



Ministry of Transport, Integrity,
Nature and Senior Affairs

2024–2030

Harmonizing People and Nature

Aruba's National Biodiversity
Strategy and Action Plan
(NBSAP)

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Aruba's National Biodiversity Strategy and Action Plan (NBSAP)

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Address:

Department of Nature and Environment (DNM)

B v/d Veen Zeppenfeldstraat 7

San Nicolas, Aruba

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Foreword by Minister Ursell Arends

It is with great pride and a profound sense of duty that I present to you our National Biodiversity Strategic Action Plan, a cornerstone in our commitment to safeguarding the natural heritage of our beloved nation. This plan is not merely a document; it is a heartfelt promise to our children, to future generations, and to every living organism that calls our country home.

Our nation's landscapes, from the verdant forests and rolling meadows to the vibrant coral reefs and serene wetlands, are treasures of immeasurable value. These ecosystems are not only the backbone of our environmental health but also the bedrock of our cultural and economic well-being. They provide us with clean air and water, food, medicine, and the raw materials that fuel our industries. They inspire us, enrich our lives, and connect us to the very essence of life itself.

However, the beauty and bounty of our biodiversity faces unprecedented threats. Habitat loss, climate change, pollution, and unsustainable practices are eroding the natural wealth that has sustained us for generations. It is our responsibility, now more than ever, to act decisively and with unwavering resolve.

This strategic plan outlines our comprehensive approach to conservation and sustainable use of biodiversity. It emphasizes community engagement, scientific research, and innovative policies that will guide us towards a future where nature and people coexist in harmony. Together, we will restore ecosystems, protect endangered species, and foster a resilient and vibrant natural environment.

As we embark on this journey, let us remember that every small action counts and that our collective efforts can indeed make a monumental difference. Let us pledge to nurture nature, so in turn, nature can nurture us all.

In harmony with nature, we prosper!

Ursell Arends



Summary in English, Dutch & Papiamentu

Summary in English

The National Biodiversity Strategy and Action Plan (NBSAP) for Aruba aims to harmonize the island's development with nature, ensuring that the benefits of biodiversity are enjoyed by current and future generations. The plan emphasizes the intrinsic value of nature, advocating for both ecocentric and nature-centered approaches to conservation.

People, as part of nature's ecosystems, benefit from nature's services, including air to breathe, water, and food. The island's biodiversity is not only crucial for ecological balance but is also the very backbone of tourism - the largest contributor to Aruba's economy. However, these natural resources are under threat due to human activities, necessitating urgent action to protect and restore nature.

Aruba faces numerous environmental challenges, including habitat destruction, pollution, overfishing, and climate change. These threats have led to a decline in biodiversity, with several species at risk of extinction. The island's high population density and economic activities further exacerbate these issues.

The NBSAP outlines three main strategic goals to address these challenges:

1. Reduce threats to Biodiversity: this includes measures to protect ecosystems and habitats, control invasive species, and mitigate pollution and climate change impacts.
2. Sustainable Use of Natural Resources: promoting sustainable practices in agriculture, fisheries, and tourism to ensure long-term ecological balance.
3. Tools and Solutions for Implementation: developing policies, legislation, and frameworks to support biodiversity conservation and integrate it into all sectors of society.

Effective implementation requires establishing enabling conditions, such as shared values, strong governance structures, and cross-sectoral collaboration. Priority actions for the initial phase (2024-2026) include formalizing the Rights of Nature in Aruba's Constitution, promoting the Nature-Inclusive Vision for Aruba, conducting economic valuations of ecosystem services and the costs of nature degradation, and forming cross-sectoral steering and working groups to oversee implementation, monitor progress, and evaluate outcomes.

A holistic governance structure is essential for successful implementation. The Department of Nature and Environment (DNM) will lead this effort, supported by various government departments, NGOs, the private sector, and academia. Collaborative efforts are needed to align initiatives and achieve strategic goals efficiently. The plan identifies several quick wins and milestones to be achieved by 2026, such as expanding protected areas, restoring degraded ecosystems, and enhancing public awareness and education about biodiversity.

The NBSAP for Aruba represents a comprehensive effort to integrate biodiversity conservation into the island's development agenda. By protecting and restoring natural ecosystems, Aruba aims to secure a prosperous and durable future for its people and nature. The plan calls for collective action from all members of society to achieve its vision of living in harmony with nature.

Summary in Dutch

Het Nationale Biodiversiteitsstrategie en Actieplan (NBSAP) voor Aruba heeft tot doel de ontwikkeling van het eiland in harmonie te brengen met de natuur, en ervoor te zorgen dat de voordelen van biodiversiteit ten goede komen aan de huidige en toekomstige generaties. Het plan benadrukt de intrinsieke waarde van de natuur en pleit voor zowel een ecocentrische als natuurgerichte benaderingen van natuurbescherming.

- Mensen, als onderdeel van de ecosystemen van de natuur, profiteren van natuurdiensten, waaronder schone lucht, water en voedsel. De biodiversiteit van het eiland is niet alleen cruciaal voor ecologisch evenwicht, maar ondersteunt ook het toerisme, een belangrijk deel van de economie. Deze natuurlijke hulpbronnen worden echter bedreigd door menselijke activiteiten, wat dringende actie vereist om de natuur te beschermen en te herstellen.

Aruba wordt geconfronteerd met talrijke milieuproblemen, waaronder habitatvernietiging, vervuiling, overbevissing en klimaatverandering. Deze bedreigingen hebben geleid tot een afname van de biodiversiteit, met verschillende soorten die met uitsterven worden bedreigd. De hoge bevolkingsdichtheid en economische activiteiten van het eiland verergeren deze problemen verder.

Het NBSAP schetst drie hoofddoelen om deze uitdagingen aan te pakken:

1. Verminderen van bedreigingen voor biodiversiteit: dit omvat maatregelen om ecosystemen en habitats te beschermen, invasieve soorten te beheersen en de gevolgen van vervuiling en klimaatverandering te beperken.
2. Duurzaam gebruik van natuurlijke hulpbronnen: het bevorderen van duurzame praktijken in de landbouw, visserij en toerisme om een langdurig ecologisch evenwicht te waarborgen.
3. Hulpmiddelen en oplossingen voor implementatie: het ontwikkelen van beleid, wetgeving en kaders ter ondersteuning van natuurbescherming en integratie hiervan in alle sectoren van de samenleving.

Effectieve implementatie vereist het creëren van voorwaarden zoals gedeelde waarden, sterke bestuursstructuren en sectoroverschrijdende samenwerking. Prioritaire acties voor de eerste fase (2024-2026) omvatten: het formaliseren van de Rechten van de Natuur in de Arubaanse grondwet; het bevorderen van de Nature-Inclusive Vision voor Aruba; het uitvoeren van economische waarderungen van ecosysteemdiensten en de kosten van natuuraantasting; en het vormen van sectoroverschrijdende stuur- en werkgroepen om de implementatie te overzien, vooruitgang te monitoren en resultaten te evalueren.

