2024

ANNUAL REPORT

CARMABI FOUNDATION

Caribbean Research and Management of Biodiversity

PISCADERABAAI z/n, P.O. Box 2090
Willemstad, CURAÇAO
+599 9 462 42 42

www.carmabi.org
info@carmabi.org

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FROM THE DIRECTOR

Dr. Manfred van Veghel.

In 2024 we continued to strengthen the Carmabi organization to become more resilient in our fast-changing world. Challenges like growing tourism and continuous development on Curaçao affects our daily live on the island as well as Carmabi's work. And worldwide impacts like climate change, human land use and the unsustainable waste production, impact on our vulnerable ecosystems, affecting the quality and quantity of our nature. All our employees can be proud of our remarkable progress, dealing with these challenges, and collaborating with partners to accomplish this.

Core values drive our mission as an organization as well as the ecosystems we protect like diversity, connection, resilience, and synergy. In 2024 we succeeded in breaking many records like the number of visitors in our parks and peers reviewed scientific publication as much as you can read in this annual report.

Memorable is May 4th when over 300 mm of rain fell in a matter of hours on the west side of the island. We had to close the Christoffel and Shete Boka Parks and suffered severe damage, like fences that came down, trails or beaches that were washed away and a lot of debris on the roads. Being able to re-open these parks the next day for hikers and a day later for cars is a perfect example of how resilient we already are already as an organization.

Climate records have been broken over the last years, and we faced a very warm summer in 2024 with extreme seawater temperatures causing corals to bleach for yet another year. This year's coral spawning season was the most disappointing of the last 33 years with respect to the abundance of new gametes for our future reefs. These are examples of symptoms that our nature is under a large pressure. But, also increased coastal development led to severe disturbances, of which damage to protected and endangered species was reported to the local authorities on several occasions.

The organization is now fully prepared for transition to a Two-Tier organization in 2025, so we can comply with local regulation and create more transparency and flexibility. In preparation we are establishing new and updated, mission, vision, values, statutes, rules, profiles, procedures, ICT upgrades and much more. Our collaboration with the government and main stakeholders related to science, education and nature conservation locally and internationally has been enhanced and expanded and our expertise is widely embraced.

FROM THE DIRECTOR

In November we participated in the Science Summit at the UN Global Assembly in New York sharing our story during the Islands Shaping the Future of Innovation and Science and setting an example of how we perform as a social enterprise.

In 2025 we will continue this journey trying to make the ecosystems in the Caribbean a little more resilient every day, gaining the knowledge that is needed to safeguard and regenerate our nature for the benefit of all living creatures. With the introduction of the new Caribbean Guilder in 2025, a new currency that displays the theme of our underwater world, we have another opportunity to share wonderful stories about the hidden life in our ocean and re-connect man with nature. During the celebrations of our 70th anniversary we will look back in history and respectfully say THANK YOU for all our predecessors and contributors that made Carmabi the institution it is today. Nature and society will continue to benefit from our groundbreaking research and conservation strategies like we have done already for 70 years.

Dr. Manfred van Veghel
Director Carmabi

Dr. Manfred van Veghel.

The severe rainfall on May 4th caused significant damage to both Shete Boka National Park and Christoffel National Park.

Scientific Research (Marine)

VISITING SCIENTISTS

117 scientists visited Carmabi in 2024. In addition, 104 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 2024 was slightly lower than previous years (Figure 1). Because of the renovation of the lab and dormitory facilities at Piscadera, less researchers could stay at the facilities during the spring of 2024.

Most visitors in 2024 were from the United States (50%) followed by the Netherlands (32%). Almost all the scientists and students that worked at Carmabi stayed at the facilities at Piscadera.

The occupation of Carmabi's science center in 2024 was 62% which is similar to that of preceding years (i.e., in 2023: 70%, in 2022: 66%, in 2021: 53%, 2020: 26%).

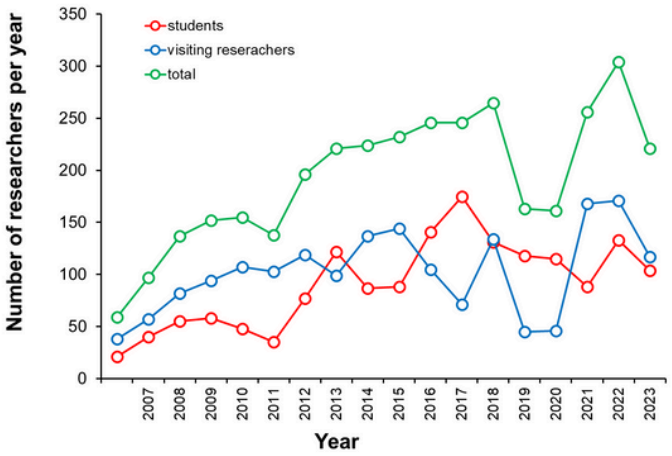
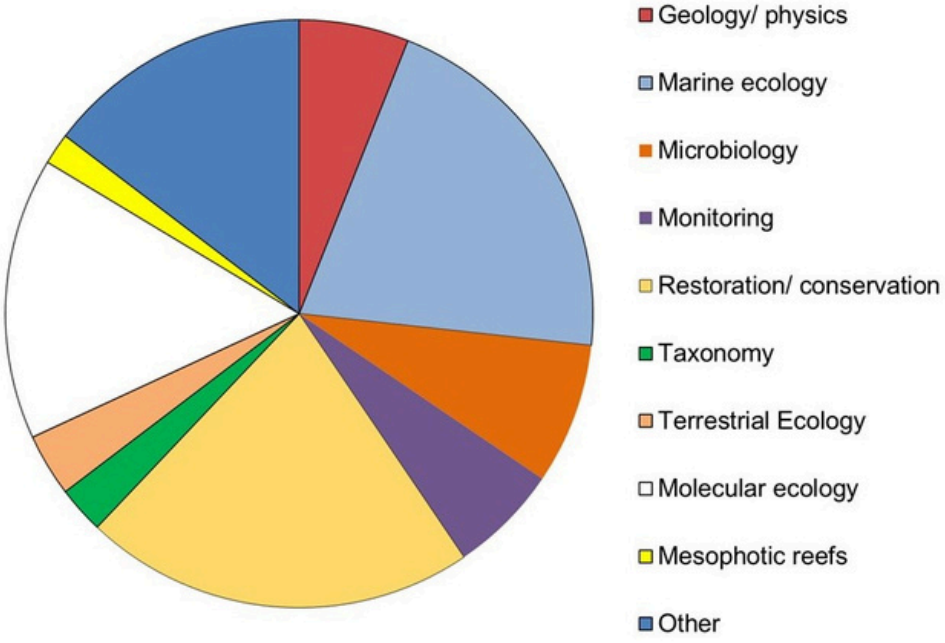


Figure 1

An overview of the areas in which researchers were active that visited or worked at Carmabi in 2024 is shown in Figure 2 .

An overview of visiting scientists (PI name, home institute and topic of research conducted in Curaçao) is provided in Annex 1. Many of these researchers visited Carmabi multiple times in 2024.

Figure 2



An overview of the areas that researchers that visited or worked at Carmabi worked on in 2024.

Scientific Research (Marine)

PEER REVIEWED PUBLICATIONS

Forty-three publications appeared in peer reviewed scientific journals based on work that was conducted at Carmabi making 2024 making it the most productive years 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, 24 reports were produced by MSc students that did their master's thesis' project at Carmabi.

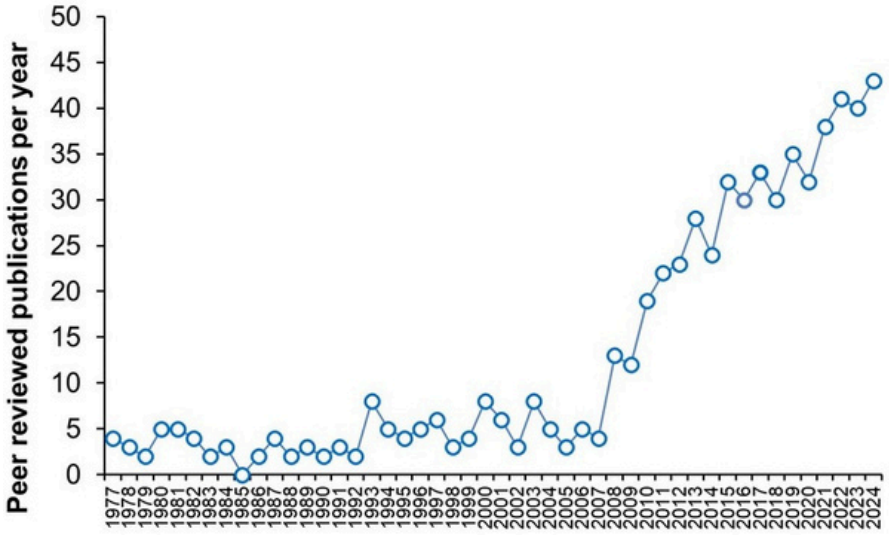


Figure 3

FREE ADVICE, OUTREACH, AND CONSULTATION

A vibrant coral reef off the coast of Curaçao.

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

We assisted in 52 cases, both oral and written. In 2024 the Carmabi Science Department was featured/ interviewed in 67 items for international and local TV, radio and newspapers. Two documentaries on (marine) biology were filmed at Carmabi in 2024.

Scientific Research (Marine)

SELECTED PROJECTS 2024

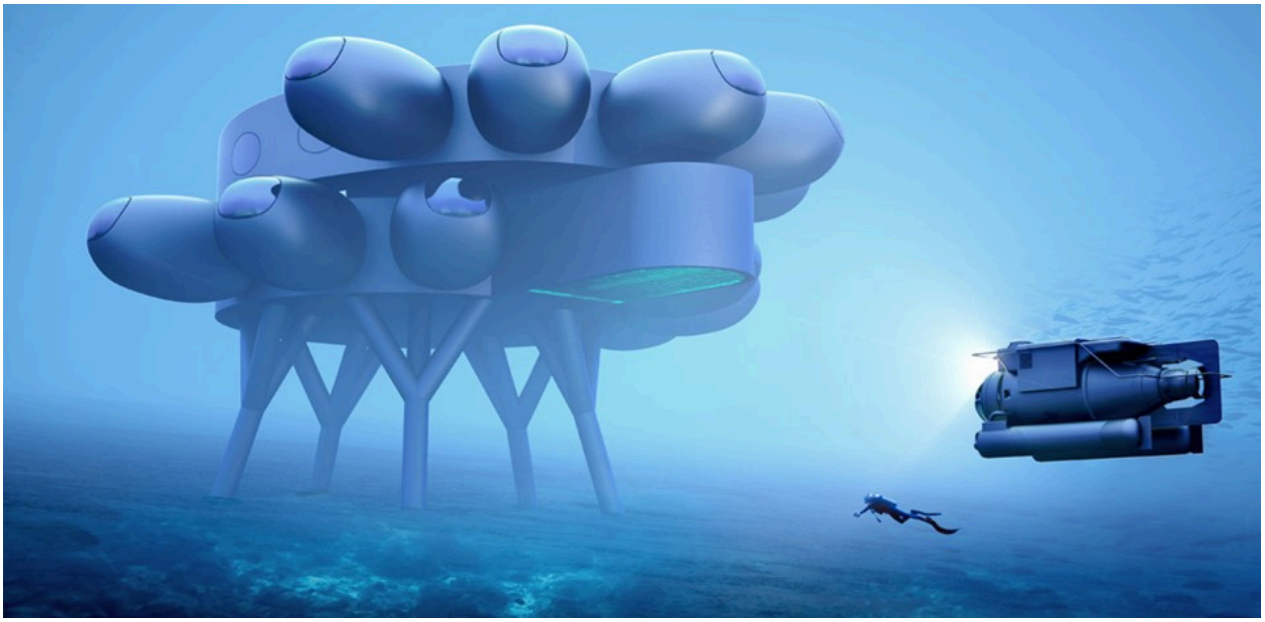
Official partnership between Carmabi and the Proteus Ocean Group

Proteus Ocean Group announced an official partnership with the Carmabi (Caribbean Research and Management of Biodiversity Foundation) through the signing of a Memorandum of Understanding (MoU) in January 2024. Proteus Ocean Group is a for-profit social enterprise developing and operating PROTEUS™, the world's most advanced underwater habitat where scientists can live and work underwater 24/7. Carmabi is responsible for the management of the Curaçao Marine Park which has been chosen as PROTEUS™'s first location in a global network of research habitats.

