the year.

On the 26th of November we had the honor to be visited by Her Royal Highness Princes Beatrix who attended a lesson with schoolchildren, was briefed on the state of the coral reef and opened symbolically the Curacao Marine Park by ringing a bell on the Carmabi pier.

On the 20th of October the Oostpunt court case took place. Unfortunately, we lost this court case. On the 11th of January 2022 we appealed.

During the end of 2021 the Omicron crisis started. So far this hasn't impacted Carmabi a lot. We are therefore looking towards 2022 with confidence!

Paul Stokkermans
Director Carmabi



scientific research (marine)

VISITING SCIENTISTS

46 scientists visited Carmabi in 2021. In addition, 115 students participated in Coral Reef Ecology courses and workshops that were taught by Carmabi and various universities and organizations from the Netherlands and the United States. The number of visiting scientists and students in 2021 was only slightly lower compared to years before COVID-19 (Figure 1).

Approximately 90 researchers and students had to cancel previously booked trip to come conduct research at Carmabi. Most visitors in 2021 were from the United States (55%) followed by the Netherlands (23%). Almost all the scientists and students that worked at Carmabi stayed at the facilities at Piscadera. The occupation of Carmabi's science center in 2021 was 53% which is also an improvement compared to the preceding COVID year, i.e., 26% in 2020 (2019: 56.2%, 2018: 67% 2017: 53%, 2016: 58%, 2015: 54%, 2014: 47%, 2013: 28%).

An overview of the areas in which researchers were active that visited or worked at Carmabi in 2021 is shown in Figure 2. An overview of visiting scientists (PI name and home institute) is attached in Annex 1.

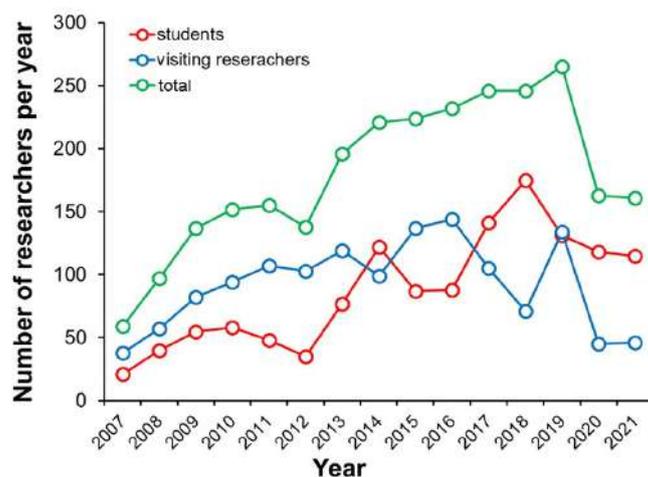


Figure 1

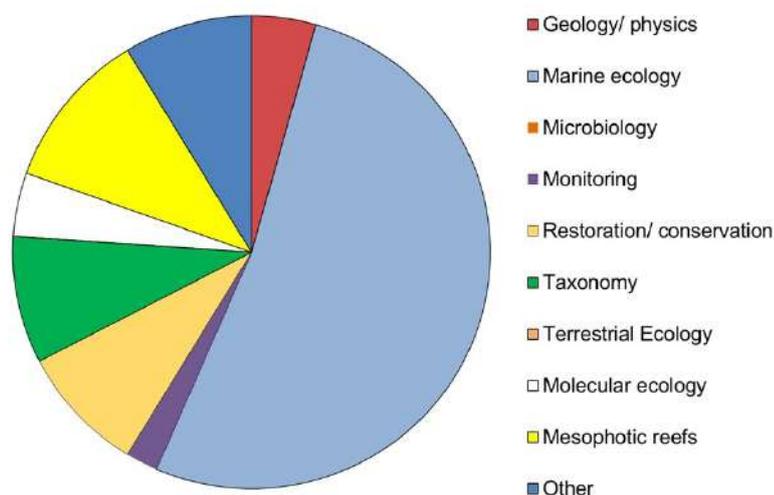


Figure 2

scientific research (marine)

PEER REVIEWED PUBLICATIONS

Thirty-eight publications appeared in peer reviewed scientific journals based on work that was conducted at Carmabi making 2021 the most productive year ever in terms of Carmabi's scientific output ([Figure 3](#)).

The results of some of these studies have been featured in magazines, news programs and educational websites around the world. Furthermore, 17 reports were produced by MSc students that did their master's thesis' project at Carmabi.

An overview of all peers reviewed scientific publications published in 2021 is shown in [Annex 2](#).

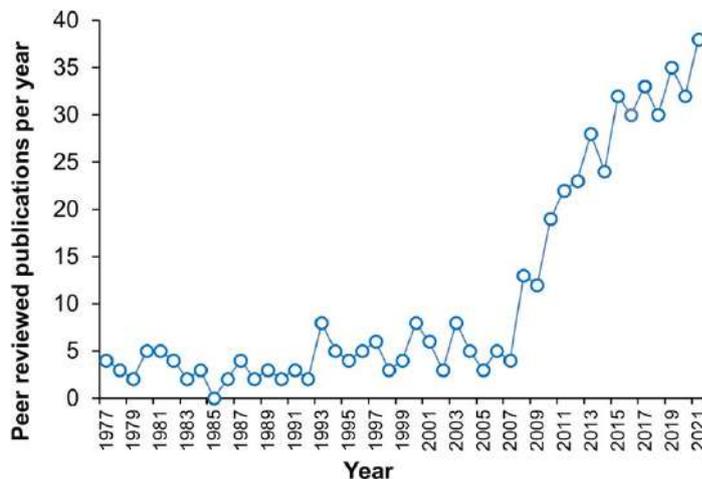


Figure 3

FREE ADVICE, OUTREACH, AND CONSULTATION



Several organizations, government departments (Curacao, Aruba, and The Netherlands), the press and others received free advice and information from the Carmabi Science Department during the year.

We assisted in 37 cases, both oral and written. In 2021 the Carmabi Science Department was featured/ interviewed in 102 items for international and local TV, radio, and newspapers. Three documentaries on (marine) biology were filmed at Carmabi in 2021.

scientific research (marine)

SELECTED PROJECTS 2021

Coral Live 2021

The Coral Live expedition team engaged students around the world with the wonders of the coral reefs and the human impact on these fragile ecosystems through a series of live broadcasts from 8 to 17 November 2021 (Figure 4).

Covering less than 1 percent of the marine environment, coral reefs are home to 25 percent of marine species and important nursery habitats to edible fish. It is estimated that 1 billion people depend on food from the reefs. Exploring this fascinating topic, Jamie Buchanan-Dunlop, educator and expedition leader, and Ellie Mackay, science communicator, brought corals to life for classrooms around the world. Working with researchers at the CARMABI research station, Jamie and Ellie hosted thirty interactive education broadcasts for teachers keen to bring science, geography and primary school learning to their classroom.

Running on Digital Explorer's YouTube Live Channel, teachers were able to introduce their students to any of the five topics: an introduction to coral, coral ecosystems, corals and climate change, the deep reef, and the coral adaptation. Each day of broadcasts was dedicated to one of these themes and classes could choose from three different live broadcast formats running twice daily, live investigations, interviews with experts and Ask-Me-Anything sessions. The program won the Education Technology industry's biggest award (BETT award) in 2019. The Coral Live program from CARMABI reached 30 thousand students from 163 schools in 8 countries.



Figure 4

scientific research (marine)

SELECTED PROJECTS 2021

SEALINK Project starts on Curaçao

In 2020, Minister of Education, Culture and Science, has announced that more than 7 million euros had been awarded to two projects within the NWO program Caribbean Research to strengthen the knowledge system and the embedding of scientific research in the Caribbean part of the Kingdom of the Netherlands. The research programs focus on issues that are of great societal and scientific importance for the Caribbean region and facilitate the transfer of knowledge via education and outreach. This is the first time that NWO has funded programs of this size in the Dutch Caribbean.

One of these two awarded projects is the SEALINK with program chair Prof dr. Mark Vermeij (University of Amsterdam, CARMABI Curaçao). The project kicked off in the fall of 2021 when ~30 researchers involved in the project visited Curacao. The SEALINK Program will establish an integrative, transdisciplinary research program merging geology, hydrology, ecology, and sociology. This program will bring together a diverse consortium of scientists to create a new tradition of integrative, transdisciplinary science in the Dutch and wider Caribbean. The program will leverage the remarkable scientific value that exists across the six islands of the Dutch Caribbean due to their existing differences in geology, coastal morphology, freshwater abundance, erosion, coastal development, and sewage infrastructure. By bridging multiple fields of research, SEALINK will reveal how natural processes and human influences along the land-sea continuum interactively shape the future of coral reef communities, and how this in turn affects the ability of coral reef systems to provide valuable benefits back to the human communities that live, work, and play just steps away (Figure 5).

For more information: <https://www.sealinkcaribbean.net/>



Figure 5

scientific research (marine)

SELECTED PROJECTS 2021

Long-distance relationships for endangered corals

Flash-frozen sperm collected from corals in Florida and Puerto Rico was used to fertilize coral eggs from hundreds of miles away in Curaçao. The technique could be used as a conservation tool by introducing genetic variation into endangered corals and potentially accelerating their adaptation to climate change. The juvenile corals raised from this trans-Caribbean coupling demonstrate the reproductive compatibility of coral colonies that would otherwise be too far apart to produce offspring in the wild and they represent the largest wildlife population ever raised from cryopreserved material (Figure 6).

A paper describing this study appeared in the Proceedings of the National Academy of Sciences. Genetic diversity is the fuel for species adaptation. However, sexual reproduction by Caribbean corals that causes genetic diversity is now increasingly rare.

To increase genetic diversity in corals, researchers used 'assisted gene flow' by bringing corals together that are physically distant in the wild using cryopreserve coral sperm. These results demonstrate that assisted gene flow could be a valuable tool in conservation by introducing genetic diversity into this critically endangered marine species.

The research was funded by the Paul G. Allen Family Foundation. Additional support was provided by the Smithsonian Conservation Biology Institute, the Hawaii Institute of Marine Biology, the Volgenau Fitzgerald Family Fund, National Geographic, the U.S. National Science Foundation, and the Government of Curaçao.

Source: Smithsonian's National Zoo



Figure 6

scientific research (marine)

SELECTED PROJECTS 2021

Real time information on seawater temperature on Curacao

Curious to know what the conditions are of the seawater near Piscadera?

Our new buoy (Figure 7) reports "real time" seawater temperatures, wave conditions etc. and this information is available to all that are interested. It is accessible by clicking the link below.

Remember: 68 degrees F is 20 degrees C and 86 degrees F is 30 degrees C. For those swimming, diving, and boating in and near the Piscaderabaai area, please do not use this buoy (see picture) for climbing, mooring etc. Thanks!