Summary in Dutch continued.

Een holistische bestuursstructuur is essentieel voor succesvolle implementatie. De Directie Natuur en Milieu (DNM) zal deze inspanning leiden, ondersteund door verschillende overheidsdepartementen, NGO's, de private sector en academische instellingen. Samenwerking is nodig om initiatieven op elkaar af te stemmen en strategische doelen efficiënt te bereiken. Het plan identificeert enkele snelle winsten en mijlpalen die tegen 2026 moeten worden bereikt, zoals het uitbreiden van beschermde gebieden, het herstellen van aangetaste ecosystemen en het vergroten van het publieke bewustzijn en onderwijs over biodiversiteit.

Het NBSAP voor Aruba vertegenwoordigt een uitgebreide inspanning om biodiversiteitsbehoud te integreren in de ontwikkelingsagenda van het eiland. Door natuurlijke ecosystemen te beschermen en te herstellen, streeft Aruba naar een voorspoedige en degelijke toekomst voor haar inwoners en de natuur. Het plan roept collectieve actie op van alle leden binnen de samenleving om de visie van leven in harmonie met de natuur te bereiken.

Summary in Papiamentu

E Strategia y Plan di Accion Nacional pa Biodiversidad (National Biodiversity Strategy and Action Plan na ingles, NBSAP) pa Aruba tin como meta pa harmonisa e desaroyo di e isla cu naturalesa, asegurando cu e beneficianan di biodiversidad ta wordo disfruta pa e generacionnan presente y di futuro. E plan ta enfatisa e balornan intrinsico di naturalesa y ta boga pa tanto un propuesta ecocentrico como un propuesta centra na naturalesa pa conservacion.

Hende como parti di e ecosistema ta beneficia di servicionan esencial cu naturalsea ta brinda manera aire limpi, awa y alimentacion. E biodiversidad di e isla no ta solamente crucial pa balansa ecologico, pero tambe ta sostene turismo, cual ta un parti significante di economia. Sinembargo, e recursonan natural aki ta core peliger pa motibo di actividanan humano, haciendo cu ta necesario di tuma accion urgente pa proteha y restaura naturalesa.

Aruba ta enfrenta hopi desafionan ambiental, incluyendo destruccion di habitat, contaminacion, sobrepesca y cambio di clima. E peligernan aki a trece un declinacion den biodiversidad, cu varios especienan ta core risico di extension. E densidad di poblashon halto y actividanan economico di e isla ta empeora e asunto aki mas.

E NBSAP tin tres meta principal y strategico pa ataca e desafionan aki:

1. Reduci Peliger pa Biodiversidad: esaki ta inclui midanan pa proteha ecosistemanan y habitatnan, controla especienan invasivo y mitiga e impacto di polucion y cambio di clima.
2. Uzo Duradero di Recursonan Natural: promove practicanan sostenibel den agricultura, pesca y turismo pa asina segura un balansa ecologico na largo plaso.
3. Hermentnan y Solucion pa Implementacion: desaroya polisa, leyman y structuranan pa apoya preservacion di biodiversidad y integra esaki den tur sector di sociedad.

Pa logra implementacion eficaz, ta necesario pa establece condicionnan cu ta facilita e proceso, manera balornan compartí, structuranan di gobernacion fuerte y colaboracion intersectoral. Accion prioritario pa e fase inicial (2024-2026) ta inclui: formalisa e Derechonan di Naturalesa den constitucion di Aruba; Promove e vision inclusivo di naturalesa pa Aruba; Realisa balornan economico di e servicionan ecosistemico y e costo di degradacion di naturalesa; y formando grupo di trabou intersectoral pa guia implementacion, monitor progreso y evalua resultado.

Un structura di gobernacion holistico ta esencial pa un implementacion exitoso. E Departamento di Naturalesa y Medioambiente (DNM) lo lidera e esfuerzo aki, sostene pa varios departamento gubernamental, NGOs, e sector priva y e academia. Esfuersonan di colaboracion ta necesario pa alinia iniciativanan y logra metanan strategico di un manera eficiente. E plan ta identifica algun logronan rapido y meta pa logra pa 2026, manera expande areanan proteha, restaura ecosistemanan degrada y eleva e consientisacion publico y educacion tocante biodiversidad.

Summary in Papiamentu continued.

E NBSAP pa Aruba ta representa un esfuerso comprehensivo pa integra preservacion di biodiversidad den e agenda di desaroyo di e isla. Pa medio di proteha y restaura ecosistemanan natural, Aruba ta bisti un futuro prospero y duradero pa su pueblo y e naturalesa. E plan ta yama pa accion colectivo di tur miembro di sociedad pa logra e vision di biba den harmonia cu naturalesa.

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1.Introduction

Aruba, an island in the Caribbean region with 107.780 (Central Bureau of Statistics and the Civil Registry and Population Office) inhabitants, is famous for its nature. The island's coral reefs, white-sand beaches, mysterious rock formations, salina's, mangrove forests and natural parks give home to a wide variety of flora and fauna. Every Aruban is familiar with the Shoco, the neon green Prikichi, the sea turtles, the Cododo lizards, the Pegapega, the Watapana and our iconic Fofoti tree. For Aruba, harmonizing nature with all developments is essential. This approach ensures that the natural beauty Aruba is famous for, is conserved, and continues to benefit its residents, both now and in the future.

This document outlines Aruba's National Strategy and Action Plan (NBSAP) for 2024 – 2030, to restore, conserve, and strengthen Aruba's natural environment for its people and nature. The content of this NBSAP aligns with the Kunming-Montreal Global Biodiversity Framework (GBF) that was developed by the parties to the Convention on Biological Diversity (CBD) under the leadership of the United Nations Environment Programme (UNEP). The GBF succeeds the Aichi targets for 2020. Comprising twenty-three (23) targets for 2030, the GBF aligns with four main overarching global goals and vision for 2050 (see figure 1). The targets are categorized in three main themes: (1) Reducing threats to biodiversity; (2) Meeting people's needs through sustainable use and benefit-sharing and (3) tools and solutions for implementation and mainstreaming.

All parties to the CBD must translate the GBF into a National Biodiversity Strategy and Action Plan (NBSAP) in consultation with state and non-state actors and adapt it to the local context, an obligation also reflected in the Nature Conservation Ordinance of Aruba (more information on the legal context in Appendix 2). This document serves as the NBSAP for Aruba.