"Carmabi is excited to step into the future of underwater science and exploration with PROTEUS™," said Dr. Manfred van Veghel, Director of Carmabi. "The research history of our institute and deep knowledge of the plants and animals that live on our reef, combined with PROTEUS™'s capacity to facilitate a permanent human presence underwater, will contribute to discoveries that are only possible when living and working at depth." Curaçao is home to one of the few remaining Caribbean reefs that is still growing, providing scientists unique access to one of the region's healthiest coral ecosystems. Building on a long history of research conducted by Carmabi, PROTEUS™'s scientists have already installed a suite of sensors to capture variables ranging from temperature to water quality to the acoustic environment with the goal of building toward an extensive network that will inform conservation approaches to benefit Curaçao's coral reefs. In Curaçao, the PROTEUS™ team will build its first state-of-the-art, modular underwater laboratory habitat (Figure 4) enabling scientists, aquanauts, astronauts, teachers, artists and more to live and work at depth. The continuous human presence on the ocean floor, coupled with cutting edge technologies, will make this reef in Curaçao one of the most well-studied coral reefs on the planet. PROTEUS™ aims to engage the global community through education and storytelling via broadcast, social and interactive media, connecting people to the ocean and strengthening their understanding of the critical role the ocean plays in allowing life on earth— including human life—to thrive.

Source: Curaçao Chronicle

Figure 4



An impression of the underwater lab Proteus that will be constructed in Curacao by the Proteus Ocean Group.

Scientific Research (Marine)

SELECTED PROJECTS 2024

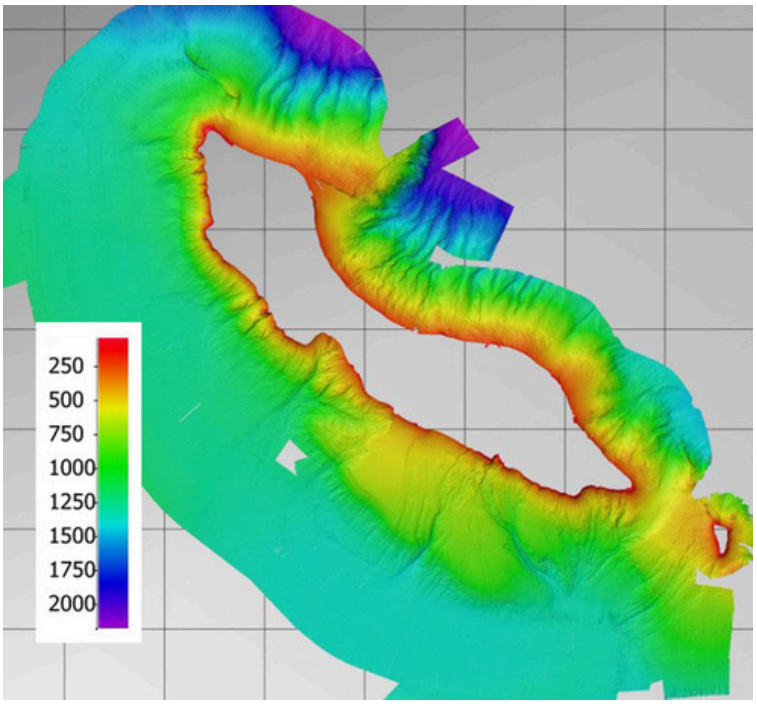
SEALINK Program continues on Curaçao.

In 2020, the Dutch Minister of Education, Culture and Science, 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. The program continued in 2024 and will end in 2026 (Figure 5).

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

Figure 5



The first ever depth map of the waters around Curacao has been produced though the SEALINK Program. The research vessel Pelagia, owned by the Netherlands Institute for Sea Research was used to do the surveys needed to produce this map.

SELECTED PROJECTS 2024

How are the water masses that surround the ABC islands "structured"?

A new study aimed to identify ocean- and land-based sources of nutrients to the offshore waters surrounding the Southern Caribbean islands Aruba, Bonaire, and Curaçao. The composition of water masses around these islands were assessed to depths up to 300 m and three distinct overlying water masses were identified, separated by mixing zones. The spatial distribution of chlorophyll-a (indicative of phytoplankton biomass), rather than nutrient concentrations, suggested the presence of higher-than-average nutrient concentrations in islands with higher population densities and near urbanized/industrial areas. This showed that eutrophication signals are foremost "visible" as an increase in ,e.g. phytoplankton and other small organisms, which corresponds to coastal waters changing over time from "azure blue" to "smaragd green" in areas affected by eutrophication.

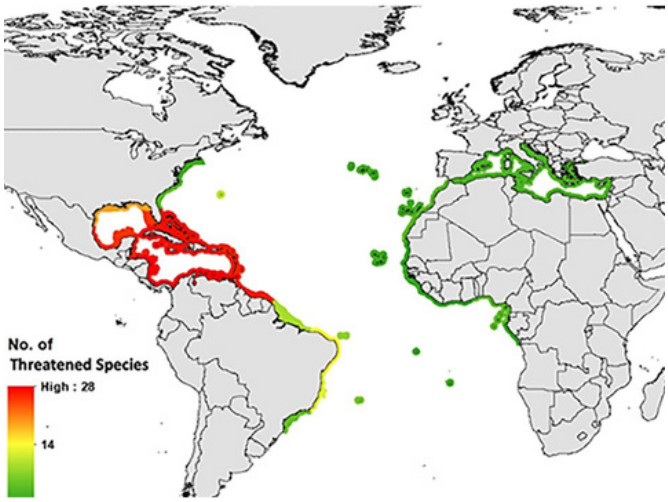
Read the whole story: https://www.sciencedirect.com/.../pii/S0025326X24012748

Half of Atlantic reef-building corals at elevated risk of extinction due to climate change and other threats

Atlantic reef-building corals and coral reefs continue to experience extensive decline due to increased stressors related to climate change, disease, pollution, and numerous anthropogenic threats. To understand the impact of ocean warming and reef loss on the estimated extinction risk of shallow water Atlantic reef-building scleractinians and milleporids, all 85 valid species were reassessed under the IUCN Red List Categories and Criteria, updating the previous Red List assessment of Atlantic corals published in 2008. The updated assessments place 45.88%–54.12% of Atlantic shallow water corals at an elevated extinction risk compared to the previous assessments conducted in 2008 (15.19%–40.51%**). 26** (out of 85) Atlantic coral species are now listed as Critically Endangered in the IUCN Red List (Figure 6). Each of these species had previously been listed under a lower threatened category and this result alone highlights the severe threat future bleaching events pose to coral survival and the reef ecosystems they support.

Read the whole story: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0309354

Figure 6



Distribution of threatened Atlantic reef-building coral species by marine ecoregions.

Scientific Research (Marine)

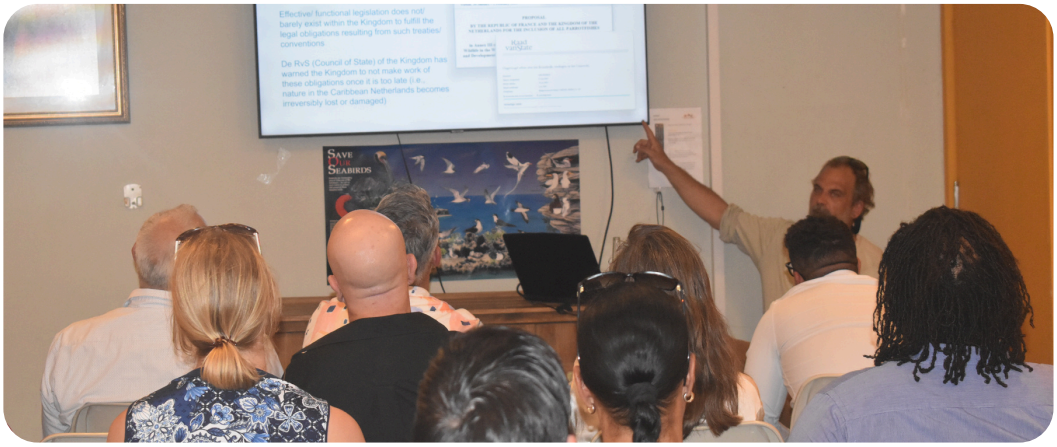
SELECTED PROJECTS 2024

Carmabi hosts working group on Kingdom Climate Agenda

In January 2024, Carmabi welcomed twenty-five policymakers from the Kingdom Climate Agenda working group. The working group was in Curaçao to devise concrete solutions for the climate agenda. Participants in this four-country meeting (Curaçao, Sint Maarten, Aruba, and the Netherlands, including Bonaire, St. Eustatius, and Saba) visited the Curaçao Reef Mangrove Park in Otrobanda and Carmabi's Science Center at Piscadera. Rangers from the Mangrove Park and scientists provided a tour, discussing the current impact of climate change in Curaçao and outlining actions needed to preserve vital Curaçaoan ecosystems, such as mangroves, seagrasses, and coral reefs. The Mangrove Park offers the local population and tourists a unique opportunity to observe this exceptional ecosystem up close. Mangroves play a crucial role in protecting the coastline from erosion, acting as nurseries for many coral reef fish and preventing sediment from reaching the vulnerable reef during rainfall. With less frequent but more intense rainfall and an increase in stronger storms and hurricanes due to climate change, the role of mangroves becomes increasingly significant.

On a Kingdom level, agreements have been established for nature conservation in the Caribbean, including through the 'Protocol concerning Specially Protected Areas and Wildlife,' commonly known as the SPAW Protocol. This protocol oversees the protection of vital components such as seagrasses, mangroves, corals, and parrotfish. In discussions with the working group, Carmabi presented current examples, emphasizing the need for enhanced efforts to protect these endangered species, as their populations are currently declining rapidly. The recent coral bleaching that severely damaged the coral reefs surrounding Curaçao over the past few months serves as an illustration of the consequences of climate change. Prolonged sea temperatures exceeding 29 degrees Celsius in 2023 caused many corals to bleach and starve. While some corals are recovering as temperatures decrease, the damage to the coral reef remains substantial. Research indicates that parrotfish can play a crucial positive role in promoting natural recovery. Carmabi aims to support organizations and initiatives contributing to the protection and sustainable management of ecosystems on and around Curaçao. The organization has offered its assistance to the working group in establishing improved nature management on the islands.