For current seawater temperatures at Piscadera: <https://spotters.sofarocan.com/historical/SPOT-1032>



Figure 7

scientific research (terrestrial)

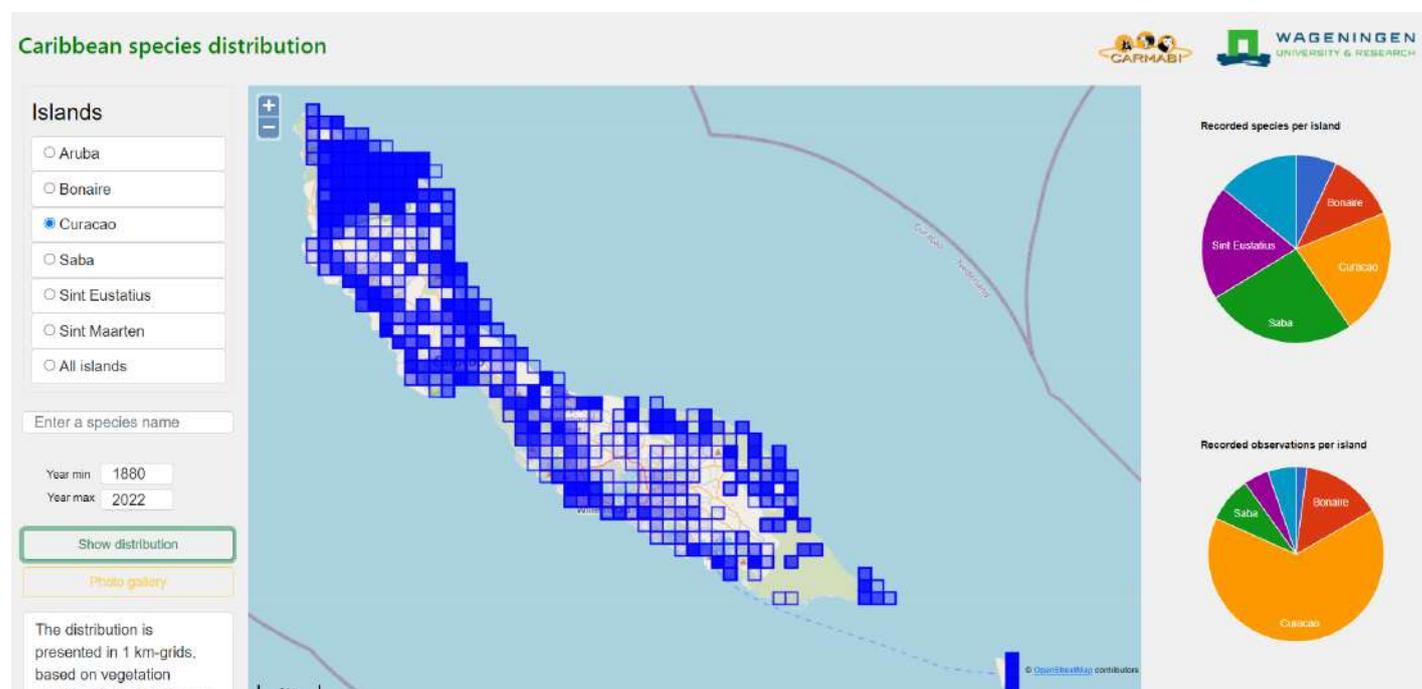
SELECTED PROJECTS 2021

NLBIF project plant distribution

The collaboration between Wageningen University and Research and CARMABI to further knowledge on the status and distribution of plant species was continued in 2021. Within the project plant occurrences were collected from a range of different sources, including recent and historic flora and vegetation research, herbarium collections and private photo collections. Occurrences were also validated by project team to ensure correct identification. The project only included naturally occurring plant species. This includes all native flora, but also includes some introduced and invasive species which escaped into the wild, while excluding all plants introduced species limited to rural areas.

Throughout the two-year project over 35.000 plant occurrences have been validated, georeferenced and digitized for the Dutch Caribbean, with almost 20.000 plant occurrences from Curaçao. From the 555 plant species for Curaçao, 531 plant species (96%) are included in the project.

Source: *The Curacao Chronicle*



scientific research (terrestrial)

SELECTED PROJECTS 2021

Vegetation research Aruba

As part of the larger project on plant distribution for the Dutch Caribbean, Wageningen University and Research and Carmabi visited Aruba to train Fundacion Parke Nacional Aruba (FPNA) personnel and other interested parties and persons in identifying native plant species and mapping vegetation as well as study the distribution of native plant species (Figure 8).

The visit yielded two new plant species for the Dutch Caribbean and a new plant species for the islands Aruba and Curaçao. The species were all found near a small freshwater body and included two Sedges (Cyperaceae; *Cyperus surinamensis* and *Cyperus distans*) and Yellowseed false pimperl (Lindernia dubia). Likely these species are also found near other water bodies in Aruba, Bonaire and Curaçao. Other for the islands new plant species are likely to be found in similar understudied habitats.

Figure 8



Saliña and mangrove vegetation of Spanish Lagoon, Aruba



Assisting National Parks

The Consultancy department supported the Christoffel National Park and Shete Boka National Park with monitoring of flora and fauna and providing advice on management.

The department also advised on the National Parks in development; the 'Curaçao Rif Mangrove Park' and the 'National Park Rif St. Marie - Hermanus'.

scientific research (terrestrial)

MONITORING ACTIVITIES 2021

Monitoring activities

The monitoring of flora and fauna of the National Parks was continued in 2021; Activity of nesting turtles was monitored for the Shete Boka National Park and Boka Grandi (Christoffelpark) and the Curaçao White-tailed deer (*Odocoileus virginianus curassavicus*) population was monitored in the Christoffelpark.

The department has conducted the yearly monitoring of nesting sea turtles of the Shete Boka National Park (Figure 9); three visits of the sandy pocket beaches of the Shete Boka National Park per week during nesting season, running from May to December. Patrols are now also conducted by drone, which proved to be more time efficient while also providing HD imagery of the beaches. These pictures are stored and provide opportunity to study for example beach erosion and sargassum influx.

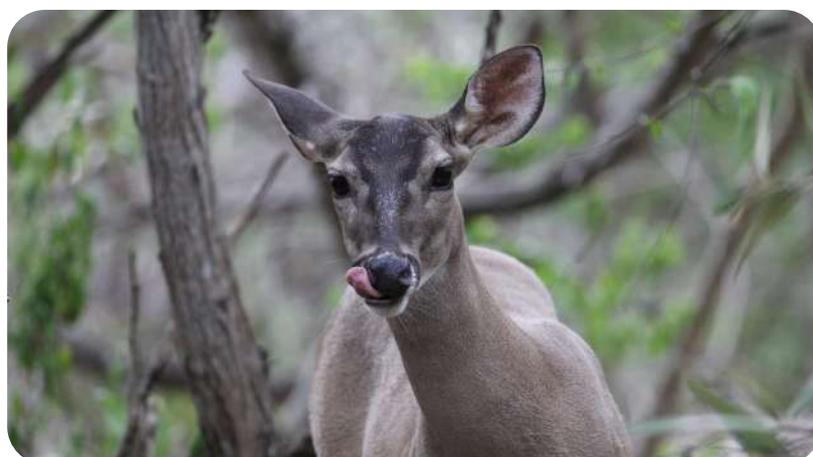
Compared to both the 2019 and 2020 monitoring seasons, lower activity of Green turtles (*Chelonia mydas*) and Hawksbill turtles (*Eretmochelys imbricata*) was observed in the Shete Boka National Parks. Continued monitoring during the coming nesting seasons will provide more information on the use of the Shete Boka National Park pocket beaches by nesting sea turtles.

A new monitoring protocol was established to study the Curaçao White-tailed Deer in the Christoffelpark by use of wildlife cameras during the second half of 2021. The new protocol, based on distance sampling, will run for a year and provide an estimate on deer population size for the Christoffelpark. The research is also being conducted in neighbouring former plantation Wacawa, an important habitat for the Curaçao White-tailed Deer.

Figure 9



Drone imagery of Boka Kalki, Shete Boka National Park



Curaçao White-tailed deer (*Odocoileus virginianus curassavicus*) near Savonet, Christoffelpark

scientific research (terrestrial)

NATIVE PLANT NURSERY

The native plant nursery has steadily seen an increase in the number of species and the number of plants grown (Figure 10). Main goal of the nursery is to study Curaçao's flora in detail, focussing on all stages of development of Curaçao's native plants which in turn greatly improves our understanding of landscape ecology and vegetation. The nursery also provides companies and private persons the opportunity to buy native flora for landscaping purposes and so aims to promote the use of native flora.

Currently 130 native plant species are cultivated inside the greenhouse, including rare and endemic species. The nursery includes all elements of vegetation and aims to provide a complete representation of Curaçao's vegetation and therefore includes trees, shrubs, herbs, vines, and succulents.



Figure 10

Developing seeds *Erythroxylum havanense*

Important milestones in newly cultivated species are the successful germination of the rare trees *Eugenia procera*, *Guaiacum sanctum*, *Erythroxylum havanense* and *Geoffroea spinosa*. Although some of these trees only germinated in small quantities, the successful germination provides a good perspective for the future as we aim to further increase the number of these rare plant species.

In general, many of the earlier successfully attempts in germinating native plant species have been replicated as to increase availability of these species. For instance, *Coccoloba swartzii*, *Myrcia curassavica*, *Sabal antillensis* and *Guapira pacurero* are now readily available and can be reliably germinated from seeds.

The end of 2021 saw the start of phase two of the native plant nursery, with the expansion of the facilities at Savonet. The expansion provides the opportunity to increase the scale of operations at the nursery and allows for the increase of available plants species and the number of individual plants. During 2022 the expansion of the nursery will be finalized and the botanical garden will be started to highlight and showcase the plants grown in the nursery.

consultancy department

RESEARCH & SERVICES

The consultancy department has seen a steady increase in the number of consultancy requests throughout 2021 while also conducting terrestrial research and monitoring of the National Parks. Different smaller projects were commenced and finalized, and larger and long-term research collaborations and consultancy projects were established. The department provides ecological advice, conducts biological inventories, and formulates conservation priorities and management plans of natural areas and National Parks.

The department was further equipped and professionalized. Professional drone services were added to the department, providing a valuable bird's-eye view, and allowing improved mapping and surveying techniques. Due to increased data collection with remote sensors (e.g., drones, wildlife camera's) and the strong increase in necessary data storage, a server was installed to facilitate easy access and safe storage of data.

Biological inventory of military practice and firing range Wacawa, Curaçao

Carmabi's consultancy department was requested by Dutch Ministry of the Interior and Kingdom Relations (BZK) to conduct a series of biological inventories of areas of the former plantation and current military practice and firing range Wacawa (Figure 11). Wacawa is a designated Conservation area following the Island Zoning Plan (EOP), the coastal area is part of the Ramsar site Northwest Curaçao (Ramsar site no. 2119).

Subject of the inventories were two areas proposed for development as to expand the practice grounds and increase training capacity. The inventories included standardized surveys to assess the current state of vegetation, avifauna and Curaçao white-tailed deer. Results of the survey indicated the importance of the coastal area of Wacawa for nesting Least terns (*Sternula antillarum*), an internationally protected bird species.

2021 also saw the start of the larger inventory of the entire Wacawa and St. Hyronimus area. This collaboration between Rijksvastgoedbedrijf (as part of BZK), Wageningen University and Research and Carmabi will provide a detailed study on the natural value of Wacawa. Aim of the study is to provide more detailed information on the state of vegetation and population size and habitat use of the Curaçao White-tailed deer and to assist and advice on the use of the area as military practice and firing range. The research will be continued throughout 2022 and 2023.