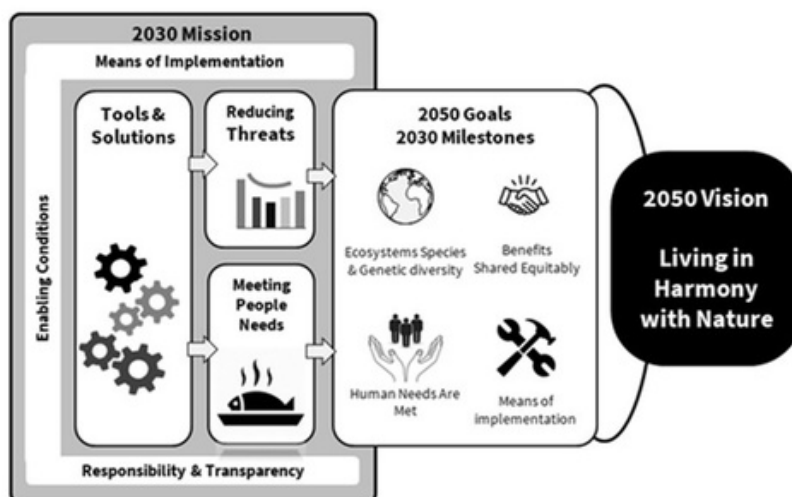


Figure 1. Global Biodiversity Framework by the Convention on Biological Diversity (September 2020).

1.1. Value of nature for the people of Aruba

Nature (or ecosystems) is inherently connected to the prosperity and well-being of the residents of Aruba. The diversity of both land and marine ecosystems offers a multitude of valuable services, known as ecosystem services. These underpin the value Arubans attribute to nature and can be classified in four main groups: provisioning, regulating, cultural and supporting services (Report: resilient islands, 2019).

Provisioning services describe the products that can be obtained from ecosystems, such as food, water, genetic resources, medicines and fuel. Tourism is also a product of nature. Aruba 'sells' their beaches and natural surroundings as a product, hence welcoming over 1,260,000 stayover and 817,000 cruise visitors each year (Aruba Tourism Authority, December 2023 monthly report).

Regulating services are the benefits that people obtain from the regulation of ecosystem processes. For Aruba, a vital regulating service is derived from its mangrove forests, giving the island flood and storm protection. Aruba's wetlands enable the regulation of the air quality, purification of water and carbon storage. Coral reefs and healthy parrotfish populations also contribute to natural beach replenishment. After parrotfish digest the edible portions from the reef, they excrete it as sand, helping create small islands and sandy beaches (Perry et al., 2015).

Cultural services are the non-material benefits obtained from ecosystems. The unique, endemic species of Aruba, such as the Prikichi and the Shoco, can be considered as part of the cultural heritage. Many generations have been raised with these species. The beaches and rock formations also contribute to 'a sense of place' for local Arubans. The natural surroundings refer to a feeling of connection, belonging and familiarity that individuals experience with a particular location or environment. Furthermore, accessibility to natural surroundings contributes to the physical health and mental well-being of the local population by offering opportunities for exercise and relaxation (Stakeholder consultations (physical meetings), 2024).

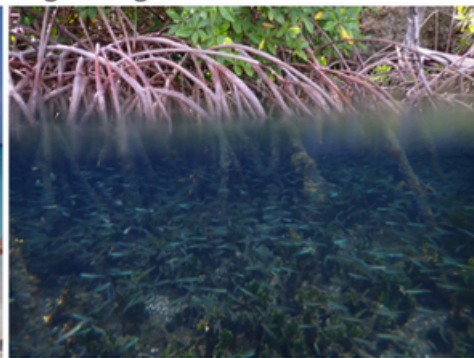
Finally, *supporting services* are considered as the backbone of all ecosystem functioning. These services, such as pollination, photosynthesis, and the nutrient cycle, ensure the growth and dispersal of plants and species. The extensive value and role of Aruban long-nosed and long-tongued bats in pollinating and dispersing seeds of various endemic plant species is a local example of this type of service.

All together, these ecosystem services are vital for maintaining and supporting the prosperity and well-being of the people in Aruba. Any limitation on these services can directly or indirectly impact the health, safety, and prosperity of the people of Aruba. Therefore, it is crucial to sustain and enhance these ecosystem services, to guarantee a healthy, safe and prosperous future.

Provisioning services



Regulating services



Cultural services



Supporting services



Figure 2. Example of Aruba's ecosystem services, DNM 2024.

In Aruba, The Economics of Ecosystems and Biodiversity (TEEB) study (Wolfs et al. 2017, van Zanten et al. 2018, Polaszek et al. 2018) was used to source socioeconomic values of different ecosystem services. An economic, and thus anthropocentric, perspective is provided whereby our dependencies are captured and quantified.

This study states that the direct contributions of tourism account for 28.6% of total GDP. When combined with indirect contributions, this reaches 88.1%, and it is expected for this value to reach 97.4% by 2027.

Therefore, the growth, employment benefits and economic rewards of the tourism industry are directly correlated to Aruba's environmental attributes. Beyond tourism, the Aruban population relies and depends on many other services provided by its ecosystems. For example, yearly:

- The fishing industry (provides its related natural capital with a value of US\$ 4.45 million).
- Cultural value (provides its related natural capital with a value of US\$ 3.6 million).
- Carbon sequestration value (provides its related natural capital with a value of US\$ 109,000).

Aruba's tourists are not the only ones that depend on the wellbeing of our ecosystems and their services. There is a strong and dependent link between nature and the wellbeing of Aruba's citizens. Most residents visit the environmental attributes of the island to relax and to connect with family and friends (Stakeholder consultations (physical meetings), 2024). The environment is therefore an essential component of Aruban life and culture.

Locals are increasingly showing their concern on the current state of Aruba's environmental well-being, and the future of the main economic pillar, tourism. A recent example of this, as depicted in the picture below, was the protest on King's Day on April 27, 2024, about the current environmental crisis that Aruba is facing. The protest held was to urge the government to address this crisis, halt the over-construction of hotels, make nature a priority, and demand climate justice for local Arubans.



Figure 3. Protestors in Aruba demonstrated against the island's environmental crisis, photo used with permission.

1.2. Challenges to Aruba's natural environment

Globally, nature is deteriorating despite efforts to preserve and restore it. Nature on a small tropical island is particularly sensitive to pressures. Despite their significance, Aruba's ecosystems have steadily been degrading over the past years due to local pressures such as coastal development, overfishing, physical destruction, and disturbance caused by recreational activities and tourism (Stakeholder consultations (physical meetings), 2024). These drivers of ecosystem degradation may increasingly affect Aruba's capacity of providing its ecosystem services. For example, tourists will not be able to enjoy clean and beautiful beaches due to inadequate waste disposal. Due to loss of coral reefs and marine biodiversity, they will also be less inclined to take part in recreational activities like scuba diving. To illustrate the challenge to urban expansion, from 1986 till 2020, Aruba's built environment increased from 29 to 60 km² translating to one-third of the island (Jurgens, Mijts, and van Rompaey, 2024). Progressing on current trends will increase the pressures and suppress Aruba's ability to cope with the challenges. The current state of nature is degraded, and Aruba has long surpassed her carrying capacity (Stakeholder consultations (online), 2024). As a result, the provision of ecosystem services to the people of Aruba is at risk.