Source: Curaçao Chronicle



After visiting the Mangrove Park, the group received a presentation from Dr. Mark Vermeij.

Lots of fishes infected by parasites

Observations of Black Spot Syndrome (BSS), a pigmented dermatopathy in marine fishes (Figure 7), have been increasingly reported in important grazers such as surgeonfish and parrotfish in the Caribbean. This condition has been linked to infection by the trematode parasite, *Scaphanocephalus spp*., although relatively little is known about the environmental drivers of infection and how they vary spatially. This study surveyed BSS presence and severity in ocean surgeonfish (*Acanthurus tractus*). Application of the approach across 35 coastal sites in Curaçao was used to evaluate the influence of environmental factors on BSS, including longitude, herbivorous fish density, wave energy, depth, nutrient pollution, and inhabited surface area. Of the 5123 fish surveyed between February 2022 and January 2023, 70% exhibited visible signs of BSS, and the average number of lesions per fish increased by fivefold from eastern to western sites along the leeward coastline. Analyses of environmental factors indicated that BSS decreased with wave intensity while increasing in association with higher nutrient runoff and fishing pressure. This study provides insight into environmental correlations of BSS severity while highlighting the use of video-based surveillance as a non-invasive survey method. The mechanisms linking environmental factors with BSS as well as its consequences for affected fish remain unknown, emphasizing the need for long-term and experimental studies in this system.

Source: Marine Biology

Figure 7

A Redband parrotfish in Curacao that is infected by trematode parasites whose presence results in discolored skin in affected fishes.

Scientific Research (Terrestrial)

MONITORING ACTIVITIES 2024

Bird monitoring Christoffel National Park

CARMABI is taking part in the Dutch Caribbean Nature Alliance (DCNA) project "Monitoring for Bird Biodiversity Conservation in the Dutch Caribbean". The 5-year project is conducted on all 6 Dutch Caribbean islands. The aim of this project is to assess bird population trends over time to identify potentially vulnerable bird species following the Proalas Protocol from Birds Caribbean. The project takes place between 2023 and 2027 and twice a year, bird populations are surveyed in spring (March-April) and fall (October-November).

Brown throated parakeets observed during bird monitoring in the Christoffelpark

The surveys in Curacao take place in the Christoffel National Park at 20 fixed survey locations. All birds that are seen or heard are recorded. The collected data will also be shared with citizen science websites such as e-Bird and Observation.org. In the coming years, we intend to expand this monitoring program to other managed national parks and areas outside the parks.

Green turtle hatchlings making their way to sea.

Turtle monitoring in Shete Boka National Park and Christoffel National Park

Starting in 2018, the pocket beaches of the Shete Boka National Park and Christoffel National Park have been monitored for nesting sea turtle activity. During the turtle nesting season (May – January), pocket beaches in both parks are monitored three times a week.

In 2024, we observed the nesting activity of the green turtle (*Chelonia mydas*) in the Shete Boka National Park and were able to confirm two nests that produced 169 young sea turtles. These nests show that the pocket beaches of the Shete Boka National Park are still being used by nesting sea turtles. Monitoring will continue in 2025.

Scientific Research (Terrestrial)

SELECTED PROJECTS 2024

Sabal antillensis (Kabana) genetic research

The charismatic palm species of Curaçao and Bonaire, locally known as Kabana, have long been unidentified and different authors provided different identifications (e.g. *Sabal cf. causarium, Sabal palmetto*). Based on morphological characteristics, these palms were identified as *Sabal antillensis* (Griffith et al., 2017), an endemic palm species for the islands of Bonaire and Curaçao. Although the two different island populations share many characteristics and considered to be a single species, they also differ in certain aspects like the compact crown of leaves and erect leaf segments amongst others. Based on these differences Griffith et al. (2019) published the split of *Sabal antillensis* for Bonaire and Curaçao into *Sabal antillensis* for Curaçao and *Sabal lougheediana* for Bonaire. A new study published in 2024, confirmed the division of the species into *Sabal antillensis* for Curaçao and *Sabal lougheediana* for Bonaire. By doing so, the research also reconfirmed the very different population status and conservation needs for the two islands. While the Curaçao palms have showed increases in abundance over time (de Freitas et al., 2018) after exotic herbivores (e.g., goats) were removed from the park where these palms are relatively common, the Bonaire palm populations are still very vulnerable due to continued grazing pressure, their small population size and their limited distribution.

Sabal antillensis near Seru Bientu, Christoffel National Park.

Students moving through the dense and thorny limestone vegetation of Seru Largu.

Landscape ecology and vegetation of Curacao's new National Park Seru Largu

In 2024 the landscapes and vegetation of the Seru Largu National Park were assessed at over 160 survey locations, adding to the already extensive knowledge of the floristic diversity of the area. The research was conducted by Carmabi researchers with assistance from three students of the HAS Green Academy. This project intends to map and inventory the distribution and state of the vegetation types within Curacao's newest national park.

Scientific Research (Terrestrial)

NATIVE PLANT NURSERY

Native plant nursery

In the nursery that was established in 2018 at Savonet, thousands of native trees, shrubs and herbs are cultivated to increase our understanding of our native flora and provide landscapers and gardeners with an equally pretty alternative to non-native plants that are commonly used in landscaping and gardening, but can become invasive or carry pests that impact our local plant species (e.g., the red palm weevil).

In 2024, the number of plants and the number of species increased substantially. Highlight of the year was the planting of the third tiny forest on Curaçao by the Hòfi Chikí foundation together with the children of the J.W.Th. Schotborghschool in Koraalspecht. Sixhundred native plants belonging to 60 different species that were grown in the Carmabi nursery were outplanted at the school and will provide a platform for education on the native flora of Curaçao for future students.

Psidium sartorianum flowers and developing fruits

Carmabi researchers in the field.

Consultancy Department

SELECTED PROJECTS

The consultancy department provided services for seven projects in 2024 related to ecological inventories, nature value studies and vision statements for planned development projects around the island and abroad.

Some examples from 2024 are provided here:

Brown pelican at Ascension observed during geology tour with Albert Schweizer.

Landscape ecology and vegetation research in Bonaire

In February 2024, researchers of Wageningen Environmental Research and CARMABI commenced the resurveying of the historic vegetation survey locations (from 1999, see de Freitas et al. 2005) in Bonaire to assess changes in the island's vegetation distribution and composition and understand the processes responsible for these changes. Half the original survey locations were surveyed in 2024, and the remaining sites will be surveyed in February 2025. To better understand the current state of vegetation and to provide information on the changes between current and historic states, the ~300 historic survey locations were revisited and resurveyed in similar fashion compared to the 1999 survey, with new added sites on Klein Bonaire. Preliminary results for Klein Bonaire indicate an increase in vegetation diversity, density and height since the 1999 survey. This recovery of vegetation is most likely linked to the removal of exotic herbivores from the island since the 1980's.

View from Mount Brandaris during fieldwork.

Consultancy Department

SELECTED PROJECTS 2024

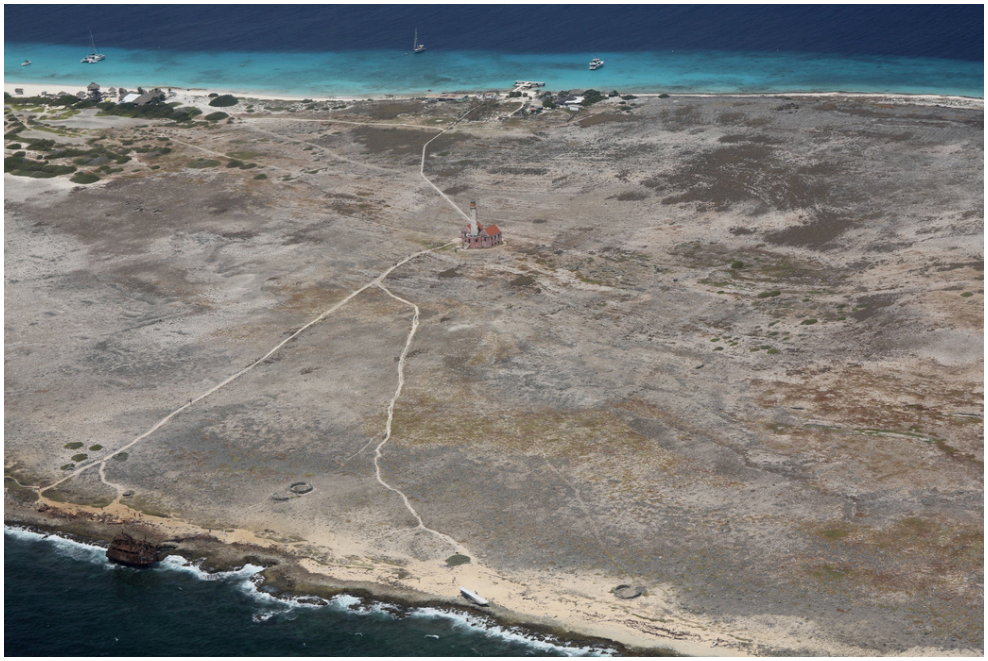
Inventory of nature values of the Bisento area, Curaçao

Carmabi's consultancy department surveyed this area's natural values (e.g. landscape ecology, vegetation types and fauna) to inform decision making processes related to the planned development of the area. The area was mostly comprised of a single vegetation type, with a fairly low species diversity and cover, typical of Curacao's diabase vegetation which has not changed much through time based on earlier descriptions of the area's vegetation (Stoffers 1956, Beers et al. 1997).

Aerial view over the Bisento survey area.

Klein Curaçao Development plan

In 2024, consortium partners, including CARMABI, finalized the project's deliverables to come up with a plan to sustainably make use of the island of Klein Curaçao. These deliverables included a report on Klein's carrying capacity, a legal framework and a financing plan in support of a new plan intended at safeguarding Klein Curacao's unique identity. The project results were presented to the Curaçao government. Final stakeholder sessions and different financial reports will be delivered in early 2025 to complete the project. The project "Klein Curaçao Development Plan" started in 2023 to achieve the management goals of the existing Klein Curaçao Management plan. The new plan provides a wholistic vision for the sustainable management of the small island that is already internationally protected under the Ramsar treaty. The project was financed through the Resilience, Sustainable Energy and Marine Biodiversity (RESEMBID) programme' funded by the European Union.



Aerial view of Klein Curaçao.

Consultancy Department

SELECTED PROJECTS 2024

Consultancy Marine nature study Caracasbaai

This study assessed benthic and reef fish community composition with emphasis on the presence and occurrence of locally protected coral species (Landsverordening Grondslagen Natuurbeheer en -bescherming). These surveys were conducted to inform and guide the government that intends to develop the recreational and touristic infrastructure and facilities at Caracasbaai.

Aerial view on near-shore reef at Caracasbaai.