Figure 11



Wacawa coastal area

Consultancy department

SELECTED PROJECTS 2021

Jan Kok

The vegetation of an area near former plantation Jan Kok (Figure 12) was quantified to provide Peppelhof Advies with biological information in relation to the proposed development of the area. The area is designated partially as Rural area and partially as Open land area following the Island Zoning Plan (EOP). The area was cultivated in the past for agricultural practices.



Figure 12

Jan Kok

The results of the survey indicated the presence of a recovering vegetation following historic land use. Areas close to the plantation complex were found to have a more disturbed vegetation and have a higher occurrence and abundance of invasive species. More distant areas were found to have a more pristine vegetation. Seasonal gullies (rooien) were identified and mapped as important landscape features for their ecological importance and the presence of some rare plant species.

Coral Estate Resort

Caribbean Crown Realty NV, Curaçao, requested Carmabi's consultancy services to assess the natural values of an area near the main resort of Coral Estate Resort (Figure 13). The area is a designated Conservation area following the Island Zoning Plan (EOP) and was assessed following standardized protocols for vegetation and avifauna studies.

Following the results of the survey, areas have been mapped with high natural values including rare and protected plant species warranting the Conservation status of the area and deemed unsuitable for development. A directly neighbouring area to the main resort was deemed suitable for development.



Coral Estate

Figure 13

consultancy department

SELECTED PROJECTS 2021

Rif St. Marie

Ecovision, Curaçao, requested Carmabi's consultancy services to conduct the inventory of natural values of the Rif St. Marie area (Figure 14). Plans have been proposed to develop the area into an eco-resort, following the Island Zoning plan designation of the area as Urban living area. The area borders the Ramsar site (site no. 2120) and National Park Rif St. Marie – Hermanus. The study included surveys on vegetation and the Curaçao white-tailed deer.

Due to the presence of a complex network of seasonal gullies (rooien), transporting precipitation from the watershed to the Ramsar site, the area marked for development and the Ramsar site are strongly linked. The vegetation of the area was found to be diverse, including some rare species for the island, which can be explained by the large differences in composition of the landscape (e.g., elevation, geology, and soil characteristics). The presence of deer could not be confirmed, however neighbouring areas have documented deer presence and it is to be expected that deer also visit the Rif St. Marie area, although likely in low numbers.

Figure 14



Rif St. Marie

park management

CHRISTOFFELPARK & SHETE BOKA

One of the main focuses of Carmabi is nature management and nature conservation. The Parks Department of Carmabi is responsible for the management of the Christoffel National Park (which includes the Savonet Museum) and Shete Boka National Park. The Hato Caves is outsourced to Indian Caves BV. The parks are among the most popular attractions on the island for both locals and tourists.

The Christoffel National Park comprises more than 2300 ha. of protected land and has the highest biodiversity in the ABC islands. The park is also home to an array of animals and plants including several endemic species.

The Shete Boka National Park is a coastal stretch of land consisting of 13 inlets. Aside from its importance as a crucial turtle nesting site, the Shete Boka National Park offers spectacular views of the incoming waves and rock formation along the island's northern coast.

The Hato Caves is the biggest and most prominent cave on the island. Formed more than 200.000 years ago below the sea level, the Hato Caves is currently one of the most beautiful and popular natural occurrences on the island. Alongside its eminent beauty the Hato Caves offers a glimpse into the rich history of Curaçao, from the remains of petroglyphs to its importance as sanctuary for runaway slaves.



Peacock at the Savonet Plantation



View of the Saliña in the Christoffel National Park

park management

OVERALL VISITOR STATISTICS

In 2022 the COVID-19 Pandemic continued to have its effects on the overall visitor numbers of the Parks Department of Carmabi. As a result of the negative travel advice from the Netherlands towards Curaçao in the first quarter of the year, visitor numbers from the island's leading tourism market (the Netherlands) plummeted. Furthermore, a total lockdown was announced by the Government of Curaçao in March 2021. As a result, the Parks Department closed its doors in the period March to May 2021. As the lockdown and COVID-19 measures were gradually uplifted, the visitor numbers for the island and the Park's Department began to slowly rise again.

As the COVID-19 situation on the island stabilized, the negative travel advice from i.e., the Netherlands, Germany and the US were retracted. The effects of these positive developments can be seen in the take-off of the visitor numbers in the second half of the year, where the total visitor per month surpassed the number of visitors from the same months in 2019. The Park's Department is hopefully that this growth-trend will continue in 2022.



View over Boka Wandomi Shete Boka National Park

park management

OVERALL VISITOR STATISTICS

Christoffel National Park

The Christoffel National Park offers a variety of recreational activities to its visitors such as hiking, mountain climbing, camping and guided tours such as jeep safaris, bird watching and deer watching.

In 2021 the Christoffel National Park welcomed a total of 52.502 visitors which is an increase of 56% compared to 2020 in which 33.667 visitors visited the park (Figure 15). The mentioned amount includes i.e., a total of 13.098 local visitors (Figure 16). And 32.933 tourists (Figure 17).

FIGURE 15

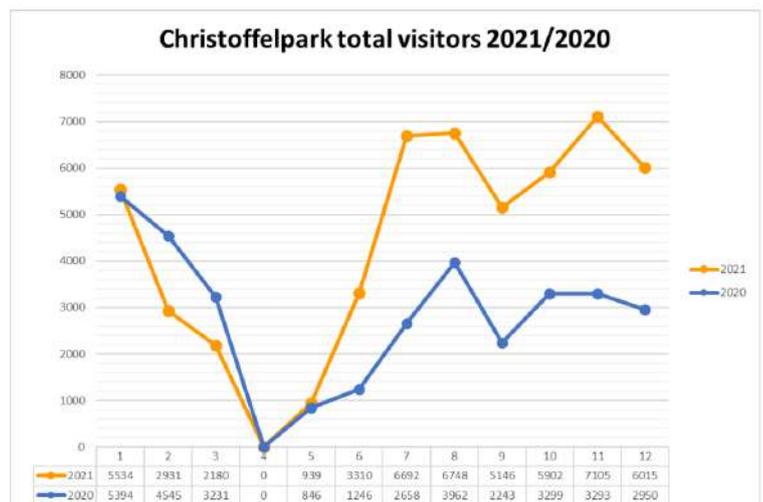


FIGURE 16



FIGURE 17



park management

OVERALL VISITOR STATISTICS

Shete Boka Park

The National Park Shete Boka welcomed a total of 53.890 visitors in 2021 (Figure 18). This is an increase of 31% compared to 2020 in which 41.147 visitors visited the park. The mentioned amount includes i.e. a total of 9.484 local visitors (Figure 19), and 37.621 tourists (Figure 20).

FIGURE 18

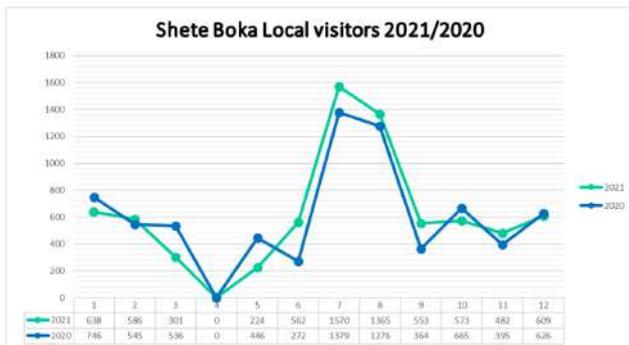
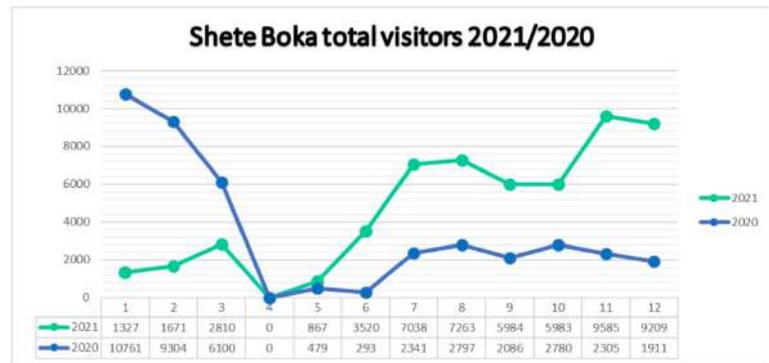


FIGURE 19

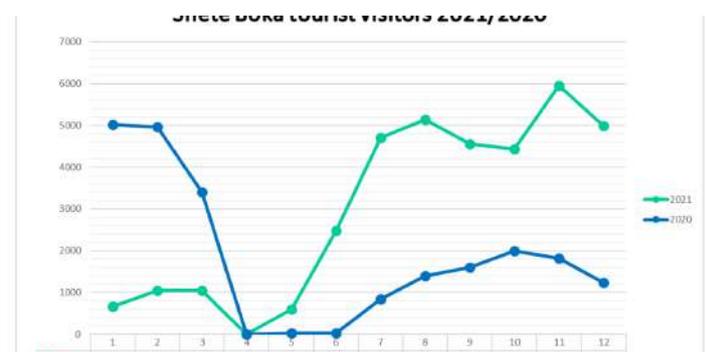
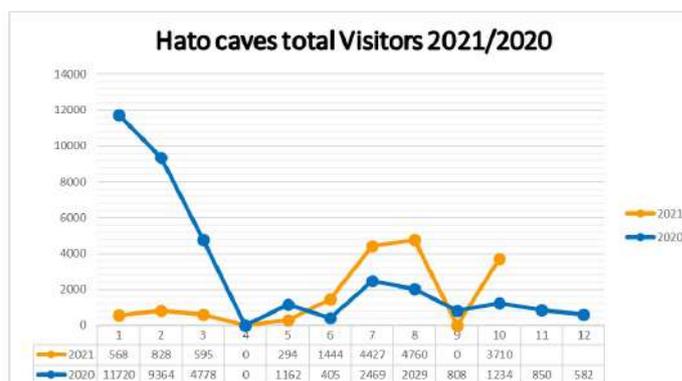


FIGURE 20

Hato Caves

A total of 33.805 visitors visited the Hato Caves in 2021. This is a decrease of 5% compared to 2020 in which the Hato Caves welcomed 35.401 visitors (Figure 21).

FIGURE 21



park management

PROJECTS

National Park Rif St. Marie - Hermanus

In 2021 Carmabi has begun setting up the new National Park Rif St. Marie – Hermanus near Willibrordus in Banda Bou. The park covers an area of 667 ha. at both sides of the salinja Rif St. Marie and includes also the salinja itself.

Carmabi has signed management agreements with Refineria di Korsou (RdK) (29th of January 2021) for Rif St. Marie, with the Government of Curaçao for Hermanus and the salinja (24th of May 2021) and with the Stichting Monumentenzorg Curaçao (1th of July 2021) for the salt pans of Jan Kok.