To illustrate, Wolfs Company together with Yabi Consultancy (2018) estimated a 50% loss in visitors due to environmental degradation. To address the anticipated demand for labor driven by the pipeline construction projects for additional hotel rooms, forecasts estimate the influx of between 20.000 to 25.000 new inhabitants to our island in the coming years (Aruba Birdlife Conservation, 2024; Antilliaans Dagblad: March 8th, 2024). This significant increase in population will lead to an oversaturation of the island's demographics, with wide-ranging consequences. Housing shortages, infrastructure strain, and traffic congestion are examples of the challenges expected. Hereby, the implications extend beyond socio-economic and cultural dimensions; the environmental impact on Aruba's natural ecosystems will likely also amplify.

A new mindset for planning and acting to harmonize nature and people as it relates to Aruba's development is needed (Verweij et al., 2023) to reduce human-caused threats. Behavioral change is required to support the other actions.

1.3. Call to harmonize nature with Aruba's development

From March to July 2024, DNM collaborated with stakeholders across government and society to formulate an NBSAP that ensures the harmonization of nature, and its ecosystem services, in the development of Aruba – now and in the future. The multi-step process began with in-person stakeholder sessions, involving diverse stakeholders from across government and society to gather input and insights (see Acknowledgments). This was followed by the development of a strategic framework in accordance with the Global Biodiversity Framework (GBF). Subsequently, a digital validation process was conducted with stakeholders to ensure broad-based support and accuracy. The final step involved finalizing the NBSAP with a legitimacy check by the bureau of the Minister of Nature to ensure compliance and endorsement.

1.4. Reading guidelines

Chapter 2 first details the biodiversity context of Aruba: what life is found on land and in the surrounding waters, and what are the main challenges to its conservation? **Chapter 3** describes the strategic framework to harmonize nature into the development of Aruba, including its vision, strategic goals and subgoals. **Chapter 4** sets the priorities to achieve the strategic goals set for 2030 and delineates the enabling conditions needed to ensure effective implementation for the priorities identified for 2024 -2026.

2.Context biodiversity Aruba

2.1. Life on land

The National Decree on Protected Indigenous Flora and Fauna came into effect on august 15, 2017. This law aims to protect plants and animals threatened with extinction or those with a high ecological value. This law is an expansion of the Nature Conservation Ordinance from 1995. Since 2017, it is prohibited to kill or damage plants and animals on the list of this national decree. The list of protected species includes forty-seven (47) plant species, forty-five (45) animal species, the Corallinaceae family, the Anthozoa and Hydrocorallina classes, and the Cetacea order. Furthermore, twenty-one (21) ecologically valuable plant species and six (6) ecologically valuable animal species are mentioned. All parrotfish are considered ecologically valuable.

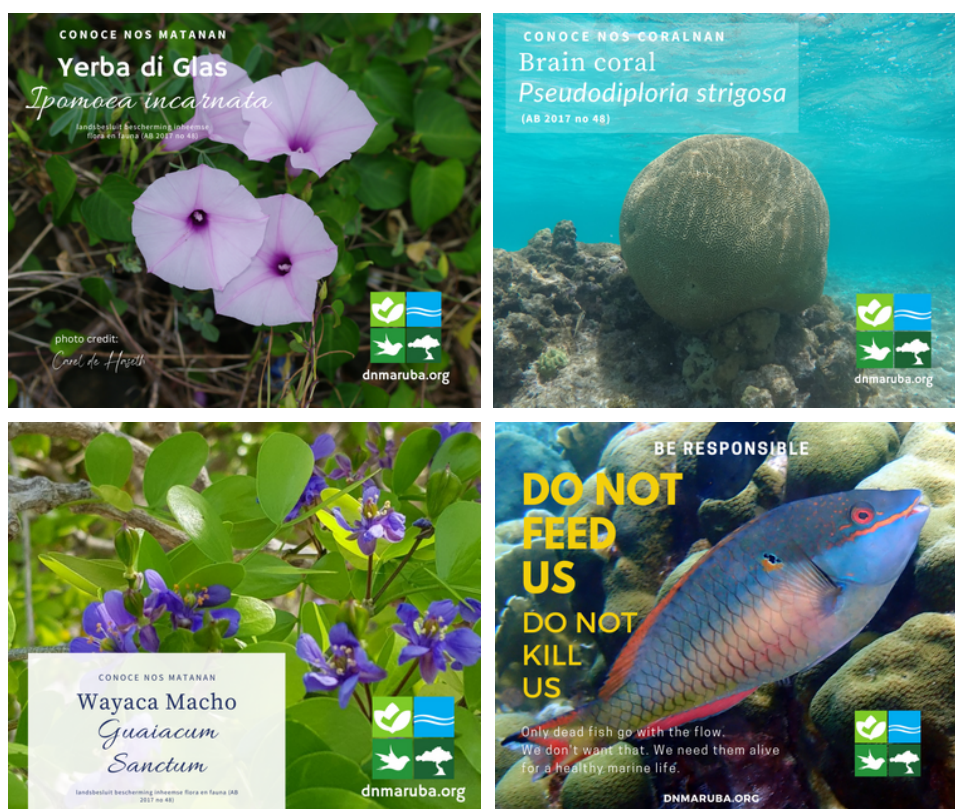


Figure 4. Example of native species, DNM 2024.

A large surface area of Aruba (Parke Nacional Arikok and Spanish Lagoon), along with sixteen (16) other designated protected areas, equating to approximately twenty-four percent (24%) of Aruba's surface, is protected by law (see Figure 5). The Aruba Conservation Foundation (ACF) is an independent and non-profit organization responsible for managing these protected areas. The National Park Arikok is the largest contiguous piece of land protected (34 square kilometers) and was established in the year 2000. This park is in the north-eastern part of the island and is home to much of our native flora and fauna. The national park has a rich biodiversity of trees and plants, birds, bats, invertebrates, and reptiles, including the endangered rattlesnake known locally as the 'Cascabel'.