Park Management

CHRISTOFFEL NATIONAL PARK

Selected projects and other activities

In 2024, Christoffel National Park continued to grow as a cornerstone for conservation, education, and meaningful nature experiences on Curaçao. As the largest protected natural area on the island, the park is home to a rich diversity of flora and fauna, including several endemic species, and offers a blend of rugged natural beauty and cultural history. This year, the park team worked with renewed energy and resilience to maintain and enhance the park's role as a safe and inspiring place for both locals and tourists.

The Bromelia humilis in bloom in Christoffel National Park.

Ranger walks through the high water after the heavy rainfall.

Restoration & resilience

On May 4th, a record-breaking 300 mm of rain fell in just a few hours, causing landslides, trail damage, and fallen fences across the park. Despite the scale of destruction, our team mobilized rapidly, and Christoffel National Park reopened to hikers the very next day. Vehicle access resumed shortly after. This swift recovery reflects the dedication of our rangers and volunteers and highlights our growing organizational resilience.

Education & engagement

Thousands of schoolchildren visited the park this year as part of Carmabi's terrestrial education program. Through interactive hikes and educational modules, students learned about Curaçao's reptiles, birds, native plants, and historical agricultural practices. These lessons help nurture a sense of stewardship and pride in the island's natural and cultural heritage.

Children play games in Christoffel National Park.

Park Management

CHRISTOFFEL NATIONAL PARK

Selected projects and other activities

Special visits

In 2024, the park received several distinguished visitors, including representatives of the tourism organizations on the island and management of several ministries. During these visits, they explored the Savonet Museum, met with staff, and learned more about Carmabi's conservation efforts and the rich history of the Savonet plantation. Special attention was given to the Awa pa Kòrsou project.

Start of the Zevenbergen Manor consolidation project and associated waterworks.

Carmabi and Willibrordus residents build a traditional lime kiln together.

Site improvements

A number of infrastructure improvements were made in the park in 2024. Picnic areas and visitor zones received a fresh coat of paint, and park rangers were outfitted with new uniforms.

These efforts improve the experience for our guests and support the professional image of the park. And a new limestone kiln was built with local volunteers.

Collaboration

The Christoffel National Park plays a vital role in several collaborative projects, including 'Awa pa Kòrsou', a heritage-focused initiative that links water conservation, ecological restoration, and cultural education.

These projects help ensure that both nature and Curaçao's history are preserved and shared with future generations.

Students from Kolegio St. Margaretha at a water well in Savonet.

Park Management

SHETE BOKA NATIONAL PARK

Selected projects and other activities

Natural spectacle & protection

The park continues to serve as a crucial nesting area for endangered sea turtles. As part of our ongoing monitoring program, two nests of the Green turtle (Chelonia mydas) were confirmed in 2024, resulting in 169 hatchlings.

This reaffirms Shete Boka's role as a vital sanctuary for marine life. Rangers and volunteers conducted in-person and drone-based monitoring throughout the nesting season to track activity and ensure protection.

Baby turtles find their way to the sea after hatching.

View point at Shete Boka.

Maintenance & improvements

The year 2024 saw several infrastructure upgrades aimed at ensuring safety, functionality, and resilience. Repairs were carried out on internal roads damaged by weather and increased traffic.

Guard towers and shelters were reinforced, and minor renovations were made to the ticket office. These measures enhance both the security of our team and the comfort of our guests.

Park Management

SHETE BOKA NATIONAL PARK

Selected projects and other activities

Innovation in visitor experience

This year, the park experimented with new types of engagement by organizing activities outside regular opening hours. These pilot initiatives, held in collaboration with tour operators, proved to be popular and will be expanded in 2025. From sunset tours to exclusive nature walks, Shete Boka is evolving into a place of both day and night experiences, blending nature, adventure, and storytelling.

Meditation & Sound event at Shete Boka National Park.

Different inlets were cleaned during the clean-up.

Community involvement

On September 21st, 2024, Shete Boka hosted a massive cleanup action during World Cleanup Day, in collaboration with MCB. Over 150 volunteers cleaned up at seven different boka's, removing debris and plastic waste from the coastline. Events like these demonstrate the power of community participation in nature conservation and raise awareness about pollution's impact on marine ecosystems.

Park Management

SERU LARGU NATIONAL PARK

Selected projects and other activities

Officially opened in 2024, Seru Largu National Park has quickly established itself as a unique destination where nature, culture, and community meet. Located near Willibrordus, this newest addition to Curaçao's national parks offers expansive views, vibrant cultural heritage, and a growing range of recreational and educational activities.

View of the Seru Largu mountain.

At the park office during a visit from school children.

A year of launch & engagement

The park office was opened at the Sportcomplex Willibrordus, serving as a home base for community engagement and park operations. With support from the Dutch Cultural Participation Fund and as part of the Slavery Memorial Year, project Salu was launched to reconnect people with forgotten cultural practices. Highlights included the revival of traditional lime kilns, ceremonies guided by elders, and workshops on Curaçaoan musical instruments.

Dia di Willibrordus & cultural revival

On September 29, Seru Largu National Park hosted the lively Dia di Willibrordus celebration. Over 150 guests joined in for a day filled with tambú music, domino games, poetry, local snacks, guided hikes, and even a community biking tour. The day closed with the symbolic lighting of a traditional limestone kiln — the first time in 75 years this ritual was performed in the region. It was a powerful moment of cultural reconnection and pride.

The newly build traditional limestone kiln.

Park Management

SERU LARGU NATIONAL PARK

Selected projects and other activities

Nature & outdoor experiences

Throughout 2024, Seru Largu National Park became a hub for nature lovers and outdoor enthusiasts. Orientation hikes, kids' trails, flamingo tours, and even moonlight walks were introduced. The Coral Estate Classic biking event selected the park as its new starting location, adding visibility and excitement to the park's identity.

People gathering for the start of the orientation hike.

The Guide Masterclasses was attended by more than 80 participants.

Education & innovation

The park hosted a well-attended Masterclass for Guides, themed Where Nature Meets Culture, with over 80 participants. Data from earlier botanical surveys by interns was shared to deepen participants' understanding of the park's unique vegetation. Mini salt pans (saliñas) were also reintroduced as part of a pilot project to revive local salt production, although the unusually wet second half of the year postponed the results.

Conservation & collaboration

Reforestation efforts included two mangrove planting events, supported by CuraDoet, Miss Curaçao candidates, and partners such as Ryan de Jongh, Deloitte, and Wageningen University. The Dutch Army (Genie) constructed a new Flamingo Viewing Tower and reopened the service road, allowing access for restoration work at the historic limestone kilns of Jan Kok — which will continue into 2025.

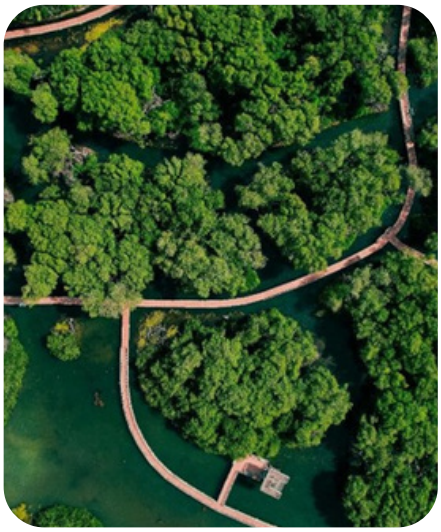
The Flamingo Observation Tower was build by the Dutch Armie (Genie).

Park Management

CURACAO RIF MANGROVE PARK

Selected projects and other activities

The year 2024 was a year of growth, development and new experiences for the Curaçao Rif Mangrove Park. The park has now established itself as a popular destination where conservation, environmental education and sustainable tourism go hand in hand. With increasing visitor numbers, and successful collaborations with local and international partners, the Mangrove Park team has worked with dedication and passion to make the park what it is today. To further strengthen our mission of awareness and conservation in Mangrove Park, a new kayak tour was introduced in 2024, offering a unique way to experience the mangroves and their ecosystem at night. A monitoring program now exists focused on water quality in the park and the results assured us that recreation is the Mangrove Park is safe.



View of the park's boardwalk, bringing us closer to the mangroves.

The whole team graduating for the Portuguese course.

Learning & training

In 2024, the Mangrove Park staff successfully completed a Portuguese language course to improve communication with the growing number of visitors from Brazil etc and successfully completed a Red Cross first aid course. Local internships have been provided as well as students that came over for a working day experience. The Curaçao Rif Mangrove Park continues to prioritize knowledge exchange and collaborative learning. Juan Wyatt, representing the park, joined as a volunteer in the CCS Expedition, the largest scientific survey dedicated to assess the abundance of whale and dolphin species in the Caribbean.

Collaboration

The Curaçao Rif Mangrove Park and the Youth Rangers, held a successful cleanup event to maintain the natural beauty and health of the park's mangrove ecosystem. The Curaçao Rif Mangrove Park also established a collaboration with its neighbor Corendon to offer kayak tours starting from The Rif at Corendon Mangrove Beach Resort. At the Curaçao Rif Mangrove Park, we believe in fostering learning and professional growth by providing valuable internship opportunities. Throughout the year, the Park received numerous internship requests from various local and international students from a wide range of backgrounds ranging from environmental studies to studies related to tourism and hospitality. Additionally, park staff engaged with local businesses to strengthen community involvement and support eco-friendly initiatives.

Park Management

CURACAO RIF MANGROVE PARK

Selected projects and other activities

Open day

In 2024, the Curaçao Rif Mangrove Park proudly hosted its second Open Day, which attracted a large number of visitors interested in environmental education, community engagement, and mangrove conservation. This special event provided an opportunity for the community to explore one of the island's unique ecosystems (mangrove forests).

Throughout the day, attendees enjoyed a variety of interactive activities, including educational painting sessions, a bouncer, face painting, a local plant sale from the Carmabi Greenhouse, and delicious local snacks and beverages provided by the community. Rangers were on hand to share information about the mangrove ecosystem and its importance to the island. The enormous turnout clearly indicated an increasing awareness and appreciation for the park. The event was broadcasted by a local radio station.

There were different activities throughout the park.

Tour for the key stakeholders.

Special Visits

In 2024, several Ministers, Members of Parliament, researchers, conservation organizations, miss Curaçao candidates, tourists, local residents, and students visited the Mangrove Park to learn about our unique ecosystem. We also welcomed key representatives from the tourism and environmental sectors.

Park Management

CURACAO MARINE PARK

Selected projects and other activities

The Curaçao Marine Park (officially designated as Curaçao's SPAW Area 1) focused on conservation, patrolling, mooring buoy management, and facilitating scientific research in 2024 to preserve and sustain the delicate ecosystems within the park's boundaries.

Marine park Ranger preparing to change a buoy.

Installing two new buoys.

Strengthening partnerships for marine conservation

In 2024, the Marine Park partnered with Proteus to install a telemetry buoy for ocean monitoring. In collaboration with GMN and accompanied by Prime Minister Pisas, two new buoys for fishers were installed in the Marine Park. These initiatives illustrate the department's commitment to building and maintaining partnerships that address and mitigate threats to the marine park and ensure its effective management. The Marine Park is working on a new video in collaboration with the Curaçao Ports Authority (CPA) to showcase the work it does. Carmabi is extremely grateful to CPA for the 4 years of invaluable partnership and support for the park's management.

Law Enforcement

Members of the Marine Park team participated in a Law Enforcement (BAVPOL) training program at ORV, which will conclude in Q2 2025. Once completed, this training will enable park staff to play a crucial role in enforcing existing laws within the park to safeguard the unique marine communities within the park and to ensure the long-term effectiveness of our conservation efforts.