Opening of the bridge by Minister Charles Cooper and two members of the Willibrordus community

Since this is a new park, we are improving the park infrastructure. The areas of Rif St. Marie and Hermanus are separated by a salinja which is connected to the sea by means of a channel of more or less 10 meters wide. To make it possible for the park visitors to move from Hermanus to Rif St. Marie and vice versa we requested the Dutch Army to construct a Bailey bridge crossing the aforementioned channel. Before the bridge was built, the two areas were connected by a semi-submerged metal pipe. The Dutch Army has donated this bridge to Carmabi. The bridge makes it possible for not only hikers but also bikers to easily get to the respective sides. In the same period the bridge was constructed also a camping place was built behind Landhuis Hermanus. The camping place can be used by local groups including vacation activities for schoolchildren (vakantieplannen) and tourists alike.

The opening of the bridge and camping place happened on the 21st of October.



The pavilion at the Hermanus plantation house

park management

PROJECTS

Cooperation with the Dutch Army

Carmabi and the Dutch army work closely together on a yearly basis on certain trainings projects for the Army Corps of Engineers (Genie). The army needs building projects for training purposes and Carmabi has many building projects in the parks. Examples are the bridge and camping place mentioned above.

Every year the army invites its stakeholders for a lunch at its base at Parera. In 2021 the lunch took place on the 2nd of December. Invited were director of Carmabi Paul Stokkermans and the Head of the Department of Terrestrial Parks of Carmabi, Kenneth Tromp.



Lunch at Parera



Terrace at Christoffel Food and Terrace

Restaurant Christoffelpark

The Christoffel Food Terrace had been closed after the previous tenant left but opened its doors again in august 2021.

The restaurant facilities at the Christoffelpark are now fully operational again. The Terrace is open all days of the week and offers breakfast and lunch to the visitors of the Christoffelpark and public.

park management EVENTS

Open Day/Dia di Sabaneta

On November 7th, 2021, the Christoffel National Park held its annual open day and 'Dia di Sabaneta' Celebration in collaboration with the residents of Sabaneta. Due to the pandemic, this yearly celebration could not take place in 2020. The event was a success, welcoming a great amount of people. Throughout the event, particular care was taken regarding the COVID-19 hygiene measures introduced by the government of Curaçao. Participants and visitors were required to have a QR-code to access the premises of the park, where the activities were held.



Kids could also participate in a quiz where they had to do several activities at each department to win prizes such as T-shirts, compasses, and puzzles.

A Market Fair was organized and featured several local artists and vendors selling locally handmade goods including decorations, jewelry, and souvenirs. The food and beverage booths included local food such as goat and iguana stew and beef soup. Visitors could also opt for BBQ while they enjoyed the live music or dance workshop.

Visitors could climb the Christoffel mountain free of charge. Interested visitors could also join a guided hiking tour to the north side of the Park. For the more adventurous visitors, safari tours were held every hour in which participants got an introduction to the local flora and fauna.

The event featured several activities for kids including a bouncer and face painting. Furthermore, representatives of the Consultancy Department of Carmabi, the Marine Park and the Department for Nature and Environment Education (NME) were present to give visitors more information about the work they do.



park management

MAINTENANCE

Restorations in Christoffel Park

Despite the Covid-19 measures the Parks Department has continued to carry out its regular park maintenance. This includes the maintenance of hiking trails, car routes, park signs, platforms etc. Restoration of Shete Boka/Christoffelpark Platform



The restored platform at Christoffelpark- viewpoint Boka Tabla

Platform renewed

The Platform at the Christoffel National Park with a view on Shete Boka has been completely restored as part of the periodical maintenance schedule.

Christoffelpark guests can once again enjoy the spectacular view of the northern coast and incoming waves on a safe distance on the platform. Furthermore, regular maintenance has been conducted on the Boka Tabla platform at the Shete Boka National Park.

New shower Facility

An outdoor shower facility has been created at Savonet for the Dutch Army. Old horse stalls have been transformed into 3 separate showers. The Dutch Army periodically spends a few nights in the Christoffelpark, as they carry out annual training on the park terrain. From now on they will be able to take a shower during their training.



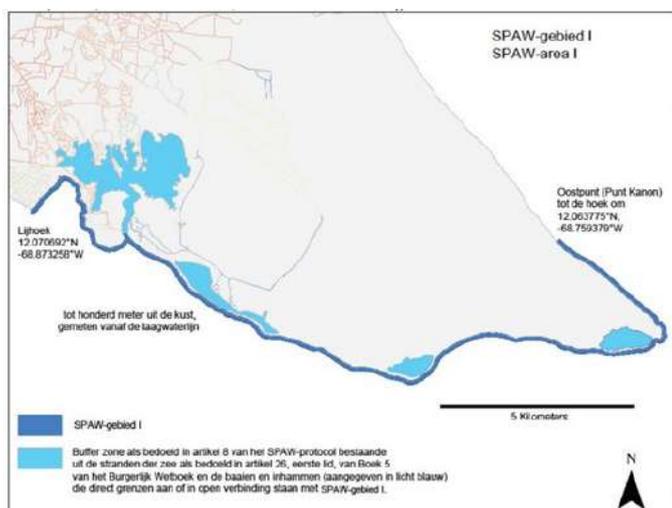
old horse stalls converted into shower facilities for the Royal Marine

park management

CURACAO MARINE PARK

Selected projects and other activities

In 2021 Carmabi established a new Marine Parks Department that is responsible for the management of the Curacao Marine Park (SPAW-area 1) and which will be also responsible for the management of the Curacao Rif Mangrove Park in Otrobanda in 2022.



SPAW- Area 1

FIGURE 22

Management Curacao Marine Park (SPAW-Area 1)

The government selected Carmabi to manage the newly designated SPAW-area 1 at Oostpunt and to cover all the expenses related to the management of the SPAW-area 1 for 5 years. Carmabi signed an agreement with the Curacao Government for the management of the park, and with the Curaçao Ports Authority (CPA) regarding the funding, on the 27th of November 2020.

In 2021 Carmabi established a new Marine Parks Department that is responsible for the management of the SPAW-area 1 (Figure 22) and which will be also responsible for the management of the mangrove park at Rif in Otrobanda in 2022.

Starting up the Curaçao Marine Park

In June 2021 we recruited a Head for the Marine Parks Department (Figure 23). The recruitment of this department head gives us the hands and feet starting up of the park.

The head of the marine parks department is responsible for the management of the marine park and the mangrove park in 2022. His responsibility is to achieve a healthy balance in the parks between nature conservation, recreation by local visitors and tourists.

FIGURE 23



The new Head Marine Parks Department, Duvan Rios

park management

CURAÇAO MARINE PARK

The new Marine Park logo

One of the first steps was to design a logo for the Marine Park (Figure 24). This logo will be used amongst others on vehicles, boats and in communication about the marine park.



FIGURE 24

Curaçao Marine Park logo

FIGURE 25



Head Marine Parks Department Duvan Rios together with the two new Marine Park rangers, the director Paul Stokkermans and head of Marine Park Roland de Cuba

Recruitment rangers

Seeing that the SPAW-Area 1 was getting new equipment, Carmabi began to recruit new Marine Park Rangers (Figure 25).

A Marine Park Ranger is responsible for conducting field operations; maintenance of mooring buoys, patrolling the protected area; support for research and information projects within the protected area.

park management

CURAÇAO MARINE PARK

New vehicle and boat for the Marine Park

We bought a new pick-up ([Figure 26](#)) for the marine park and the Curaçao Port Authority (CPA) made a boat ([Figure 27](#)) available to the Marine Park. After the boat was available, we arranged with Santa Barbara Plantation for a berth at Seru Boka Marina.



CPA security Boat

FIGURE 27



The new Curaçao Marine Park Pick-up

FIGURE 26

Maintenance on the boat

With the permission of Curaçao Port Authority (CPA) we made a few modifications to the boat. A large compartment was constructed for the ropes, life jackets and buoys. The broken fiberglass on the entire boat was repaired and painted. ([Figure 28](#)).

A boat bench (for the diving tanks) and a diving ladder ([Figure 29](#)) were made. By securing the work equipment on the boat bench and the compartment (dive tank, dive equipment, ropes and mooring buoys) the boat will be stable and safer to navigate the Eastpoint Sea. The renovated boat was baptized "Yaru".



FIGURE 28



FIGURE 29

park management

CURAÇAO MARINE PARK

Assisting the Proteus Ocean Group

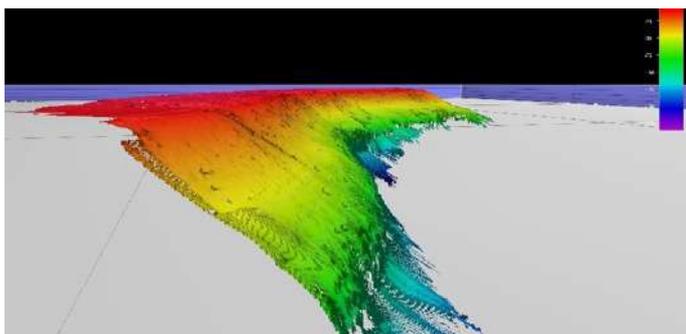
We assisted the Proteus Ocean Group in mapping the seafloor by making our boat and staff available. Proteus Ocean Group's site mapping mission in Curaçao, with the help of strategic partners Map the Gaps, R2Sonic & Carmabi (Figure 30) to map the entire marine protected area (SPAW-Area 1) helped gain a better picture of the ecosystem and seafloor. Together in one week they mapped approximately 6 square kilometers of coral reef and over 4 square kilometers of inland bays.

Source: Proteus Ocean Group, Ltd. Proudly created by JSC Impact



Head of Marine Park department and volunteer Roland De Cuba working together with Map the Gaps and R2Sonic

FIGURE 30



SPAW-Area 1 under water Mapping

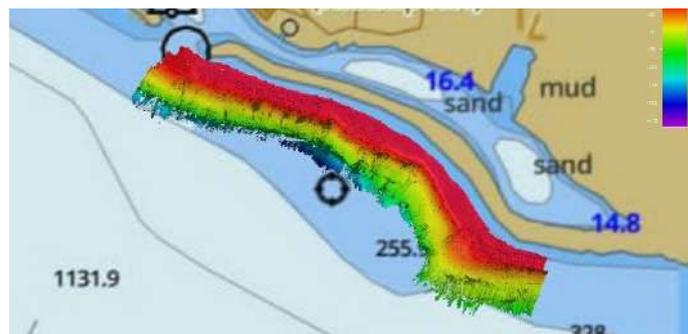


FIGURE 31

Building a working area

The marine park department has set up a workshop for the assembling of the buoys (Figure 31) including storage space for storing the ropes and buoys.



Marine park ranger working on the workbench



park management

CURAÇAO MARINE PARK

Marine Park Buoys

The Curaçao Ports Authority (CPA) has made 16 mooring buoys available. And with the help of CPA, the Marine Park department ordered 20 mooring buoys and 2 marking buoys (Figure 32). These buoys will be placed in the Curacao Marine Park so that local fishermen, divers, and other park visitors can moor their boats.

With our existing knowledge and experience of the Curaçao seabed, the head of the Marine Parks department has made an adjustment to the design of the mooring buoys for the Curacao Marine Park. The mooring buoys are designed in such a way that they are more firmly attached and cannot cause harm for the environment or navigation.