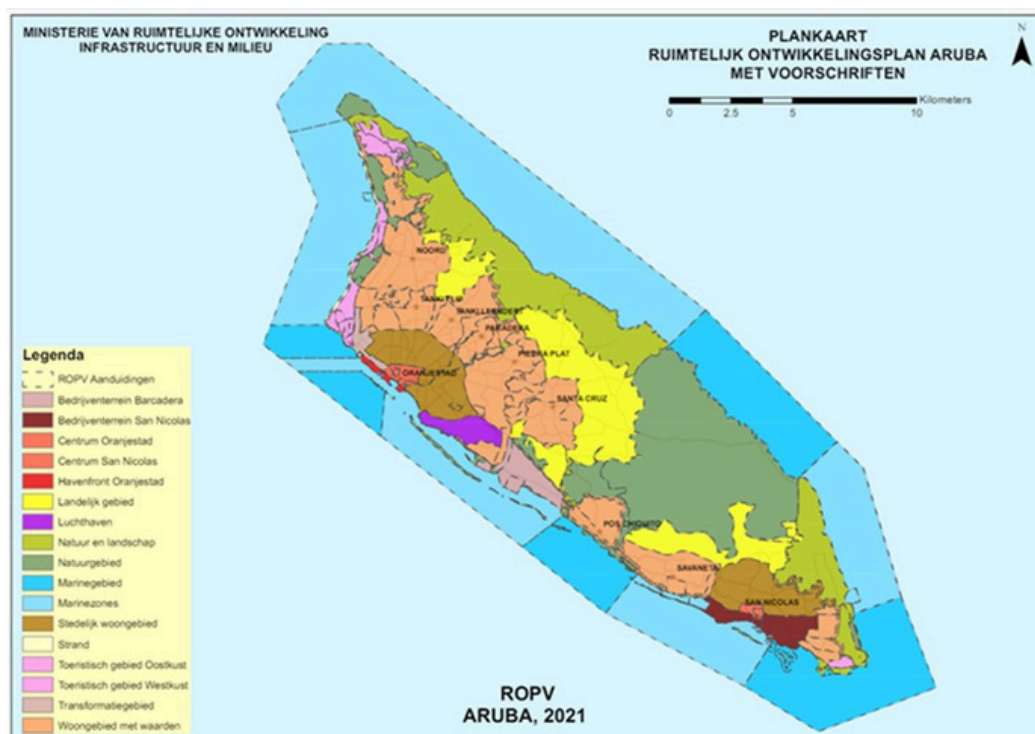


Figure 5. Overview of Aruba's protected areas (marine and terrestrial), ROPV Aruba 2021.

Aruba aims to protect several other areas with high biodiversity. This should be prioritized before these locations degenerate from the adverse consequences of urbanization and land use change. Areas that are eligible include e.g. Rooi and Sero Canashito, Hooiberg and surroundings, Tanki Leendert (Prikichi Heaven), Grot di Lourdes Strip, Rooi Prikichi and Rooi Master. The Rooi Prikichi area scored high based on specific "Key Biodiversity Area" criteria of the DNM. This area contains significant natural ecological value.

Most recently, Aruba has seen a major expansion of the islands' protected wetlands under the Ramsar Convention. On November 10th, 2023, the Minister of Nature officially announced the addition of four new Ramsar areas within its borders. In addition, the first and previously existing Ramsar area, Spanish Lagoon, was expanded. With these extensions, the total area protected under the Ramsar Treaty increased from 70 to 14,408 hectares (see Figure 6).



Figure 6. Aruba Ramsar areas (RIS Search | Ramsar Sites Information Service).

Despite best efforts to protect not only individual species, but also entire areas and ecosystems, Aruba's biodiversity continues to decline at an alarming rate (Sanders and Slijkerman, 2019). Our island is among the most densely populated countries in the world and over the years our ecosystems have been heavily impacted by centuries of extensive agriculture, grazing, extraction and conversion of lands.

Threats to nature continue to accelerate and increase due to global climate change, pollution, urbanization, coastal development, illegal and unsustainable harvesting, invasive species, and desertification. Figure 7 provides an overview of the main threats to ecosystems and biodiversity. Some obvious stressors that occur on land will be elaborated in this paragraph, including high-impact recreation by UTV's and ATV's, land clearing for coastal and urban development, unsustainable tourism, invasive species, quarries and pollution.

Main threats to ecosystems & biodiversity			
<ul style="list-style-type: none"> • Climate change • Population growth (over-capacity) • Unsustainable tourism • High-impact recreation • Unsustainable food sources/harvesting (fisheries & agriculture) 	<ul style="list-style-type: none"> • Urban development • Coastal development • Private properties and lease land in protected areas • Land clearing • Invasive species • Feral (domestic) animals 	<ul style="list-style-type: none"> • Quarries (sand / stone mining) • Landfills • Pesticides, herbicides and insecticides • Solid Waste pollution • Water pollution by chemicals • Sewage pollution 	<ul style="list-style-type: none"> • Marine debris • Soil degradation and pollution • Air pollution • Light pollution • Noise pollution • Trash pollution

Figure 7. Main threats to ecosystems and biodiversity (Aruba Conservation Foundation, Multi Annual Corporate Strategy 2023-2032).

High-impact recreation (UTV's and ATV's)

One of the factors putting pressure on Aruba's natural resources is off-road driving (ORD), due to a significant increase in this type of activity in recent years. The large, organized groups with utility terrain vehicles (UTV's) and all-terrain vehicles (ATV's) can mainly be seen along the north coast of Aruba. A recent study showed how ORD creates dust clouds which negatively impact vegetation, soil stability, water infiltration, and nutrient cycling (Fundacion Parke Nacional Aruba, 2020). The pandemic in 2020 presented the opportunity to analyze and investigate the impacts of these motorized vehicles in the park, due to the forced closure of the national park from March until June. Pre Covid-19 conditions (under high-impact use for ORD) were compared to the conditions during the closure of the park, specifically for the route to Conchi - the most visited site in the park. This study demonstrated how ORD negatively impacts the surrounding environment, in both social and ecological aspects (see Figure 8). Recorded negative impacts on the environment were:

1. Dust Impact on vegetation.
2. Habitat fragmentation.
3. Sedimentation in watershed systems and in the ocean (run-off).
4. Disturbance of fauna and roadkill.
5. ORD engine oil spill (pollution).



Figure 8. Dust clouds and dust cover on vegetation created by UTV's and ATV's, DNM 2024.

Land clearing for coastal and urban development

Land clearing is often seen as a necessary step in urbanization, facilitating the construction of infrastructures including buildings, roads, and public facilities. For the development of a site, the process begins with clearing of the site, including the removal of trees and other vegetation (see Figure 9). The lack of coordination between economic development and nature conservation has caused several bottlenecks. Our island has one of the largest population densities in the Caribbean, and high-speed urbanization takes place in this formerly rural island state. The unbalanced growth of the urban area has led to a loss of nature reserves and ecological values. Construction in dry riverbeds has disrupted the water system, resulting in nuisance (flooding) after heavy rain falls. The deteriorating conservation status of our native flora and fauna species reflects the increasing pressures of population growth, the expansion of the tourism industry/facilities, and land use intensification. Land-use change is a main driver of biodiversity loss, primarily via loss and fragmentation of habitat. Additionally, government subsidies and contracts that are harmful to nature should be reconsidered and adjusted, including contracts for how the maintenance of green spaces are devised.



Figure 9. Protected species are being removed to pave the way for development, DNM 2024.