Park Management

CURACAO MARINE PARK

Selected projects and other activities

Relocating old mooring block.

Patrolling & Buoys

Throughout the year, the Marine Park Department has maintained and improved the numerous buoys within the park to support diving tourism and local fishers.

Empowering our Futuregeneration (Fotocredits: CPA).

Marine Park Awareness

The Marine Park Department, in collaboration with Carmabi's education staff, participated in various activities, such as CPA's Maritime Day event, themed "Navigating the Future: Safety First!" This initiative aimed to engage and educate the younger generation about the critical importance of environmental conservation and marine safety. Park rangers also conducted a cleanup together with the Marine Youth Rangers at Piscadera Bay.

Assisting the Research department

The Marine Park Department reaffirmed its commitment to supporting the research department on multiple occasions to conduct studies and surveys within the Marine Park to gather critical data essential for advancing our knowledge of Curaçaoan reef communities and the state of the reefs present within the Marine Park.

Photo of the Sealink duo.

OVERALL VISITOR STATISTICS

Christoffel National Park

In 2024, the number of visitors to Christoffel National Park reached 75,619, reflecting an increase of 5.55% compared to 2023 as shown in Figure 8. This growth underscores the park's continued appeal as a key destination for both nature lovers and cultural explorers on Curaçao.

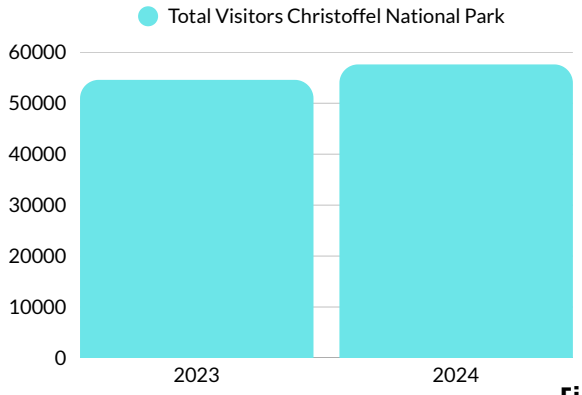


Figure 8

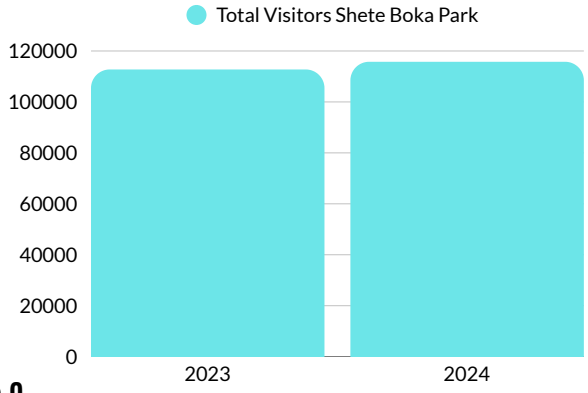


Figure 9

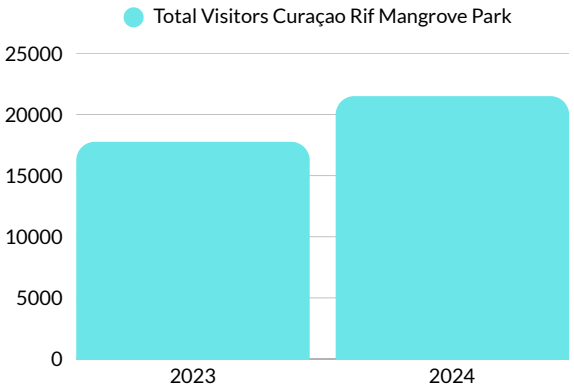
Shete Boka National Park

In 2024, Shete Boka National Park welcomed 115,756 visitors, marking an increase of 2.68% compared to the previous year as shown in Figure 9. This steady growth highlights the park's importance as one of Curaçao's most iconic and frequently visited natural attractions.

Figure 10

Curacao Mangrove Park

In 2024, the number of visitors to the Curaçao Rif Mangrove Park increased substantially with an increase of 21% compared to previous years. 21,500 people (4,874 local visitors and 16,626 tourists) visited the Park compared to 17,766 in 2023 as shown in Figure 10.



Seru Largu National Park

In 2024, the year Seru Largu National Park was officially opened, the park welcomed 887 visitors. As a brand-new addition to Curaçao's protected areas, this marks a promising start and reflects growing interest in the park's unique blend of nature, culture, and community engagement.

Nature & Environment Education Department

EDUCATIONAL PROGRAMS

Carmabi Education is responsible for educational programs for primary school children and secondary education students. It also offers various other outreach and awareness activities for other target groups.

Primary Education

The programs for primary education consist of a Terrestrial Education Program (TEP) which include guided tours within Carmabi's national parks, a Marine Education Program (MEP) which includes educational programs in the Marine Education Center (MEC) at Piscadera and a program on wetlands in the Curacao Rif Mangrove Park.

Savonet Museum, Christoffel National Park, Shete Boka National Park and Daaibooi were visited by schoolchildren from group 1 to group 8 of our primary school system (ages 4 till 12) as part of the TEP. Students are offered a different theme while visiting the parks in subsequent years, for example 'our plants', our birds' and 'our reptiles'.

The marine programs for school children in group 6, 7 and 8 involve excursions to Carmabi Piscadera where they receive an interactive program with presentations and a visit to the MEC. School classes group 7 also visit the Curaçao Rif Mangrove Park.

Education at Boka Grandi.

Education at Shete boka.

Secondary Education

The education department offers 3-hour programs for pre-exam classes (vsbo 3/ havo 4/ vwo 5) comprised of a combination of theory and practical work. At the school location we carry out the marine part, where we test the quality of various ocean water samples and teach students more about the coral reef and the negative impacts of sewage waste and overfishing on our reefs.

The terrestrial part is carried out at the Hato caves and focusses on bats and their role in nature.

Nature & Environment Education Department

PARTICIPATION

Marine Youth Rangers (MaYoR)

Besides the regular nature and environmental school education programs, Carmabi education offers a more extensive and profound nature awareness program for 12–15-year-olds. Participants take part in various activities twice a month on Saturdays such as snorkeling, diving, kayaking, theory lessons, clean ups to increase their knowledge and awareness of our marine environment.

MaYoR at Klein Curacao.

Other activities

Various outreach & awareness activities, including:

- 'Student days' for secondary education students. They get to interact with marine biology students that visit Carmabi to e.g., discuss their motivation and field of interest.
- Providing information during the study and career fair, where we guide secondary school students toward possible follow-up studies.
- Snorkeling programs for children from 6 to 12 years old.
- The Education department takes furthermore part in various partnerships, including the 'Awa pa Kòrsou' project, Club17 etc.
- Providing a training course for the students at the University of Curacao's LOFO (PABO) about local nature to train future teachers in environmental education.
- Providing teaching materials for primary schools and high schools.
- Support secondary education students with their thesis/ paper/ practical assignments on topics related to biology.
- Making podcasts and radio programs.
- Inspiration hikes and talks for companies.
- Attending the NOW expo.

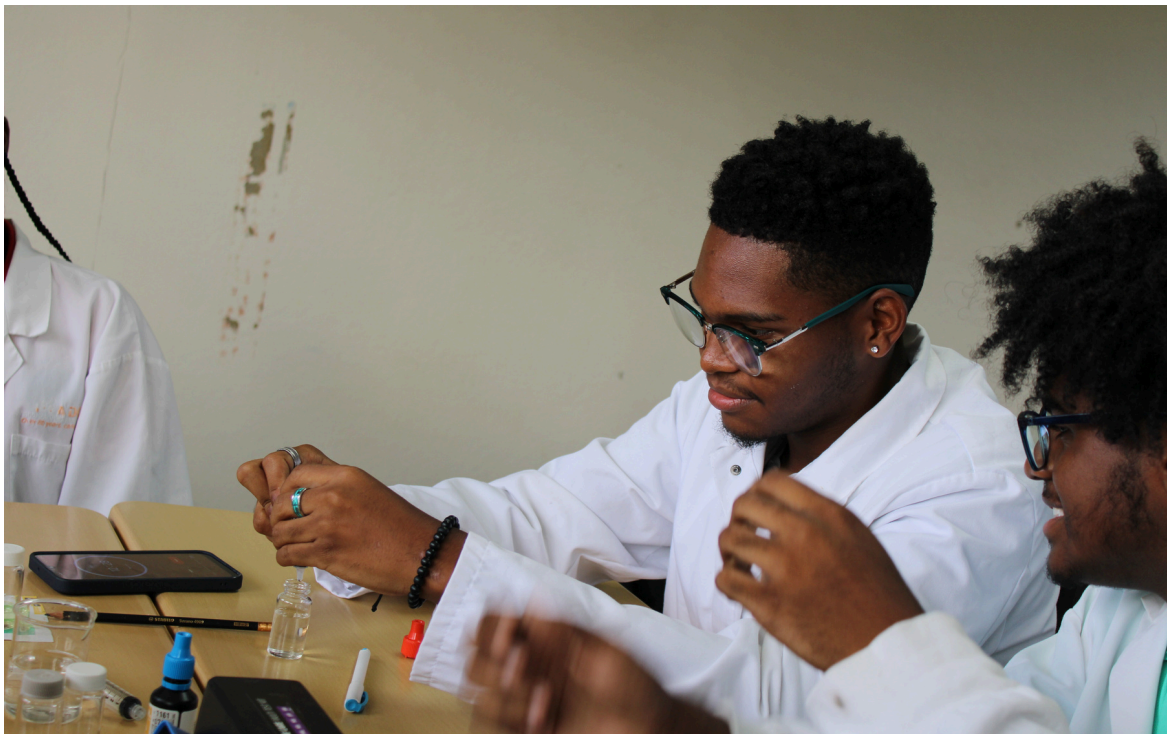
MaYoR Shete Boka.

PARTICIPATION

Overview of achieved results

Terrestrial Education Program (TEP) children participation	
Christoffelpark (Mondi Misterioso/ Nos Mondi) Group 1 & 2	2560
Christoffelpark (reptiles, reptilnan) Group 3	1470
Christoffelpark (birds, paranan) Group 4	1711
Christoffelpark (plants, palunan) Group 5	1449
Christoffelpark (Savonet, wells, agriculture and ruins) Group 6	1388
Christoffelpark (Zorgvliet, wells, agriculture and ruins) Group 7	1244
Daaibooi (ecology of an island) Group 8	537
Shete Boka (ecology of an island) Group 8	998
Total	11357

Marien Education Program (MEP) children participation	
Group 6: Our turtles	901
Group 7: Our mangroves	1119
Group 8: Our coral reef	849
Total:	2869



Secondary Education at Kolegio Alejandro Paula.

PARTICIPATION

Overview of achieved results

Secondary Education Program student participation	
Pre-exam classes (3 vsbo/ 4 havo/ 5 vwo)	500
Total:	500

Marine Youth Rangers (MaYoR) teen participation	
Youngsters (11-15 year old) doing year round activities	
January – June	20
August - December	30
Total:	50

Special awareness programs participation	
Foundations, summer schools (fakansiplan), etc.	500
Total:	500

Education at Hato Cave.