FIGURE 32

Mooring buoys

The buoys are painted yellow and have a protruding pipe with a height of 70 cm for better visibility (Figure 33 and 34). Furthermore, these buoys are equipped with reflective tape for visibility in the dark. The mooring buoys are also equipped with a yellow rope with a loop to which the boats can be tied. These mooring buoys are set up in such a way that everyone can use them.

FIGURE 33



New SPAW-Area 1 buoys

FIGURE 34



Marine park Ranger painting the Buoys

park management

CURAÇAO MARINE PARK

Assisting the Research department

The Marine Parks department had the privilege to work with some of the SEALINK PROJECT researchers. This project is being led by our Science Director Dr. M.J.A. Vermeij. The Marine Parks Department assisted the research team, to get underwater samples from a depth of 1 meter and 20 meters (Figure 35).

FIGURE 35



The SEALINK team together with the Rangers getting some samples on board of the "YARU"



Old marine park concrete block

FIGURE 37

Old Marine Park mooring blocks

The Marine Parks department together with the researchers started mapping all existing anchors in the Curacao Marine Park (Figure 37). By means of this mapping we will know what the condition is and at what depth the concrete blocks and helix anchors are located.

Source: Matan Yuval



Inspecting the Helix anchors

FIGURE 38

We also found the helix anchors belonging to the Department of Agriculture, Animal Husbandry and Fisheries (Dutch: Landbouw, Veeteelt and Visserij or L.V.V.) now known as Agricultural and Fisheries Management (Dutch: Agrarisch en Visserij beheer or A.V.B.). We are planning to make a transition from the old concrete block to helix anchors in the future (Figure 38). The reason for this is that these anchors do not cause damage when installed and unlike the concrete blocks are not moved when a larger vessel is moored.

park management

CURAÇAO MARINE PARK

Testing the first Buoy

We did a few test runs of the buoy in the Curacao Marine Park (Figure 39). Here we observed the behavior of the buoy, the buoyancy of the buoy with the adjustments, the way the buoy reacts with the sea state (Figure 40), the visibility of the protruding pipe, the strength of the rope, the strength of the ring, the condition of the helix anchors and the way the buoys react when the boat is tied to it.

Source: Benjamin Mueller

FIGURE 40



Testing the first buoy in the SPAW-Area 1

FIGURE 39



Marine Park Ranger inspecting the Helix Anchor and testing the buoy

park management

CURAÇAO RIF MANGROVE PARK

Curaçao Rif Mangrove Park

The government has announced that CARMABI will be requested to manage the park once the construction of the infrastructure has been completed. The upcoming Curacao Rif Mangrove Park is located near the historic city center of Otrobanda, within the urban residential area and opposite the Mega pier. At this moment, most of the park infrastructure is built.



Mangrove park Boardwalk

The already realized infrastructure consists of a network of boardwalks (Figure 41), a bird watching tower (Figure 42) and a network of channels for kayaking (Figure 43). The visitor center is still not built because of the economic impact of the Covid pandemic. In the meanwhile, the government will set up the necessary facilities for a temporary entrance. The necessary temporary facilities will consist of a ticket office, toilets, and storage space for the kayaks. It is expected that this setup should be able to function properly until the completion of the visitor center.

Source: Ministerio di Tráfiko, Transporte i Planifikashon Urbano

FIGURE 42



Mangrove Park bird watch tower

FIGURE 43



Mangrove Park kayaking area

nature & environment education department

EDUCATIONAL PROGRAMS

Our Nature and Environment Education Department (NME) is responsible for educational programs for primary school children and secondary education students.

The activities of Carmabi's education program include:

- Terrestrial Education Program: tours to teach children about terrestrial nature at Savonet, Christoffel Park and the areas of Daaibooi & Shete Boka.
- Marine Education Program: tours to teach children about Curacao's marine nature at the Marine Education Center at Piscadera.
- School visits supporting education. For primary education we have lessons with microscopes ('microworld') and the program 'environmental challenges' for secondary education.
- Providing teaching materials to primary schools (FO) and high schools (VO).
- Support high school students with thesis/ paper/ practical assignments on topics related to (marine) biology.
- Various other activities to increase general awareness.



M.M. Romerschool visits MEP at Piscadera



TEP Blenchi school Savonet juni 2021

nature & environment education

PARTICIPATION

Education Program

The new school year (August 2021) had a good start for education on Curacao. Fortunately, there were no restrictive measures regarding Corona. All our activities (Terrestrial and Marine) in education were able to continue. But due to the Corona Virus the first semester of 2021 (schoolyear 2020-2021) was challenging for education. Curacao, and the schools were in lockdown from 24th of March till April 28. Due to restriction till May 10th all extracurricular activities (bus transport and excursions) were cancelled.

During the Covid-restrictions, instead of the excursions, we have developed a school visiting program as an alternative. In this way, the education department was able to offer a program even when the children from Elementary Schools could not visit our locations. Although there were challenges Carmabi Education had a record of 14421 children attending our Terrestrial Education Programs or Marine Education Programs.



School Visit group 8 Albert Schweitzer

nature & environment education

PARTICIPATION

Terrestrial Education Program

The Christoffel Park was visited by schoolchildren divided from class/ group 1 to group 8 of our primary school system (ages 4 till 12). The younger children (group 1 and 2) visited the Christoffel National Park as part of a program aimed at introducing them to the nature world around them, i.e., the 'Mondi Misterioso' program. The aim of this program is to learn how to better take care of our nature in a playful way by identifying varied species of flora and fauna. In our program 'reptiles', the children (group 3) learn about reptiles, their habitats, niches and role within the wider Curacao ecosystem.

Schoolchildren group 4 visited the Christoffel Park to learn about birds. The bird lessons involve lessons on our local birds in theory and by observing birds in the park. Group 5 visited the Christoffel park to learn more about trees and plants and how to recognize them. Lessons on wells, agriculture, and ruins around Savonet & Zorgvlied in the Christoffel Park are the topic of lessons for groups 6 and 7, whereas children from group 8 are taught specific lessons in the general nature/ ecology of islands. All the lessons for the groups 4 up to 8 are followed by a small exam that can be made part of the school report.

A total of 10657 students followed an educational program on location and because of the Corona regulations 1349 students followed an alternative program at the school itself.

A group of 7 guides are conducting the Terrestrial Education Program.



TEP Glorieux College at Shete Boka

nature & environment education

PARTICIPATION

Marine Education Program

The Marine Education Program provides a program for schoolchildren in group 6 and 8. Both programs involve excursions to Carmabi Piscadera where they receive an interactive program with presentations and a visit to the Marine Education Center (MEC).

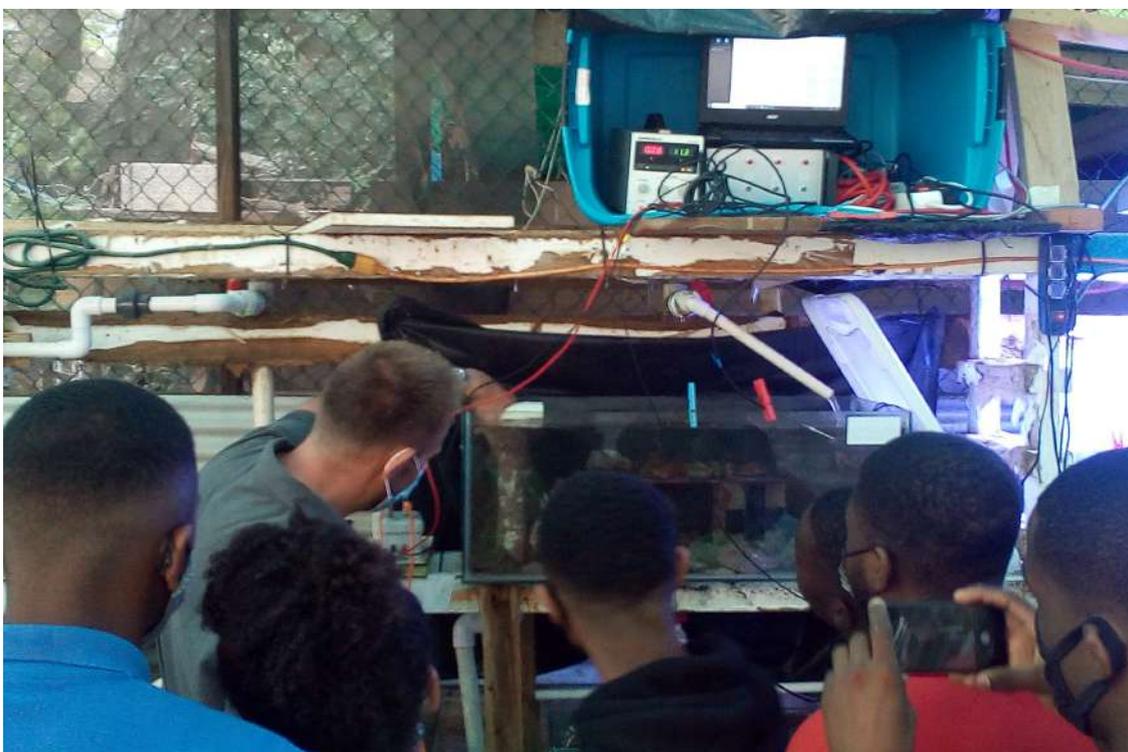
Schoolchildren group 6 (9-year-old) follow a program on Turtles and plastic waste whereas children of group 8 (11-year-old) focus on the importance of marine life and especially corals. The purpose of the Marine Education Center is to convey the beauty of Curacao's underwater world.

A total of 1940 students followed an educational program at our Marine Education Center and because of the Corona regulations 475 students followed an alternative program at the school itself.



TEP Clean Up met Brion School op shete boka

A total of 7 guides has facilities, including a classroom, covered patio, and Marine Education Center to run the programs in an interactive modern way, at their disposal.



Student Day at Piscadera

nature & environment education

SELECTED PROJECTS

Other activities

This year Carmabi Education organized 2 Student Days at Carmabi Piscadera. On these days students from Secondary Education (VWO 4 & 5) join an activity day where researchers/ marine biologists explain what their research entails. The students get an impression of the work and possibilities with (Marine) Biology as a field of study.

See [Figure 44](#) for a total overview of reached children in Elementary Education and other projects.

FIGURE 44

Overview	
Terrestrial Education Program (TEP)	10657
TEP school visiting program during Covid measurements	1349
Marine Education Program (MEP)	1940
MEP school visiting program during Covid measurements	475
Secondary Education 'Student Day'	53
Special projects, Summer School, etc.	312
total	14786



nature & environment education

OTHER ACTIVITIES

Nos Medio Ambiente

On August 20th Carmabi Education organized a Happy Teachers Hour for all Elementary Schools, where all schools could collect two teaching packages. The package Nos Medio Ambiente (our environment) has been donated to all schools to support the Terrestrial Education Program. It contains a teacher's guide, student booklets, and educational materials, like games.

The Coral Heroes teaching package for group 7 was made in collaboration with GreenKidz. This teaching package contains PowerPoints, educational assignments and games, teacher's manual, videos, the comic book 'Coral Heroes' and a coral poster. Both hard-copy packages are also available for free download on our website.