Tourism growth model and carrying capacity

For years, the pursuit for economic growth has been the major driver leading to mass tourism (Stakeholder consultations (physical meetings), 2024). One major trade-off of this economic growth model is the loss of natural areas due to tourism activities and increasing urbanization. Aruba is one of the most tourist intense (see Figure 10) destinations in the region, with 1.1 million stay-over tourists in 2019. In 2023, Aruba welcomed over 1.24 million tourists, reflecting an impressive growth of more than eleven percent compared to the pre-corona year of 2019. Carrying capacity studies have already indicated that for several components (waste management and formation of beach sludge, especially in Palm Beach) capacity has been exceeded. Several NGO's are concerned about the increasing hotel rooms in Aruba. The additional jobs created will most likely be filled by migrant laborers, for whom housing must be provided. If housing and infrastructure is planned and built in the traditional way, it will put even more pressure on our nature.



Figure 10. Massive (tourist) crowds on Arashi beach, Aruba. One of the few beaches where no hotel has been built and which was previously mainly used by locals, DNM 2024.

Quarries and pollution

Examples of habitat degradation on land are the excavations found all over the island. Property lands are being excavated for (unregulated) sand mining. The excavation is then illegally filled with waste (see Figure 11) and covered with a layer of sand. Finally, the property is resold for other purposes. Often the soil is so contaminated by the underlying waste that ecosystem services are lost. Tackling illegal waste dumping in Aruba is the next step in the transition to a circular and sustainable economy. The DNM has been tasked with devising a policy for the responsible filling of the current excavations (where illegal dumping is taking place or has taken place). After landscape restoration of the excavations, a new purpose can be given to the location.



Figure 11. Excavations are filled with waste, causing soil and groundwater contamination, DNM 2024.

Invasive species

Invasive alien species are animals and plants introduced by human activity to a natural environment outside their native range. Although the spread of invasive species can have beneficial aspects, they often adversely affect the invaded habitats, causing ecological, environmental, and/or economic damage. Environmentally, invasive species can be harmful to local flora and fauna by preying on native species, outcompeting native species for food or other resources, causing or carrying diseases, and preventing native species from reproducing.

Examples of invasive terrestrial animal species in Aruba are the boa constrictor (*Boa constrictor*), Giant African land snail (*Lissachatina fulica*) and the Sapo (*Bufo marinus*) (see Figure 12). The Boa constrictor was probably brought over to Aruba as a pet but was released into the wild once the owner could no longer care for it. The origin of the Sapo is still uncertain. Originally, these animals were thought to be introduced with the importation of river sand from Surinam in the early 1970's, when the Hyatt hotel was built in Aruba. However, letters in the archives of the Veterinary Service in Aruba indicate that these animals have been present in Aruba since the early 1960's. Records indicate that the Sapo was most probably introduced by a local who went on vacation to Colombia who brought some with her, releasing these in a water reservoir/tanki (Amigoe, March 4th, 2000).

Examples of Aruba's invasive terrestrial plant species are the Neem tree (*Azadirachta indica*), the Cordon di San Francisco (*Cryptostegia grandiflora*) and the Barba di Diabel (*Cuscuta sp.*). Aruba aims to prevent, minimize and mitigate the adverse impacts posed by these invasive species. Beyond mitigating and managing invasive alien species, the negative impacts of domestic animals on native biodiversity must also be controlled duly. Predators like feral dogs and cats threaten native species, but also invasive feral grazers, such as goats can demolish local vegetation and contribute to desertification and biodiversity loss.



Figure 12. Example of Aruba's invasive species (terrestrial), DNM 2024.

2.2. Life underwater

Aruba's leeward coast comprises a range of habitats, nearshore reefs, seagrass beds, mangrove stands and other lagoonal systems. These systems are under increasing threat from human activities, including pressures from climate change. Aruba is extremely vulnerable to climate change because of our small size and a near-exclusive reliance on climate sensitive economic activities such as tourism (Taylor et al., 2018). Climate change, due to increased CO₂ concentrations in the atmosphere, results in a warming climate and ocean acidification (Pachauri and Reisinger 2007). Corals are particularly sensitive to small changes in sea temperature because of their narrow thermal tolerance range. Thermal stress of just one degree Celsius above the long-term summer maximum temperature for a few weeks can cause reef-building corals to eject the algae that live in their tissue, a process known as coral bleaching (NOAA, 2024).

With an almost complete lack of information on Aruba's marine ecological resources, carrying capacity, limits of acceptable change, and the existing level of environmental stress, the government of Aruba aims to create an assessment program to monitor the status and changes in the reef communities along its coastline toward data-driven policy. In 2019, a Curaçaoan foundation specialized in tropical marine research (CARMABI) conducted a baseline assessment for Aruba. The intention is that this research will be repeated every 5-6 years so that a trend analysis can be performed.

Results of the CARMABI research (Vermeij et al., 2019) showed widespread degradation of Aruba's reef communities, whereby these have all but disappeared in certain areas (e.g., the northwestern part of the island). The disappearance of reef building organisms, combined with strong indications of overfishing, the widespread presence of land-based forms of pollution, and the appearance of organismal groups known to negatively impact reef growth (e.g., macro- and Turfalgae and Cyanobacteria), independently and jointly demonstrate that Aruba's reefs are experiencing an overall decline in reef abundance and health.

Trash

Fishing lines, as well as small (i.e., bottles, plastic, cans etc.) and large forms of debris (e.g., industrial waste near refineries, collapsed piers, lost anchors, construction materials), can be found along the entire Leeward shore (see Figure 13). According to CARMABI, especially the large number of lost anchors is noteworthy (Vermeij et al., 2019).



Figure 13. Marine debris along the Leeward shore of Aruba: On the left, a collapsed pier near the old refinery. On the right, industrial waste next to a degraded coral reef, DNM 2023.

Sewage pollution and strong influxes of other land-based pollutants

Sewage water is released into Aruba's coastal waters along its entire Leeward shore (Royal Haskoning, 2022). There are three sewage treatment facilities (Zeewijk, Bubali and Parkietenbos) that indirectly release effluent into the ocean. One does so directly (WWTF Zeewijk), whereas WWTF Bubali and WWTF Parkietenbos first release effluent in respectively a salina and wetland first. Overflow into the neighboring sea is especially prominent during heavy rainfall but might also occur through subterraneous groundwater flow. Along the heavily used northwestern shore of Aruba the combination of high nutrient levels and the high abundance of organic material in (partially treated) sewage water will sometimes result in anoxia near the bottom at night (Van Halewijn et al., 1992). Consequently, animals usually found at the bottom of the sea have become scarce, and cyanobacteria and algae now dominate benthic communities (Vermeij et al., 2019).

On behalf of the Aruba Tourism Authority (ATA), Witteveen+Bos conducted a sludge investigation at Palm Beach Aruba in 2017 (Stolte et al., 2017). The purpose of this investigation was to determine the extent and nature of the present sludge at Palm Beach. The accumulation of sludge is a result of the Palm Beach area not heavily being influenced by waves and wind and having a large and shallow area with an abundance of sea grass. The presence of sea grass indicates a nutrient rich environment.