Nature & Environment Education Department

PARTICIPATION

Focus points for 2025

In 2025 we want to further create and implement a new education program for groups 7 and 8 Primary Education in Seru Largu National Park. The focus will be on nature, culture and history. Furthermore, we intend to launch a new booklet focusing on Curacao's typical ecology and environment, as an addition to the schoolbooks from the Netherlands that focus on Dutch/ European ecology.

Students Kolegio Alejandro Paula with Iguana poster.

Radio Hoyer 2 with Margot Hack and Cor Hameete.

Student meet with Secore (Valerie Chamberland).

Marketing & Communications

EXPOSURE OF OUR WORK

Online Presence & Engagement

In 2024, the Marketing & Communications Department focused on strengthening Carmabi's online presence, increasing visitor engagement, and enhancing brand awareness. Through strategic content creation, we successfully highlighted nature conservation, biodiversity, and visitor experiences across our parks through high-quality visual content (photos, videos, drone footage), educational posts on conservation and sustainability and targeted campaigns to promote park visits.

An overview of our press releases can be found in Annex 3.

Here's an overview of the pages currently under management:

Facebook Pages:
- Carmabi Foundation
- Carmabi NME Educatie
- Carmabi Marien Research
- Christoffel National Park
- Savonet Museum
- Shete Boka National Park
- Curaçao Rif Mangrove Park
- Curaçao Marine Park
- Seru Largu National Park

Instagram Pages:
- Carmabi NME Educatie
- Carmabi Marien Research
- Christoffel National Park
- Shete Boka National Park
- Curaçao Rif Mangrove Park
- Curaçao Marine Park
- Seru Largu National Park

Tripadvisor Pages:
- Christoffel National Park
- Shete Boka National Park
- Curaçao Rif Mangrove Park

Youtube Page:
- Carmabi Foundation

LinkedIn Page:
- Carmabi Foundation

Google Pages:
- Carmabi Foundation
- Christoffel National Park
- Shete Boka National Park
- Curaçao Rif Mangrove Park
- Seru Largu National park

During the photoshoot at Carmabi for new stock photos.

Campaign Highlights

'Curaçao Best of 2024' Campaign: Encouraged visitors to vote for Curaçao Rif Mangrove Park in 'Best Activities for Tours' and 'Best Customer Service.'

Podcast Launch – Carmabi Natuur en Meer..!: New educational podcast covering nature conservation, climate change, and sustainability.

Collaborations & Community Engagement: Strengthened partnerships with Paradise FM, local influencers, and schools to promote nature awareness.

Marketing & Communications

EXPOSURE OF OUR WORK

Social Media Performance

Carmabi manages multiple social media pages, with Facebook and Instagram as primary platforms.

Below are selected key insights from our 2024 performance:

Christoffel National Park: In 2024, Christoffel National Park's Facebook page grew to 11,000 followers, marking a 31.4% increase compared to 2023. The page reached a total of 435,000 people over the year — a 141% rise. The best-performing post, featuring the popular mountain climb, reached over 40,000 people.
Shete Boka National Park: In 2024, Shete Boka National Park's Facebook page gained 328 new followers. The page achieved an engagement reach of 110,000 people, reflecting a 2.3% increase compared to 2023. The best-performing post — highlighting sea turtle conservation and dramatic wave footage — reached 29,000 people.
Curaçao Rif Mangrove Park: In 2024, the Curaçao Rif Mangrove Park's Facebook page grew to 10,000 followers, representing a 21% increase compared to 2023. The page achieved a total engagement reach of 385,000 people — a remarkable 285% rise. The best-performing post, promoting kayak tours, reached 45,000 people.
Carmabi: In 2024, the Curaçao Marine Park's Facebook page reached 4,000 followers, reflecting a 123% increase compared to 2023. The page recorded a total reach of 132,000 people, showing a 2.2% growth. The best-performing post, focusing on marine conservation, reached 32,000 people.

Our monthly podcast Carmabi Nature and More...!

All our media publications, such as our weekly segment on Paradise FM, can now be found on the website.

Looking Ahead to 2025

In 2025, Carmabi will strengthen its brand visibility, audience engagement, and digital outreach through:

- Targeted social media advertising and interactive content.
- A National Parks Pass to promote multiple park visits.
- Expanded branding for Rif Curaçao Mangrove Park, Seru Largu National Park, and Curacao Marine Park.
- New brochures for Seru Largu National Park and Curacao Marine Park.
- Promotional videos for CAP and Island TV.
- Media contract evaluations and new agreements for Seru Largu National Park.
- 70th anniversary campaigns and event planning.

General

VISITS

Highlights in the press and visits

Visits in 2024

In 2024, Carmabi hosted several government officials, policymakers, and international delegations, to strengthen collaborations intended to improve the island's progress in the areas of nature conservation, education, and sustainability. Some examples:

- Carmabi Experience for Tourism Sector: Representatives from various tourism organizations: CTB, CHATA, CHASA explored Carmabi's parks, including Curaçao Rif Mangrove Park, Christoffel National Park, Shete Boka, and Seru Largu National Park. The event focused on biodiversity, Ramsar sites, regenerative tourism, and conservation efforts.
- Carmabi Experience for Government Officials: Representatives from various ministries explored Carmabi's parks, including Curaçao Rif Mangrove Park, Christoffel National Park, Shete Boka, and Seru Largu National Park. The event focused on biodiversity, Ramsar sites, regenerative tourism, and conservation efforts.
- Carmabi Experience for Parliament: Representatives from various ministries were invited, but due to unforeseen circumstances this was cancelled at the last minute.
- Minister of Education, Science, Culture, and Sports Visit: Minister Sithree van Heydoorn toured Carmabi's facilities, including the Mangrove Park, Marine Education Center, and Science Center, emphasizing the role of education and research in biodiversity conservation.
- Minister of Finance and Health, Environment and Nature Visit: Minister Javier Silvania visited Carmabi to discuss the Grow funds initiative, the development of a new visitor center, and the economic value of ecosystem services.
- Kingdom Climate Agenda Working Group: A delegation from Curaçao, Sint Maarten, Aruba, the Netherlands, and the BES islands visited the Mangrove Park and Science Center to discuss climate change adaptation, mangrove conservation, and coral reef protection.
- Miss Curacao Candidates Election 2024: All candidates of the 2024 Miss Universe Curaçao elections visited Seru Largu National Park to plant Mangroves and delegation the Mangrove Park kayak to discuss climate change adaptation, mangrove conservation, and coral reef protection.
- Dutch Caribbean Accountants Association Congress 2024 speakers came for a meet and great prior to the congress at Carmabi.
- CFT: A delegation from 'Curaçao financieel Toezicht' visited the Carmabi to discuss climate change impact on ecosystems and the economy.
- De Orde van den Prince, a Dutch Flemish group that promotes the Dutch Language visited Carmabi to learn more about climate change.

These visits confirm Carmabi's role as a key player in environmental research, education, and policy development, fostering new opportunities for collaboration at local, regional, and international levels.

Visit of government officials to Carmabi.

General

DCNA MEETINGS

MEETINGS DCNA 2024

Carmabi is a proud member of the Dutch Caribbean Nature Alliance (DCNA), a regional network that connects nature management organizations across the Dutch Caribbean islands. Through this partnership, we collaborate on conservation strategies, share knowledge and resources, and contribute to joint efforts to protect the unique biodiversity of our region. DCNA plays a vital role in strengthening the capacity of local parks and fostering regional cooperation.

In 2024, DCNA started with the two-tier governance structure after changing its statutes in December 2023. All park directors of the islands of Aruba, Bonaire, Curacao, Saba, St. Eustatius and Sint Maarten left their seat as board member of DCNA in exchange for a seat in the new Advisory Council (AC).

The Advisory Council plays a strategic role in advising the DCNA Managing Board on conservation priorities and collaborative initiatives across all six islands in the Dutch Caribbean. In 2024 the AC focused on defining its role, establishing clear regulations, and building a foundation for effective operations. Key milestones included the development of draft regulations, advancing conservation strategies, and fostering improved collaboration and knowledge sharing. The AC provided advice to the Managing Board on topics such as conservation priorities and actionable steps to address both short-term and long-term goals. Productive knowledge exchanges between the National Parks organizations further strengthened DCNA's mission of safeguarding nature in the Dutch Caribbean.

The AC met 9 times in 2024, of which 7 times online. During 2 in person meetings in May on Saba and in November on Bonaire the members focused on drafting working regulations, providing advice to the Managing Board, exchanging knowledge and finding ways to collaborate. Highlight of the year was the funding of the Key Habitats Program by a Donation of National Postcode Lottery. Providing the parks opportunities to further collaborate and address urgent conservation needs in 2025 – 2027.

Participants Board Meeting Bonaire.

BOARD & STAFF PER MARCH 2024

Board

- Odette Doest, President
- Edwin Flameling, Secretary
- Pieter van den Berg, Treasurer
- Jeffrey Sybesma, Board Member
- Karel van Haren, Board Member
- Manuel Boot, Board Member
- Robin Corsen, Board Member

Management

- Manfred van Veghel PhD, Director
- Mark Vermeij PhD, Deputy Director

Research Department

- Mark Vermeij PhD, Head of Department
- Valerie Chamberland, PhD, Researcher
- Alex van der Last, M.SC., Restoration Technician
- Kelly Latijnhouwers, M.Sc., Restoration Technician

Terrestrial Parks Department

- Quinten Rico, Head of Department, as of April 1st.
- Araceli Martinez, Front Desk Officer (Savonet)
- Brenda Jantji, Front Desk Officer (Shete Boka)
- Briand Victorina, Head Ranger
- Cheandel Maria, Ranger
- Cyrill Kooistra, Deputy Head of Department and Head Ranger
- Dennert Doran, Ranger
- Edwords Alberto, Head Ranger
- Ercandace Naomi Cijntje, Management Assistant
- Ergelijn Cijntje, Ranger, until August 1st.
- Franklin Hellemun, Ranger as of November 1st.
- Janiska Spek, Janitor
- Melvin Martinez-Estevez, Ranger
- Merelyn Albertoe, Front Desk Officer
- Roel Sambo, Ranger, as of June 15th.
- Roengelo Doran, Ranger

BOARD & STAFF PER MARCH 2024

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

Marine Parks Department (Marine Park)
- Duvan Rios
- Roland de Cuba
- Kevin Philbert

Marine Parks Department (Mangrove Park)
- Elisha Janga, Ranger
- Erla Hernandez, Front Desk Officer
- Germain Cristina, Ranger, until August 1st.
- Juan Wyatt, Ranger
- Luigino Fransisca: Ranger as of November 1st.
- Mirari Hodge, Front Desk Officer, until May 1st.
- Mylaina Kwidama, Front Desk Officer, as of April 15th.
- Oswald Fleming, Head Ranger
- Serlon St. Jago, Ranger

Advice and Consultancy Department
- Erik Houtepen, M.Sc., Head of Department
- Tatiana van Stevenick, M.Sc., Terrestrial Research and Consultant, until August 1st.
- Ingo van Veghel, Assistant Terrestrial Research and Consultant, as of August 1st.
- Bernice Brands, M.Sc., Terrestrial Research and Consultant, as of October 1st.