MC Piar school receives 'Nos Medio Ambiente' educational materials

Environment wall

The environmental wall in Savonet country house is revealed on the 8th of July, in collaboration with GreenKidz. The environmental wall is a drawing of Curacao, where waste by means of magnets pollute the island. Elementary children who visit the country house with a terrestrial program can collect the waste from Curacao and put it in the correct waste bin.



Opening of the magnetic waste game at Savonet

nature & environment education

OTHER ACTIVITIES

Open Day Savonet

Carmabi Education has offered children's activities during the open day at Savonet on November 7, where children performed assignments at the stands of the various Carmabi parks. The various Carmabi parks have become part of the open day.



At the Curaçao Marine Park stand



Prinses Beatrix visits Carmabi Education

Visit Princess Beatrix

Friday the 26th of November, Princess Beatrix visits Carmabi. Princess Beatrix attended a Marine Education lesson (with guest teacher Odette Doest and Flamingo Bob), and attended the youth symposium at the Renaissance Hotel in the afternoon.

Educational Program Mangrove Park

For the new to open Curacao Rif Mangrove Park in Otrobanda, Carmabi Education developed a program for group 7 (10–11-year-old) about mangroves. Also, a program for Secondary Education (vsbo/ havo/ vwo) is made where water (wastewater and drinking water) is the topic to learn the students about the influence of sewer waste on our marine life. With the donations of the Christmas-donation-campaign we can implement this program in semester 1 of 2022.

With full-moon walks, educational parties and movie nights, a diverse audience is reached in an accessible way. Also, the monthly newspaper article 'Nos naturalesa ta interesante sigur' in two local newspapers (Extra and Antilliaans Dagblad) raises awareness. There are also a total of approximately one hundred clients of the SGR group (clients with physical and/ or mental disabilities) visiting Carmabi Education on Piscadera.



Kolegio Alejandro Paula havovwo excursion at Daibooi

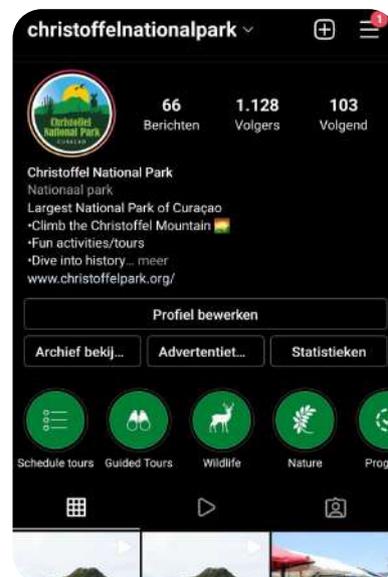
marketing & communications

EXPOSURE OF OUR WORK

Online presence

On social media the marketing and communications department continued looking for more engagement with (future) visitors, stakeholders and the population of Curaçao. One year after the launch of the Instagram pages the Christoffel National Park has reached over a thousand followers. The Shete Boka National Park reached almost 700 followers.

The marketing department posted 133 Facebookposts on the pages of Christoffel National Park, Shete Boka National Park and Carmabi, 52 Facebook stories, 123 Instagramposts, 50 Instagram stories and 35 Facebook events since may 2021.



Screen shot of the new Christoffel Park Instagram



Sunset seen from Seru Gracia

Review

In 2021 the marketing department continued to seek engagement on platforms such as Facebook, Instagram, Tripadvisor and Google. As a result, the Christoffel National Park was able to retain its 4.5. review on Google and Shete Boka its 4.7. review. On Tripadvisor the Christoffelpark and Shete Boka both retained its 4.5. review.

Marketing three new parks

With the upcoming of three new parks that will be managed by Carmabi, the marketing department started this year setting up all marketing and communication for the new parks. Social media pages have been created. Websites are being build. Furthermore, content like educational video's has been made.

marketing & communications

EXPOSURE OF OUR WORK

Climbing the mountain 52 times for Ronald McDonald House

In 2021 the Christoffelpark supported Ghislain Berend while climbing the Christoffel Mountain 52 times to collect money for the Ronald McDonald House.

He was able to collect 16.000 guilders! The Christoffelpark guaranteed him free entrance fee in exchange for online media presence.



Ghislain Berends on the top of the Christoffel Mountain



Article about the Mangrove published in the Extra Kòrant

Offline media

Monthly newspaper article 'nos naturalesa ta interesante sigur'

This year, the marketing and communication department started publishing monthly newspaper articles written by the department heads of Carmabi in local newspapers. These articles are being published every last Saturday of the month in the Extra and Antiliaans Dagblad. All articles are educational subjects to educate and inform the residents of Curaçao about the local nature of the island.

Offline media

This year the communications and marketing department helped organize the yearly Open Day in the Christoffel National Park.

A new set up has been generated with several activities like a Flea Market, Live Music, Promotional stands of Carmabi and activities for children has been organized.



Carmabi

ROYAL VISIT

Princess Beatrix visits Carmabi

Friday the 26th of November, Princess Beatrix visited Carmabi Piscadera. Children from group 8 of the St. Margaretha School actively participated in the Carmabi Education program on turtles. After the princess arrived, the children and the princess attended a guest lesson from Odette Doest about flamingo Bob.

After this lesson, the princess was briefed by Mark Vermeij at the research department about the scientific research that is carried out at Carmabi. This gave the princess a good idea of the Coral Spawning and the research at the Research Station. The coral larvae that the princess could view in the lab were symbolically released on the beach at Carmabi.

Part of the visit to Carmabi was the symbolic opening of the Curacao Marine Park. This was performed by the princess by ringing a bell at the pier of Carmabi.

The delegation was then invited to attend the release of flamingo Oscar at the salt pans of St. Michiel. The children of St. Margaretha School and Oscar, the kid who helped catch the injured flamingo months were all present

Due to the varied program the princess got well informed in a variety of aspects of education and research at Carmabi.



The princess got a tour over the property of Carmabi and officialy open the Curacao Marine Park.

Carmabi

ROYAL VISIT

Princess Beatrix visits the Curacao Rif Mangrove Park

Princess Beatrix has visited the Curacao Rif Mangrove Park on the 27th of November 2021. The park infrastructure including the boardwalks and canals for kayaking is in place. The Park itself however is not yet open to the public. The Princess accompanied by Governor Lucille George-Wout was received at the park entrance near the Mega Pier by the Minister of Traffic, Transport and Spatial Planning (VVRP) Charles Cooper and by Carmabi director Paul Stokkermans.

She started with a walk through the mangrove park over the new boardwalks. Here she received an explanation, among other things, about the technical background by Martin Koopman who had been responsible for the construction of the park and an explanation about the park management by Carmabi Head Marine Parks Department, Duvan Rios, about the educational aspects, the kayak routes through the park and the way the park will be managed.

Arriving at the birdwatch tower a presentation was given by Carmabi biologist Erik Houtepen about the ecology of the mangrove area, including the importance of mangroves as a nursery for fish and for the protection of the coral reef. The Princess was very impressed by the beauty of the park and had enjoyed her stay.



The princess got a tour through the Mangrove Park

general

DCNA MEETINGS

MEETINGS DCNA 2021

Carmabi is a member of the Dutch Caribbean Nature Alliance (DCNA). The directors of the park organizations on the 6 Dutch Caribbean islands are board members of the DCNA. The office of the DCNA is on Bonaire. The objective of the DCNA is to safeguard the biodiversity and promote the sustainable management of the natural resources of the islands of the Dutch Caribbean, both on land and in the water, for the benefit of present and future generations, by supporting and assisting the protected area management organizations and nature conservation activities in the Dutch Caribbean.

The DCNA also manages a trust fund. This trust fund is funded by donors such as the Dutch Postcode Lottery. The purpose of the trust fund is to provide core funding to cover the operational costs of the designated marine protected area (marine nature park) and the designated terrestrial protected area (land nature park) on each of the islands of the Dutch Caribbean.

The DCNA holds two board meetings every calendar year. The first meeting in 2021 was held online due to Covid on the 20th and 21th of April. The second meeting in 2021 was held in person on Curaçao from the 24th till the 27th of November. A special invited guest was her Royal Highness Princess Beatrix who is also the Patron of the DCNA.



The board of DCNA and participants in the board meeting on Sint Maarten

general
**ANNUAL
 FINANCIAL
 STATEMENT**

CARIBBEAN RESEARCH MANAGEMENT OF BIODIVERSITY (CARMABI FOUNDATION)

Equity and liabilities

	2021	2020
	ANG	ANG
Equity (6)		
Capital	106	106
Retained earnings	1,298,670	1,371,378
	<u>1,298,776</u>	<u>1,371,484</u>
Non-current liabilities		
Non interest bearing loans and borrowings (7)	154,000	154,000
Deferred income investment grants (8)	155,075	172,292
	<u>309,075</u>	<u>326,292</u>
Current Liabilities		
Deferred income project grants (9)	552,888	456,211
Pension contribution payable (10)	16,761	-
Taxes and social security payable (11)	6,043	50,012
Other liabilities (12)	537,175	85,428
	<u>1,112,867</u>	<u>591,651</u>
Total equity and liabilities	<u>2,720,718</u>	<u>2,289,427</u>

general

ANNUAL FINANCIAL STATEMENT

Carmabi Foundation

BALANCE SHEET AS OF DECEMBER 31, 2021

(after proposal of result appropriation)

	<u>2021</u> ANG	<u>2020</u> ANG
Assets		
Non-current assets		
Plantations and Buildings (1)	814,915	867,373
Tangible fixed assets (2)	<u>324,906</u>	<u>350,405</u>
	1,139,821	1,217,778
Current Assets		
Receivables (3)	271,971	151,959
Pension contribution receivable (10)	-	5,547
Stock (4)	2,778	3,735
Cash and cash equivalents (5)	<u>1,306,148</u>	<u>910,408</u>
	1,580,897	1,071,649
Total assets	<u>2,720,718</u>	<u>2,289,427</u>

general

ANNUAL FINANCIAL STATEMENT

CARIBBEAN RESEARCH MANAGEMENT OF BIODIVERSITY (CARMABI FOUNDATION)

STATEMENT OF OPERATIONS FOR THE YEAR 2021

	2021	Budget 2021	2020
	ANG	ANG	ANG
Income			
Grants (13)	1,048,415	776,000	974,131
Earmarked grants (14)	31,364	31,000	26,631
Admission fees (15)	1,518,041	1,191,700	922,907
Rental income (16)	186,137	174,000	141,970
Other income (17)	507,199	310,000	317,105
Total income	<u>3,291,156</u>	<u>2,482,700</u>	<u>2,382,744</u>
Expenses			
Personnel expenses (18)	1,736,642	1,778,000	1,672,280
Depreciation expenses (19)	133,310	138,000	133,994
Other operating expenses (20)	1,499,143	1,092,000	1,053,756
Total expenses	<u>3,369,095</u>	<u>3,008,000</u>	<u>2,860,030</u>
Operational result for the year	<u>(77,939)</u>	<u>(525,300)</u>	<u>(477,286)</u>
Interest income	5,231	4,000	8,203
Result for the year	<u>(72,708)</u>	<u>(521,300)</u>	<u>(469,083)</u>
Appropriation of the result for the year			
Retained earnings	<u>(72,708)</u>	<u>(469,083)</u>	<u>(469,083)</u>

general

BOARD & STAFF PER MARCH 2021

Board

- Odette Doest, President
- Edwin Flaming, Secretary
- Pieter van den Berg, Treasurer
- Karel van Haren, Board Member
- Marjolijn van Schaik, Board Member
- Manuel Boot, Board Member