The fine sludge particles are believed to be sourcing partly from the degradation of the dead seagrass, fine material flowing in during rain from the Salina and hotel gardens (fertilizers, herbicides and pesticides), and the flowing in of fine particles and organic matter from the overflow of the Bubali pond to the sea (see Figure 14).



Figure 14. On the left: overflow of partially treated sewage water from the Bubali pond to sea. On the right: Algae dominated benthic communities, DNM 2023.

Invasive species

Both the lionfish (*Pterois volitans*) and seagrass *Halophila stipulacea* have become a common site in Aruban waters (see Figure 15). Worldwide, invasive species are considered one of the main threats to the persistence of native communities. It has been shown to be a challenging task to eradicate and control these populations because of their ability to disperse across large distances, limited financial and physical resources, and a persistent reservoir of invasives in remote or hard to access locations. Furthermore, given the large dispersal potential of marine invasives, management of such species often requires international collaboration to ensure effective control. In most areas, natural control of lionfish is unlikely as overfishing has reduced the number of native predators potentially capable of consuming them, e.g. Atlantic grouper species (De León et al., 2013).



Figure 15. On the left: lionfish (*Pterois volitans*) photo credit Patrick van Brakel. On the right: seagrass *Halophila stipulacea*, DNM 2024.



3. Strategy to harmonize with nature

Aruba's biodiversity strategy aims to create a functional framework that integrates the value of nature into the actions of both government and society. This chapter outlines the vision, followed by the guiding principles that shape the strategy. Chapter 3.3 details the strategic goals and subgoals of the framework, thereby providing a starting point for activities planned for the period 2024 – 2030.

3.1.Vision

This biodiversity strategy aims for a future in which nature is no longer an afterthought - a remaining aspect to be finetuned to complete the picture. Instead, nature is the foundation in the redesign of our society and future economic development. The vision of Aruba's biodiversity strategy is to ensure that the intrinsic value of nature is recognized, respected, and integrated into all facets of governance and societal action. This vision seeks to foster a harmonious coexistence between human society and the natural environment, promoting responsible practices to the benefit of both people and nature.

Herein, nature in Aruba is valued, conserved, safeguarded, restored and responsibly used, while maintaining ecosystem services, sustaining a healthy planet and delivering mutual benefits essential for all people and nature itself.

The following is a snapshot of Aruba in 2050 if island policies and cultural change stimulate a beneficial partnership for people and nature:

Global climate change will continue along current trends since Aruba - being a small island- has little influence on the general climate. Yet, flood and storm damage risks will have increased. Droughts and average temperatures will also have increased, hereby having lowered the amount of water seeping into the soil causing stress on the natural vegetation. This in turn will have increased soil erosion and salinization.

In contrast to a 'business-as-usual' future, the natural vegetation will have been stimulated through reforestation, revegetation and mangrove restoration. Natural vegetation will be growing and will have had the opportunity to fully develop, including strong rooting systems that hold the soil and decrease bare soil. Coral reefs will have been restored, and regrowth will have been boosted based on improved preconditions.

The main economic driver will remain tourism but will be assisted by a developing knowledge economy. The number of cruise ship stop-overs, however, will have been reduced, the numbers of flight passengers will have been stabilized, and tourism-related net immigration will also have been phased out. Aruba in 2050 will have seen a clear shift to high-end (eco)tourism, with, primarily, an expansion in family inns and boutique hotels. The population will have stabilized, having followed the trend of tourism stabilization. With the degrowth in tourism, the negative impacts of the tourism industry will have been mitigated, including having curtailed additional imported laborers for this sector.

Urban expansion will have been restricted to current designated development contours. In the pathway towards this scenario, urbanization would have been steered towards urban densification, with smaller, multiple-story houses on smaller lots, thereby having reduced urban sprawl and prohibited urban encroachment. In 2050, public transport capacity will have been expanded, and with additional access, the pressure on the road network will have decreased. The capacities of the airport and ports will remain at their current sizes and will not have expanded further.

As it relates to energy production, in 2050, Aruba will be mostly dependent on renewable energy sources, comprising of wind, and a mix of solar farms and decentralized solar generation. Residential and commercial rooftops will provide solar energy to be used over the urban electricity grid. Rural areas will store energy on site with batteries. This will have strengthened the island's energy self-sufficiency and reduced dependence on fuel imports.

As it relates to water security, by 2050, households and businesses will be equipped to collect rainwater from rooftops, stored in cisterns and will be used for watering gardens. Where needed, governmental retention basins will store cistern surplus water. Hereto, the energy needed to desalinize for production of freshwater will have decreased. Finally, natural waterways are well-maintained and drain into dams. The combined water capturing measures will have reduced freshwater needs and land wash-off, including a decrease in excessive nutrient enrichment of mangroves, seagrass fields and corals. Natural watersheds will be free from man-made obstructions and the zones around them will have been revegetated to decrease erosion and increase water absorption into the soil.

By 2050, new construction will have been limited to first reusing abandoned buildings while preserving their original character. In the case of new construction, these buildings will have been well-insulated and will be making optimal use of prevailing wind direction, window blinds, and shading by vegetation for a comfortable indoor climate limiting the need for air-conditioning. Additionally, new construction projects will have kept the natural vegetation mostly intact; full property clearances no longer take place before construction. Private households will have invested in rooftop water harvesting for watering their decorative native plants and for growing vegetables on their private properties.

Within urban zones, green pockets are abundant in 2050 and will have been connected to each other through green veining along roads and dry riverbeds. A mix of (fruit-bearing) native trees along roads will be providing shade for pedestrians and cyclists. Landscaping will be based on the use of native species attracting insects, amphibians, reptiles and birds. Prunings are collected and used as compost in farming and gardening. Green pockets are used to grow fruits, nuts and vegetables, are maintained by residents, and serve as shaded meeting places for neighborhood activities. Vegetable and fruit tree production will have become more common with local entrepreneurs using substrate, aquaponics and hydroponics. Many small-scale entrepreneurs will have formed cooperations that sell their produce to restaurants, hotels, supermarkets and at weekly fresh markets in the neighborhood. As it relates to vegetable waste, in 2050, this is being used as fodder for goats and chickens that are kept in fenced ranches. Furthermore, traditional cunucu's will be producing a mixture of plant and livestock products, and several syntropic farms will have been developed that are maintained by the local communities for educational purposes and attracting eco-tourists.

Communities and schools will also be growing food together in local gardens in a continuous effort to stimulate the interest in individual food production and farming. Rainwater capture and grey water will be used for irrigating crops and gardens, and finally, fish will be caught responsibly and will be sold for the Aruban market. These expansions of local food production will have contributed to diversifying the economy by 2050.

3.2. Guiding principles for the strategy

The implementation of this strategy for Aruba is guided by four key principles.

Recognizing the value of nature

This principle underscores the importance of natural ecosystems for human wellbeing. It highlights benefits such as clean air and water, food security, climate regulation, flood regulation, cultural heritage preservation, and economic development to the benefit of the people of Aruba (more information in chapter 1.1.). Understanding and appreciating nature's value establishes the basis for a future for Aruba, hereto guaranteeing prosperity for the people of Aruba.