Administration Department
- Ethline Isenia, Head Administration Department
- Shahaira Martina, Assistant Financial Administration
- Nancy Provacia, Administrative Assistant

Communication and Marketing
- Kim Hendriksen

Nature and Environment Education (NME)
- Cornelis Hameete M.Sc., Head of NME department

BOARD & STAFF PER MARCH 2024

Technical Support
- Urgenello Louisa, Hoofd Afdeling Technische Dienst
- Elmer Isenia, Technician

Security Piscadera is outsourced to:
- Megory Security

Cleaning Piscadera is outsourced to:
- Servisio na bo Ordu N.V.

Security Shete Boka is outsourced to:
- Hawks Eye Security

ON CALL

Terrestrial Parks Department
- Afiaretty Boelbaai, Cleaning Savonet
- Ingrid Doran, Cleaning Shete Boka
- Jull-Mar Koeiman, Front Desk Savonet, as of October 1st.
- Richard Davelaar, Cleaning
- Wotty Ricardo, Ranger
- Wotty Sambo, Ranger

Marine Parks and Mangrove Park
- Elis-Marlin Antersijn, Assistant Ranger
- Sayid Baroud, Assistant Ranger

Piscadera
- Oscar Frans, Maintenance

Junior Rangers
- Adrion Plantijn

Education Program
- Arien Liberia
- Charetty Jansen
- Chayandra Mercera, as of May 1st.
- Cindy Eman
- Clarette (Retty) Schoop, Coordinator
- Edalys Reigina
- Joelliane (Lena) Windster
- Karen Roberts
- Lisney Maria
- Luyen Matilda-Allee
- Max van Aalst
- Peetam Dianjaranie, as of May 1st.
- Pietje Rosaria
- Rhiyon la Pas, as of May 1st.
- Ruthline (Ruth) Bernadina
- Ruthsella Statius, Coordinator
- Ruthson Cecilia
- Sonaly (Naly) Rijnschot
- Taira Daal
- Terence Elisabeth, as of May 1st.

General

DONATIONS 2024

Organizations:

- **Blue Marine Foundation (Bus transport school children and Marine Youth Rangers)**
- **By June: contribution for each visitor in Curaçao**
- **California Academy of Sciences US$ 10,000 for Marine Youth Rangers**
- **Centrale Bank Curacao and Sint Maarten: ANG 10.000 introduction Caribbean Guilder**
- **Chicas Curaçao & Polyphon Films ANG 350 use location for film set "Das Traumschiff"**
- **Coca Cola Curacao Recycle Bins for Savonet**
- **Corendon ANG 100, NL Groei Ondernemers Reizen**
- **Dutch Army (Genie) (Flamingo Tower and Road Construction Seru Largu Park**
- **EcoSense: 1100VA UPS ANG 455**
- **Go West Diving: Free Boat Charter Monitoring**
- **Kooyman: Picknick tables**
- **Mijnmaatschappij: 2 mini salt pans**
- **Dutch Caribbean Nature Alliance US$ 75.000 voor Nationale Parken**
- **Stinapa Bonaire: Underwater Helix Boor**
- **Tambu: 2 bottles of local Rum**
- **Vogelbescherming Nederland: Binoculars bird watching**

Persons:

- **Dr. Errol Prens for coral reef restoration Euro 5.000**
- **Klant Ryan de Jongh Kayak Tours ANG 25**
- **Zina Prinsen US$ 80**

financial department

STATEMENT 2024

STATEMENT OF OPERATIONS FOR THE YEAR 2024	-	
	2024	2023
	ANG	ANG
Income		
Grants (11)	877.092	766.379
Earmarked grants (12)	14.211	90.047
Admission fees (13)	3.158.514	2.612.071
Rental income (14)	233.290	297.771
Other income (15)	1.191.515	1.105.928
Total income	5.474.622	4.872.196
Expenses		
Personnel expenses (16)	2.554.709	2.374.212
Depreciation expenses (17)	186.869	170.434
Other operating expenses (18)	2.312.953	2.045.381
Total expenses	5.054.531	4.590.027
Operational result for the year	420.091	282.169
Interest income	4.594	3.791
Result for the year	424.685	285.960
Appropriation of the result for the year		
Retained earnings	424.685	285.960
	424.685	285.960

scientific research

VISITING SCIENTISTS

Dr. Adela Svajna (Czech University of Life Science, Czechoslovakia) Fungal pathogens of sea turtles (September 2024 – November 2024)
Dr. Alice Webb (NIOZ, The Netherlands) Bioerosion by sponges (May 2024)
Dr. Aschwin Engelen (University of the Algarve, Portugal) Coral Reef Ecology Course (February 2024)
Dr. Celine Bijsterveldt (WUR, The Netherlands) Mangrove and sponge ecology (October 2024 – December 2024)
Dr. Dail Laughinghouse (University of Florida, U.S.A.) Applied phycology (January 2024-February 2024)
Dr. David Bertholt (University of Florida, U.S.A.) Physiology of cyanobacteria (January 2024-February 2024)
Dr. Didier de Bakker (NIOZ & Wageningen University, The Netherlands) Bioerosion by sponges (May 2024)
Dr. Eleanor Caves (Duke University, U.S.A.) Shrimp ecology (June 2024 – July 2024)
Dr. Fabien Burki (Uppsala University, Sweden) Protist biology (October 2024)
Dr. Forest Rohwer (San Diego State University, U.S.A.) Coral microbiology and Reef restoration (July 2024 – December 2024)
Dr. Gerard Muijzer (University of Amsterdam, The Netherlands) Microbial ecology (January 2024-February 2024)
Dr. Isabel Pen (The Ohio State University, U.S.A.) Seagrass ecology (June 2023)
Dr. Isaiah Bolden (Vanderbilt University, U.S.A.) Cave and climate research (February 2024 – November 2024)
Dr. Jan Steger (University of Vienna, Austria) Tropical molluscs (April 2014 – May 2024)
Dr. Jasper de Goeij (University of Amsterdam, The Netherlands) Reef ecology and trophic structure of Caribbean reefs (April 2014 – December 2024)
Dr. Joaquin Yus Dominguez (University of Illinois Urbana-Champaign, U.S.A.) Reef restoration technology (May 2024 – June 2024)
Dr. Kristen Marhaver (Marhaverlab, Curacao) Reproductive biology of corals (January 2024-December 2024)
Dr. Lena Frijns (WUR, The Netherlands) Marine mammals (October 2024 – December 2024)
Dr. Linda Wegley Kelly (San Diego State University, U.S.A.) Coral microbiology and Reef restoration (November 2024)
Dr. Marjolijn Christianen (Wageningen University, The Netherlands) Seaturtle ecology (November 2024)
Dr. Milo de Baat (University of AMsterdam, The Netherlands) Waterquality around Curacao (May 2024 – November 2024)
Dr. Mischa Streekstra (Wageningen University, The Netherlands) Sponge biology (November 2024)
Dr. Nicole King (University of California, Berkeley, U.S.A.) Marine molecular and cell biology (July 2024)
Dr. Patrick Keeling (Canadian Institute for Advanced Research, Canada) Protist biology (October 2024)
Dr. Petra Visser (University of Amsterdam, The Netherlands) Coral Reef Ecology Course (January 2024 – May 2024)
Dr. Pieter Johnson (University of Colorado, U.S.A.) Coral Reef Ecology Course (January 2024)
Dr. Pim Bongaerts (California Academy of Sciences, U.S.A.) Mesophotic reefs (November 2024 – December 2024)
Dr. Sam Matchette (University of Cambridge, U.K.) Fish behavior (April 2024 – May 2024)
Dr. Sarah Romero (University of California SD, U.S.A.) Coral restoration (October 2024)
Dr. Stuart Sandin (Scripps Institution of Oceanography, U.S.A.) 3D reef monitoring (November 2024)
Dr. Valerie Chamberland (SECORE International, U.S.A.) Postsettlement dynamics of Caribbean corals & Reef restoration (January 2024 -December 2024)
Dr. Robert Quinn (Michigan State University, U.S.A.) Reef metabolomes (January 2024)
Drs. Emily Nixon (San Diego State University, U.S.A.) Coral holobiont symbioses (March 2024 - October 2024)
Drs. Laurent Delvoye (Vlissingen, The Netherlands) Coral histology (March 2024 – May 2024)
Drs. Michiel van Nierop (Curacao) Conch restoration (February 2024)
Ms. Daisy Flores (University of Texas at Austin, U.S.A.) Coral larvae biology (September 2024)
Naturalis (The Netherlands) Butterfly diversity (September 2024 – November 2024)
Dr. Patrick Brydon (Broadreach College, U.S.A.) Course: coral reef ecology (June 2024 - July 2024)

PEER REVIEWED PUBLICATIONS

An overview of all peer reviewed scientific publications published in 2024 is shown below:

1. Borgstein NM, Burgués Palau L, Parodi BA, Laetz EM. Unraveling the Phidiana paradox: Phidiana lynceus can retain algal symbionts but its nocturnal tendencies prevent benefits from photosynthesis. Symbiosis. 2024 Jan 19:1-1.
2. Briceño-Linares JM, Aranguren J, Clarenda J, Díaz A, Doest O, Haines J, Houtepen E, Martin RO, Millán PA, Nunes G, Schmaltz L. Research, management, and conservation of the yellowshouldered Amazon (Amazona barbadensis) across its range in the southern Caribbean and mainland Venezuela: 1980s to the present. Frontiers in Conservation Science.;5:1444609.
3. Burgués Palau L, Senna G, Laetz EM. Crawl away from the light! Assessing behavioral and physiological photoprotective mechanisms in tropical solar-powered sea slugs exposed to natural light intensities. Marine Biology. 2024 Jan;171(2):50.
4. Campana S, Arts MG, Diez-Vives C, Mueller B, Bang C, Riesgo A, Haas AF, Muyzer G, de Goeij JM. Sponges on shifting reefs: Holobionts show similar molecular and physiological responses to coral versus macroalgal food. Frontiers in Marine Science. 2024; 11:1298922.
5. Clugston JA, Coolen Q, Houtepen E, Proosdij AS, Grinage AD, Griffith MP. Genomic patterns of native palms from the Leeward Antilles confirm single-island endemism and guide conservation priorities. Conservation Genetics. 2024 Apr 19:1-3.
6. Defourneaux É, Herranz M, Armenteros M,. et al. Circumtropical distribution and cryptic species of the meiofaunal enteropneust Meioglossus (Harrimaniidae, Hemichordata). Scientific Reports. 2024. 14, 9296.
7. de Wit CD, Johnson PT. Black Spot Syndrome in ocean surgeonfish: using video-based surveillance to quantify disease severity and test environmental drivers. Marine Biology. 2024 May;171(5):1-4.
8. Fahim H, Naaykens T, D'Aloia CC. Habitat quality effects on the abundance of a coral-dwelling fish across spatial scales. Ecology and Evolution. 2024 Sep;14(9): e70322.
9. Fransen CH. The marine palaemonid shrimps (Crustacea, Deapoda, Caridea) of the Dutch Caribbean. Zootaxa. 2023 Dec 15;5387(1):1-27.
10. Gutierrez L, Polidoro B, Obura D, Cabada-Blanco F, Linardich C, Pettersson E, Pearce-Kelly P, Kemppinen K, Alvarado JJ, Alvarez-Filip L, Banaszak A. Half of Atlantic reef-building corals at elevated risk of extinction due to climate change and other threats. PloS one. 2024 Nov 15;19(11): e0309354.
11. Harper DA, La Turner MA, Donovan SK, Portell RW. 2024. Asymmetry in the cidellina (brachiopoda) from the pliocene-pleistocene of Curaçao, Netherlands Antilles: phenotypic not genotypic. Rivista italiana di paleontologia e stratigrafia.;130(3).
12. Helleman P, Schrama M, Trimbos KB, Braks MA, Schaffner F, Stroo A, Wouters RM, van der Beek JG. The ecological niche and population history shape mosquito population genetics: a case study from Caribbean islands.
13. Hernández-Agreda A, Huckeba J, Prata KE, Vermeij MJA, Bongaerts P. Hybridization and inbreeding affect the survival of a critically endangered coral. Current Biology. 2024 Nov 4;34(21):5120-9.
14. Hoeksema BW, van der Schoot RJ, Samimi-Namin K. Finding a Pied-à-Terre: Harbour infrastructure facilitates the settlement of non-native corals (Tubastraea spp.) in the Southern Caribbean. Diversity. 2024, 16, 697.
15. Holmes RB, Hamilton NM, Simpson SD, Herbert-Read JE. Lionfish (Pterois volitans) do not show directional preferences for ambient underwater soundscapes during diurnal hours. Marine Biology. 2025 Jan;172(1):1-2.
16. Johnson PT, Malawauw RJ, Piaskowy J, Calhoun DM, Kohl Z, ter Horst LJ, Zelmer DA. Emergence of black spot syndrome in Caribbean reefs: a century of fish collections reveals long-term increases in Scaphanocephalus infection. Proceedings B. 2024 Nov 13;291(2034):20242065.
17. Korzhavina OA, Nikitin MA, Hoeksema BW, Armenteros M, Reimer JD, Ivanenko VN. Tracing geographic and molecular footprints of copepod crustaceans causing multifocal purple spots syndrome in the Caribbean Sea fan Gorgonia ventalina. Diversity. 2024, 16, 280.
18. Kruijssen TP, Wit MR, van Breukelen BM, van der Ploeg M, Bense VF. Hydrogeological conceptualization of a small island groundwater system using historical data. Netherlands Journal of Geosciences. 2024 Jan;103: e27.
19. La Rosa IA, López-Marmolejo C, Cacho NI. Recent evolutionary divergence in a plant ring-species is not accompanied by floral phenology or pollinator shifts. Plant Ecology and Evolution. 2024 Jan 1;157(2):158-73.
20. Latijnhouwers KR, van Aalst M, Huckeba J, Miller MW, Vermeij MJ, Chamberland VF. The sea urchin Diadema antillarum facilitates recruitment of the Critically Endangered Caribbean coral species Acropora palmata. Marine Ecology Progress Series. 2024 Oct 8;746:35-48.

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PEER REVIEWED PUBLICATIONS

21. Lax G, Park E, Na I, Jacko-Reynolds V, Kwong WK, House CS, Trznadel M, Wakeman K, Leander BS, Keeling P. Phylogenomic diversity of archigregarine apicomplexans. Open Biology. 2024 Sep 25;14(9):240141.
22. Locatelli NS, Kitchen SA, Stankiewicz KH, Osborne CC, Dellaert Z, Elder H, Kamel B, Koch HR, Fogarty ND, Baums IB. Chromosome-level genome assemblies and genetic maps reveal heterochiasmy and macrosynteny in endangered Atlantic Acropora. BMC genomics. 2024 Nov 20;25:1119.
23. Maggioni D, Schuchert P, Ostrovsky AN, Schiavo A, Hoeksema BW, Pica D, Piraino S, Arrigoni R, Seveso D, Montalbetti E, Galli P. Systematics and character evolution of capitate hydrozoans. Cladistics. 2024 Apr;40(2):107-34.
24. Malawauw RJ, Piaskowy J, ter Horst LJ, Calhoun DM, Johnson PT. Parasitism in reef fish communities: evaluating the roles of host traits, habitat use, and phylogeny on infection by Scaphanocephalus (Trematoda). Coral Reefs. 2024 Mar 11:1-4.
25. Miller MW, Mendoza Quiroz S, Lachs L, Banaszak AT, Chamberland VF, Guest JR, Gutting AN, Latijnhouwers KR, Sellares-Blasco RI, Virdis F, Villalpando MF. Assisted sexual coral recruits show high thermal tolerance to the 2023 Caribbean mass bleaching event. PloS one. 2024 Sep 18;19(9): e0309719.
26. Naaykens T, Fahim H, D'Aloia CC. Sponge species identity and morphology shape occupancy patterns of a Caribbean sponge-dwelling goby (Elacatinus horsti). Environmental Biology of Fishes. 2024 Jul 22:1-4.
27. Pankey MS, Gochfeld DJ, Gastaldi M, Macartney KJ, Clayshulte Abraham A, Slattery M, Lesser MP. Phylosymbiosis and metabolomics resolve phenotypically plastic and cryptic sponge species in the genus Agelas across the Caribbean basin. Molecular Ecology. 2024 Mar 26: e17321.
28. Phillips PM, Langhans KE, Helmus MR, Jesse WA, Surget-Groba Y, Behm JE. Dispersal restriction and facilitation in species with differing tolerance to development: A landscape genetics study of native and introduced lizards. Diversity and Distributions. 2024: e13858.
29. Piña-de la Rosa IA, López-Marmolejo C, Cacho NI. Recent evolutionary divergence in a plant ring-species is not accompanied by floral phenology or pollinator shifts. Plant Ecology and Evolution. 2024;157(2):158.
30. Prata KE, Bongaerts P, Dwyer JM, Ishida H, Howitt SM, Hereward JP, Crandall ED, Riginos C. Some reef-building corals only disperse meters per generation. Proceedings B. 2024 Jul 24;291(2027):20231988.
31. Thobor BM, Tilstra A, Mueller B, Haas A, Hehemann JH, Wild C. Mucus carbohydrate composition correlates with scleractinian coral phylogeny. Scientific Reports. 2024 Jun 18;14(1):14019.
32. Thobor BM, Haas AF, Wild C, Nelson CE, Wegley Kelly L, Hehemann JH, Arts MG, Boer M, Buck-Wiese H, Nguyen NP, Hellige I. Coral high molecular weight carbohydrates support opportunistic microbes in bacterioplankton from an algae-dominated reef. mSystems. 2024 Oct 22: e00832-24.
33. Titus BM, Gibbs HL, Simões N, Daly M. Topology Testing and Demographic Modeling illuminate a novel speciation pathway in the greater Caribbean Sea following the formation of the Isthmus of Panama. Systematic Biology. 2024 Jul 23: syae045.
34. Trznadel M, Holt CC, Livingston SJ, Kwong WK, Keeling PJ. Coral-infecting parasites in cold marine ecosystems. Current Biology. 2024 Apr 22;34(8):1810-6.
35. van der Meij SE, Xu T. Complete mitochondrial genome characterisation of Ratha longimana (H. Milne Edwards, 1834) from the western Atlantic Ocean, with a phylogeny of the Xanthidae (Decapoda: Brachyura). Journal of Crustacean Biology. 2024 Sep;44(3): ruae058.
36. van Duyl FC, Post VE, van Breukelen BM, Bense V, Visser PM, Meesters EH, Koeniger P, Vermeij MJA. Composition and distribution of the near-shore waters bordering the coral reefs of Aruba, Bonaire, and Curaçao in the Southern Caribbean. Marine Pollution Bulletin. 2024 Dec 1; 209:117297.
37. Van Leeuwen SJ, Salvador RB. Miradiscops hovestadti spec. nov. (Gastropoda: Scolodontidae) from Curaçao. Basteria. 2024 88 (2): 173-179.
38. Van Tooren BF, Bruinsma JH. The stoneworts of Bonaire and Curaçao in 2023. Gorteria Dutch Botanical Archives. 2024 Jan 1;46(1):34-40.
39. Varona NS, Hesketh-Best PJ, Coutinho FH, Stiffler AK, Wallace BA, Garcia SL, Scholten Y, Haas AF, Little M, Vermeij MJA, Luque A. Host-specific viral predation network on coral reefs. The ISME Journal. 2024 Dec 6: wrae240.
40. Wallace BA, Varona NS, Silveira CB. An enrichment approach for the recovery of viral and bacterial genomes from coral metagenomes.

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41. Wallace BA, Varona NS, Hesketh-Best PJ, Stiffler AK, Silveira CB. Globally distributed bacteriophage genomes reveal mechanisms of tripartite phage–bacteria–coral interactions. The ISME Journal. 2024 Jan;18(1): wrae132.
42. Yap-Chiongco MK, Bergmeier FS, Roberts NG, Jörger KM, Kocot KM. Phylogenomic reconstruction of Solenogastres (Mollusca, Aplacophora) informs hypotheses on body size evolution. Molecular Phylogenetics and Evolution. 2024 May 1; 194:108029.
43. Yus J, Nixon EN, Li J, Gimenez JN, Bennett MJ, Flores D, Marhaver KL, Kelly LW, Espinosa-Marzal RM, Johnson AW. Composite substrates for coral larval settlement and reef restoration based on natural hydraulic lime and inorganic strontium and magnesium compounds. Ecological Engineering. 2024 May 1; 202:107236.

All these publications can be freely downloaded at https://www.researchstationCarmabi.org/scientific-publications/

Marketing & Communications

PRESS RELEASES

- Government Officials Learn About the Importance of Nature Conservation During Carmabi Park Visit
- Minister Van Heydoorn Explores Innovative Nature and Research Projects at Carmabi
- Successful Visit by Minister of Finance Javier Silvania to Carmabi
- Carmabi Hosts Kingdom Climate Agenda Working Group
- Carmabi and Willibrordus Community Rebuild a Traditional Lime Kiln
- Marine Youth Rangers Lead Successful Clean-Up Initiative
- Carmabi Reaches 14,618 Students with Nature and Environmental Education
- One in Three Curaçao Coral Species Threatened with Extinction
- Lifetime Achievement Award for Rolf Bak in Marine Biology
- Mangrove Park Kayak Tours Resume
- Creating a Healthy and Sustainable Work Environment: The Most Natural Office in the Caribbean
- New Flamingo Observation Tower Opens in Seru Largu National Park
- Carmabi Launches New Mangrove Kayak Tour at Piscadera
- Carmabi Education Develops New Teaching Materials on Iguanas
- Important Announcement: New Access Regulations for Jeremi/Lagun Nature Area
- Celebrate Mangrove Park's Second Anniversary with a Festive Open Day!
- Curaçao Rif Mangrove Park Open Day a Huge Success
- Warning: Portuguese Man-of-War Spotted Around Curaçao
- Carmabi's 'Salu' Project Receives Approved Funding
- A Timeless Return Home: Three Mahogany Tables from Landhuis Savonet Restored to Museum Savonet
- Coca-Cola Donates Recycling Bin to Carmabi: Working Together for a Cleaner Curaçao
- Dr. Errol Prens, Dermatologist at Erasmus MC, Donates to Carmabi Upon Retirement
- Celebrate Dia di Sabaneta on Sunday, September 29, at Christoffelpark