Patron

- Professor Jaime Saleh, Former General Governor of the Netherlands Antilles

Carmabi ambassador in the Netherlands

- André Cohen Henriquez

Management

- Paul Stokkermans M. Sc., Director
- Mark Vermeij PhD, Deputy Director

Research Department

- Mark Vermeij PhD, Head of Department
- Valery Chamberland, M.Sc. Researcher
- Kelly Latijnhouwers, Restoration Technician

Parks Management Department

- Kenneth Tromp, Head of Department
- Cyrill Kooistra, Deputy Head of Department and head ranger
- Sue Shantely Lourens, Management Assistant
- Clayna Stella (replaced Sue Shantely 26th of May – 23rd of September 2021)
- Briand Victorina, Head Ranger
- Edwards Alberto, Ranger
- Melvin Martinez-Estevez, Ranger
- Ergelij Cijntje, Front Desk and administration
- Roengelo Doran, Ranger
- Cheandel Maria, Ranger
- Araceli Ersilia, Front Desk Officer (Savonet)
- Merelyn Albertoe, Front Desk Officer (Shete Boka)
- Brenda Jantji, Front Desk Officer (Shete Boka)
- Janiska Spek, Janitor

Hato Caves

Contracted to Indian Caves N.V. (Monica Vrolijk)

Marine Parks Department

- Duvan Rios (started 9th of June 2021)
- Joël Dominguez (started 1st of October 2021)
- Kevin Philbert (started 1st of October 2021)

Nature and Environment Education (NME)

- Cor Hameete, M.Sc. Head of NME department
- Ana de Windt (Intern)

Advice and Consultancy Department

- Erik Houtepen, M.Sc. Head of Department
- Tatiana van Stevenick, Terrestrial research and consultant (started 1st of March 2021)

Administration Department

- Ethline Isenia, Head Administration Department
- Shahaira Martina, Assistant Financial Administration
- Nancy Provacia, Administrative Assistant
- Rosemary Olivo Busto, Janitor (resigned 31th of August 2021)
- Magda Inees, Janitor
- Carlos Winterdaal, Technician

Communication and Marketing

- Kim Hendriksen
- Rebecca Koenraad (Intern)

Security Piscadera is outsourced to:

- Megory Security

Security Shete Boka is outsourced to:

- Hawks Eye Security

general

ON CALL STAFF

Savonet

- Richard Davelaar (Cleaning Shete Boka),
- Daisy Lourens
- Clayna Stella (Management Assistant)

Junior Rangers

- Adrion Plantijn
- Jeremy Cijntje

Terrestrial Education Program (TEP)

- Clarette (Retty) Schoop (Coordinator)
- Ruthline (Ruth) Bernadina
- Sonaly (Naly) Rijnschot
- Charetty Jansen
- Arien Liberia
- Ruthsella Stadius
- Pietje Rosaria
- Joycerette Bartholomeus

Marine Education Program (MEP) and Marine Education Center (MEC)

- Ruthsella Stadius (Coordinator)
- Jonathan Estanista
- Lisney Maria
- Sabrina Tapoka
- Huub van der Zande
- Ruthson Cecilia
- Padsy Elsevijf
- Joelliane Windster (started 1st of March 2021)

general

DONATIONS 2021

Organizations

Rotary Club

Aqualectra

Curacao American Preparatory School (CAPS)

Vertegenwoordiging van Nederland (VNW)

Prins Bernhard Cultuurfonds

Nagelmakers Advocaten

Personal

Johannes C.P. van Zon

John de Freitas

Jacintha Bergisch

Anna Wagemans

scientific research

VISITING SCIENTISTS

Dr. Andre van Proosdij (Wageningen University, The Netherlands)
Dr. Andy Haas (Netherlands Institute for Sea Research, The Netherlands)
Dr. Ben Martin (University of Amsterdam, The Netherlands)
Dr. Ben Mueller (University of Amsterdam, The Netherlands)
Dr. Chantal Begin (Florida State University, U.S.A.)
Dr. Cynthia Silveira (San Diego State University, U.S.A.)
Dr. Fee Smulders (University of Groningen, The Netherlands)
Dr. Forest Rohwer (San Diego State University, U.S.A.)
Dr. Jasper de Goeij (University of Amsterdam, The Netherlands)
Dr. John Janssen (Wageningen University, The Netherlands)
Dr. Joaquin Yus (University of Illinois Urbana-Champaign, U.S.A.)
Dr. Kai Matuschewski (Humboldt Universität, Germany)
Dr. Kristen Marhaver (Marhaverlab, Curaçao)
Dr. Michelle Achlatis (University of Amsterdam, The Netherlands)
Dr. Mike Gil (UC Boulder, U.S.A.)
Dr. Petra Visser (University of Amsterdam, The Netherlands)
Dr. Robbert Jan Geertsma (Wageningen University, The Netherlands)
Dr. Ronald Osinga (Wageningen University, The Netherlands)
Dr. Stuart Sandin (Scripps Institution of Oceanography, U.S.A.)
Dr. Valerie Chamberland (SECORE International, U.S.A.)
Drs. Angela Marulanda (GEOMAR, Germany)
Mr. Jörg Seifert-Granzin (University of Salzburg, Austria)
Mrs. Diana Melville (University of Aruba/ Gent, Aruba/ Belgium)
Ms. Cornelia Osborne (Penn State University, U.S.A.)
Ms. Daisy Flores (University of Texas at Austin, U.S.A.)
Ms. Mikhail Matz (University of Texas at Austin, U.S.A.)
Patrick Brydon (Broadreach College, U.S.A.)
SECORE Project (Various countries)

PEER REVIEWED PUBLICATIONS

An overview of all peer reviewed scientific publications published in 2021 is shown below:

1. Achlatis M, van der Zande RM, Webb AE, de Bakker DM, de Nooijer LJ, de Goeij JM (2021) Photosynthetically stimulated bioerosion in symbiotic sponges: the role of glycerol and oxygen. *Coral Reefs* 29: 1-1.
2. Aires T, Stuij TM, Muyzer G, Serrão EA, Engelen AH (2021) Characterization and comparison of bacterial communities of an invasive and two native Caribbean seagrass species sheds light on the possible influence of the microbiome on invasive mechanisms. *Frontiers in Microbiology*: 2123.
3. Bongaerts P, Dubé CE, Prata K, Gijsbers J, Achlatis M, Hernandez-Agreda A (2021) Reefscape genomics: leveraging advances in 3D imaging to assess fine-scale patterns of genomic variation on coral reefs. *EcoEvoRxiv*. doi:10.32942/osf.io/dhvk8.
4. Campana S, Busch K, Hentschel U, Muyzer G, de Goeij JM (2021) DNA-stable isotope probing DNA-stable isotope probing (DNA-SIP) identifies marine sponge-associated bacteria actively utilizing dissolved organic matter (DOM). *Environmental microbiology* 23: 4489-4504.
5. Campana S, Demey C, Busch K, Hentschel U, Muyzer G, de Goeij JM (2021) Marine sponges maintain stable bacterial communities between reef sites with different coral to algae cover ratios. *FEMS Microbiology Ecology* 97(9): fiab115.
6. Campana S, Hudspith M, Lankes D, De Kluijver A, Demey C, Schoorl J, Absalah S, Van Der Meer MT, Mueller B, De Goeij JM (2021) Processing of naturally sourced macroalgal-and coral-dissolved organic matter (DOM) by high and low microbial abundance encrusting sponges. *Frontiers in Marine Science* 8: 452.
7. Clayshulte Abraham A, Gochfeld DJ, Macartney K, Mellor A, Lesser MP, Slattery M (2021) Biochemical variability in sponges across the Caribbean basin. *Invertebrate Biology*: e12341.
8. Cramer K, Donovan M, Jackson J, Greenstein B, Korpanty C, Cook G, Pandolfi J (2021) The transformation of Caribbean coral communities since humans. *Ecology and Evolution* 11:10098–10118.
9. Delvoye L, Bak RPM, Marhaver KL, Nieuwland G, Vermeij MJA (2021) Caribbean white coral diseases can be linked to fungal invasion. *Caribbean Naturalist* 81.
10. George EE, Mullinix JA, Meng F, Bailey BA, Edwards C, Felts B, Haas AF, Hartmann AC, Mueller B, Roach TN, Salamon P, Silveira C, Vermeij MJA, Rohwer FL, Luque A (2021) Space-filling and benthic competition on coral reefs. *PeerJ*. 2021 Jun 29;9: e11213.
11. Hagedorn M, Page CA, O'Neil KL, Flores DM, Tichy L, Conn T, Chamberland VF, Lager C, Zuchowicz N, Lohr K, Blackburn H, Vardi T, Moore J, Moore T, Baums IB, Vermeij MJA, Marhaver KL (2021) Assisted gene flow using cryopreserved sperm in critically endangered coral. *Proceedings of the National Academy of Sciences* 118 (38): e2110559118.
12. Hoadley KD, Hamilton M, Poirier CL, Choi CJ, Yung CM, Worden AZ (2021) Selective uptake of pelagic microbial community members by Caribbean reef corals. *Applied and Environmental Microbiology* 87(9): e03175-20.
13. Hudspith M, Rix L, Achlatis M, Bougoure J, Guagliardo P, Clode PL, Webster NS, Muyzer G, Pernice M, de Goeij JM (2021) Subcellular view of host-microbiome nutrient exchange in sponges: insights into the ecological success of an early metazoan-microbe symbiosis. *Microbiome* 9(1):1-5.
14. Hudspith M, van der Sprong J, Rix L, Víg D, Schoorl J, de Goeij JM (2021) Quantifying sponge host and microbial symbiont contribution to dissolved organic matter uptake through cell separation. *Marine Ecology Progress Series* 670: 1-3.
15. Kornder NA, Cappelletto J, Mueller B, Zalm MJ, Martinez SJ, Vermeij MJA, Huisman J, de Goeij JM (2021) Implications of 2D versus 3D surveys to measure the abundance and composition of benthic coral reef communities. *Coral Reefs* 16: 1-7.
16. Kwong WK, Irwin NA, Mathur V, Na I, Okamoto N, Vermeij MJA, Keeling PJ (2021) Taxonomy of the Apicomplexan Symbionts of Coral, including *Corallicolida* ord. nov., Reassignment of the Genus *Gemmocystis*, and Description of New Species *Corallicola aquarius* gen. nov. sp. nov. and *Anthozoaphila gnarlus* gen. nov. sp. nov. *Journal of Eukaryotic Microbiology* 68(4): e12852.
17. Lamb AD, Lippi CA, Watkins-Colwell GJ, Jones A, Warren DL, Iglesias TL, Brandley MC, Dornburg A (2021) Comparing the dietary niche overlap and ecomorphological differences between invasive *Hemidactylus mabouia* geckos and a native gecko competitor. *Ecology and Evolution* 1:18719–18732.

scientific research

PEER REVIEWED PUBLICATIONS

1. Levenstein MA, Marhaver KL, Quinlan ZA, Tholen HM, Tichy L, Yus J, Lightcap I, Kelly LW, Juarez G, Vermeij MJA, Johnson AJ (2021) Engineered substrates reveal species-specific inorganic cues for coral larval settlement. *ChemRxiv* 2021-r1gxj.
2. Little M, George EE, Arts MGI, Shivak J, Benler S, Huckeba J, Quinlan ZA, Boscaro V, Mueller B, Güemes AGC, Rojas MI, White B, Petras D, Silveira CB, Haas AF, Kelly LW, Vermeij MJA, Quinn RA, Keeling PJ, Dorresteijn PC, Rohwer F, Roach TNF (2021) Three-dimensional molecular cartography of the Caribbean reef-building coral *Orbicella faveolata*. *Frontiers in Marine Science*. 8:135.
3. Loureiro LO, Engstrom MD, Lim BK (2021) Biogeography of Neotropical mastiff bats: A case of multiple dispersals between the Caribbean and mainland. *Journal of Biogeography* 48(6): 1353-1365.
4. Miller MW, Latijnhouwers KR, Bickel A, Mendoza-Quiroz S, Schick M, Burton K, Banaszak AT. Settlement yields in large-scale in situ culture of Caribbean coral larvae for restoration. *Restoration Ecology*: e13512.
5. O'Neil KL, Serafin RM, Patterson JT, Craggs JR. Repeated ex situ spawning in two highly disease susceptible corals in the family Meandrinidae. *Frontiers in Marine Science* 8: 463.
6. Patton AH, Harmon LJ, del Rosario Castañeda M, Frank HK, Donihue CM, Herrel A, Losos JB (2021) When adaptive radiations collide: Different evolutionary trajectories between and within island and mainland lizard clades. *Proceedings of the National Academy of Sciences* 9: 118(42).
7. Pflingstl T, Lienhard A, Baumann J, Koblmüller S (2021) A taxonomist's nightmare—Cryptic diversity in Caribbean intertidal arthropods (Arachnida, Acari, Oribatida). *Molecular Phylogenetics and Evolution* 163: 107240.
8. Plese B, Kenny NJ, Rossi ME, Cárdenas P, Schuster A, Taboada S, Koutsouveli V, Riesgo A (2021) Mitochondrial evolution in the Demospongiae (Porifera): Phylogeny, divergence time, and genome biology. *Molecular Phylogenetics and Evolution* 155: 107011.
9. Prata K, Riginos C, Gutenkunst R, Latijnhouwers K, Sánchez J, Englebert N, Hay K, Bongaerts P (2021) Deep connections: divergence histories with gene flow in mesophotic *Agaricia* corals. *Authorea Preprints*. 2021 Jun 23.
10. Prokina KI, Keeling PJ, Tikhonenkov DV (2021) Heterotrophic flagellates and centrohelid heliozoans from marine waters of Curacao. *European Journal of Protistology* 77:125758.
11. Robertson DR, Kingon K, Baksh S, Estapé CJ, Morgan Estapé A (2021) The Indo-Pacific damselfish *Neopomacentrus cyanomos* at Trinidad, southeast Caribbean. *Aquatic Invasions* 2021: 16.
12. Simal F., Smith L., Doest O., De Lannoy C, Franke F., Zaandam I., Simal D., Nassar JM. (2021) Bat inventories at caves and mines on the islands of Aruba, Bonaire and Curaçao, and proposed conservation actions. *Acta Chiropterologica*:23(2).
13. Sivaguru M, Todorov LG, Fouke CE, Munro CMO, Fouke KW, Fouke KE, Baughman ME, Fouke BW (2021) Corals regulate the distribution and abundance of Symbiodiniaceae and biomolecules in response to changing water depth and sea surface temperature. *Scientific Reports* 11: 2230.
14. Slattery M, Lesser MP. Gorgonians Are Foundation Species on Sponge-Dominated Mesophotic Coral Reefs in the Caribbean. *Frontiers in Marine Science*: 8:304.
15. Ter Horst LJ, Hoeksema BW (2021). Salpivory by colonial reef corals at Curaçao, Southern Caribbean. *Diversity* 13(11): 560.
16. Thurman CL, Alber RE, Hopkins MJ, Shih HT (2021) Morphological and genetic variation among populations of the fiddler crab *Minuca burgersi* (Holthuis, 1967) (Crustacea: Brachyura: Ocypodidae) from shores of the Caribbean Basin and Western South Atlantic Ocean. *Zoological Studies* 60: 19.
17. Titus BM, Gibbs L, Simoes N, Daly M (2021) Topology testing and demographic modeling illuminate a novel speciation pathway in the Greater Caribbean Sea following the formation of the Isthmus of Panama. *BioRxiv*. Jan 1.
18. Vardi T, Hoot WC, Levy J, Shaver E, Winters RS, Banaszak AT, Baums IB, Chamberland VF, Cook N, Gulko D, Hein MY (2021) Six priorities to advance the science and practice of coral reef restoration worldwide. *Restoration Ecology*: e13498.
19. Webb AE, de Bakker DM, Soetaert K, da Costa T, van Heuven SM, van Duyl FC, Reichart GJ, de Nooijer LJ (2021) Functional consequences of Caribbean coral reef habitat degradation. *Biogeosciences Discussions*. 23:1-23.
20. Xu T, Bravo H, Paulay G, van der Meij SE (2021) Diversification and distribution of gall crabs (Brachyura: Cryptochiridae: *Opecarcinus*) associated with *Agariciidae* corals. *Coral Reefs* 12:1-1.
21. Zamengo HB, Moggi VY, Torres RB, Da-Silva PR, Leme FM (2021) Morfología comparada de diez taxones del género *Celtis* (Cannabaceae) del Cono Sur Sudamericano. *Darwiniana, nueva serie* 9(1):217-244.

marketing & communications

PRESS RELEASES

5-May-21	Water Refill Programma vergroot duurzame impact
10-May-21	Water Refill Programma zet zich in voor lokale kunst
18-May-21	Nationale parken weer open
24-May-21	Rif Sint Marie/Hermanus wordt natuurpark
28-May-21	Nationaal Park Rif St. Marie Hermanus
29-May-21	Middenkatern: 4 meest gestelde vragen over hagedissen
4-Jun-21	Morgen Wereld Milieudag persbericht Carmabi
5-Jun-21	Feature over Cyrill en zijn werk bij Carmabi
5-Jun-21	Moon Walk bij Shete Boka
5-Jun-21	Toename Sabel Palm door Carmabi
5-Jun-21	Carmabi staat stil bij Wereld Milieudag
7-Jun-21	Kleurrijke portretten: Cyrill
8-Jun-21	Zonder koraalrif geen stranden op Curacao -world ocean day
8-Jun-21	Wereld Oceanendag - Sin Ref di koral nos lo no tin playa na Korsou
8-Jun-21	Coral Heroes Lespakket voor alle scholen op Curaçao
8-Jun-21	Interview World Oceanen Dag
8-Jun-21	Introductie Coral Heroeslespakket op scholen
9-Jun-21	Doe de virtuele Coral Heroes Tour in MEC
9-Jun-21	Pakete di les Coral Heroes pa tur skol na Korsou
10-Jun-21	Onze interessante natuur: 4 meest gestelde vragen over hagedissen
11-Jun-21	Eerste cruisetoeristen bezoeken Shete Boka
12-Jun-21	Carmabi verheugd over terugkeer cruisetoeristen bij Shete Boka
16-Jun-21	Wereld zeeschildpadden dag
18-Jun-21	Interview zeeschildpadden
19-Jun-21	Koraalles leerlingen Piar School
19-Jun-21	Koraalles leerlingen Piar School
19-Jun-21	Les Coral Heroes bij Watersportcentrum Brakkeput
21-Jun-21	Kinderhoek in museum Savonet
23-Jun-21	Aqualectra doneert namens gemeenschap aan Carmabi
23-Jun-21	Aqualectra ta entregá donashon na Carmabi
28-Jun-21	Cactussen di Korsou

marketing & communications

PRESS RELEASES

- 10-Jul-21 Korsou Limpi stimuleert milieubewustzijn onder kinderen
- 10-Jul-21 Lokaal lesmateriaal over het milieu
- 10-Jul-21 Apertura di eksposishon pa mucha korsou limpi den museo Savonet
- 16-Jul-21 Cactussen van Curaçao
- 18-Jul-21 Hiking up mount Christoffel
- 19-Jul-21 Nog geen antwoorden voer Camp Dovale
- 29-Jul-21 Stilstaan bij belang natuurbescherming
- 29-Jul-21 Dia di protekshon di Naturalesa
- 31-Jul-21 Dieren die je verbazen
- 31-Jul-21 Bestianan asombroso
- 5-Aug-21 Beach CleanUp dor di studiantenan Merikano na Shete Boka
- 28-Aug-21 Krantenartikel: Mangrove
- 21-Sep-21 Nieuwe methode redding van koraal
- 25-Sep-21 Krantenartikel: Groenblijvende planten
- 25-Sep-21 Groenblijvende planten
- 27-Sep-21 Bouw onderzoekstation Proteus stap dichterbij
- 28-Sep-21 Cousteau i Proteus Ocean Group ta marka e área marina Protehá
- 28-Sep-21 Fabien Cousteau su stashon supmarina Proteus ta start na Kórsou
- 30-Sep-21 Curacao Marine Park krijgt concrete invulling
- 30-Sep-21 365ste klim Christoffelberg voor RMHC
- 8-Oct-21 102 constructiepeleton bouwt brug bij Rif Sint Marie
- 19-Oct-21 Opening Park Rif St. Marie-Hermanus stap dichterbij
- 19-Oct-21 Morgen behandeling beroepen tegen herziening EOP Oostpunt
- 22-Oct-21 Entrega oficial di brùg i sentro di kamper Ri St. Marie-Hermanus
- 30-Oct-21 Krantenartikel: Rooien

marketing & communications

PRESS RELEASES

- 2-Nov-21 Nos naturalesa ta interesante sigur: De rooien van Curaçao
- 2-Nov-21 Interview over open dag Christoffelpark
- 3-Nov-21 Verschillende activiteiten tijdens de open dag in het Christoffelpark
- 3-Nov-21 Diferente aktividatnan durante e dia Habri den Christoffelpark
- 5-Nov-21 Interview over open dag Christoffelpark
- 5-Nov-21 Programma open dag Christoffelpark
- 5-Nov-21 Program di dia habri den Christoffelpark
- 6-Nov-21 Open dag Christoffelpark op Dia di Savonet
- 6-Nov-21 Dia habri den Christoffelpark riba Dia di Sabaneta
- 7-Nov-21 Dia habri di Christoffelpark ta hopi succes
- 7-Nov-21 Open dag Christoffelpark was groot succes
- 25-Nov-21 Krantenartikelen: Kringlopen
- 30-Nov-21 Onderzoekers ontdekken 3 nieuwe grassoorten op Aruba