Development in harmony with nature

Development in harmony with nature requires the integration of nature into all development endeavors. Aruba's nature is not only an essential asset towards further development, but the very pillar that sustains the tourism-driven economy. Undertaking development not in harmony with nature will cause additional future costs including, but not limited to, healthcare expenses, water scarcity, property value decline, increased infrastructure maintenance and expenses, lower tourist income, and flood damage. This principle aims to integrate nature's ecosystem services and its representative value (economic, cultural, and social) into decision-making processes, hereby ensuring conservation and responsible use of natural resources whilst developing Aruba.

Collective responsibility

All stakeholders, including government entities, private sector, non-governmental organizations, and local communities, share the responsibility of harmonizing nature in their actions. This strategy aims to foster a sense of collective responsibility - this is to ensure that diverse perspectives are considered and that all actions taken align with the shared vision of preserving Aruba's biodiversity for present and future generations.

Precautionary principle

In the pursuit of development in harmony with nature, the government has a duty of care to catalyze, enable and inspire urgent and transformative actions to halt and prevent biodiversity loss, and to ensure the provision of ecosystem services to the people of Aruba. Options and development measures that undermine the value of nature, and thereby the wellbeing of Aruba's people, are not considered acceptable. Neither the bill nor the problem should be shifted in space or time - a lack of scientific certainty should not be used as a reason for postponing measures benefiting nature.

3.3. Strategic Framework

In this subchapter, an overview of the main strategic goals and subgoals is provided, which collectively contribute to Aruba's vision harmonizing people and nature. Figure 16 provides an overview of the vision, the main strategic goals and subgoals. Together they provide the strategic framework for the implementation of actions for 2024 - 2030 (chapter 4 and 5). The strategic goals and subgoals are aligned with the CBD's Global Biodiversity Framework and the Sustainable Development Goals.

Vision: <i>Harmonizing people and nature</i>		
Strategic goal 1: Reducing threats to biodiversity loss.	Strategic goal 2: Responsible usage of natural resources for the people of Aruba.	Strategic goal 3: Tools and solutions for implementation and mainstreaming.

Figure 16. Overview of the vision, the main strategic goals and subgoals of Aruba's NBSAP.

3.3.1. Strategic goal 1: Reducing threats to biodiversity loss

Biodiversity is fundamental for all processes that support life on earth. All species, including humans, rely on many other species to live. Without a wide range of animals, plants, and microorganisms, we cannot have the healthy ecosystems that we rely on to provide us with food and materials, protection from extreme events, healthy quality of water and air, and a wide range of cultural and aesthetic values (hereafter: ecosystem services).

Declining biodiversity threatens the structure and proper functioning of ecosystems. Although nature can adapt to stressors and biodiversity loss to some extent, ecosystem complexity will be reduced when certain species disappear. When important mutual relationships within an ecosystem are lost, the ecosystem loses its ability to recover from a disturbance (ecological resilience). Beyond critical points of species removal, the ecosystem can become destabilized and collapse.

To date, very little is known about the interconnectedness and relationships between different species. This makes it impossible to be certain if there are any redundancies in our natural systems. In other words, we do not know if we can afford to lose a species without any adverse impact on its ecosystem. Much like a Jenga tower game, all bricks balance on each other. When at an advanced stage of the game, where many blocks have been removed, how could one be certain that picking one brick from the tower would, with confidence, not cause, the now fragile tower, to collapse? A Jenga tower with many holes (lost species) will easily collapse if, for example, the table on which it is placed is moved, or is shifted slightly simply by a gust of wind through an open window.

Biodiversity loss causes Aruba's ecosystems to be fragile and susceptible to the major threat of climate change. Like any other small Caribbean island, we are on the frontlines of climate change. Despite our minimal historical contributions to greenhouse gas emissions, islands face some of the most severe impacts of climate change. Biodiversity and ecosystem services are intrinsically linked; biodiversity contributes to the processes that underpin ecosystem services. Healthy ecosystems provide a range of essential services, including coastal protection, erosion control, water purification, carbon sequestration and maintenance of fisheries. With less resilient ecosystems, due to biodiversity loss, Aruba can expect serious loss and damage in the form of economic and cultural loss, damaged infrastructure, loss of livelihoods and forced displacement.

Now that it is clear *Why* it is crucial to stop the loss of biodiversity, the next question is: 'How do we effectively reduce threats to biodiversity?'.

Subgoal a: Protect 30% of land, coastal, and marine areas



Globally, protected areas have become one of the most effective instruments to preserve nature. When managed properly, it can significantly reduce human pressure and other existing threats to biodiversity. Aruba too must be prepared to preserve and strengthen life on land and in the sea, in line with SDG 14 and 15. Various steps have already been taken in this regard. For example, the National Decree on the Protection of Native Flora and Fauna came into effect in 2017. A year later, in 2018, the Marine Park Aruba (Parke Marino Aruba) was established. Within the park, four marine reserves were designated. In 2020, the legal protection of sixteen nature reserves was established, and the Aruba Conservation Foundation (at the time under the name Fundacion Parke Nacional Arikok) was assigned to manage and protect these. Last year, in 2023, Aruba's Western Wetlands were designated as Ramsar areas. Currently (2024), Aruba has protected 24.3% of the total land area of the island (178.7 km²). These are the Parke National Arikok, Spanish Lagoon and surroundings, and the additional sixteen nature reserves (43.5 km²). All these areas are owned by Aruba and managed by ACF.

As part of the Western Wetlands project, Aruba aims to restore the watershed, health, and connectivity of the marshlands, and in the process, the conditions for biodiversity to thrive as a result. Other areas that can be added to reach the 30% goal include Sero Canashito, North Coast, Tanki Leendert (Prikichi heaven), Grotto di Lourdes strip, Rooi Prikichi with dam, Rooi and Sero Canashito, Rooi Master, Hooiberg and surroundings. These areas are well-known for their high biodiversity, yet they are under pressure of urban development (land-use change). Other potential areas for protection include the "Colony Saltspray" and Rincon. This would require the formulation and implementation of adequate management plans for all protected land, coastal and marine areas. The above-mentioned areas are categorized according to the spatial development plan with regulations as 'Nature and Landscape', 'Hooiberg and surroundings', 'Residential area with values' and 'Rural area'. Most of these nominated areas are unsuitable for housing, with the exception of Tanki Leendert (Prikichi Heaven). The fear of conflicting spatial functions, namely residential areas and nature conservation, is therefore minimal.

Subgoal b: Restore 30% of degraded land, coastal, and marine areas

This target ensures that by 2030, at least thirty per cent (30%) of the total area of degraded terrestrial, coastal and marine ecosystems are under effective restoration to enhance biodiversity, ecosystem services, ecological integrity, and connectivity. Habitat degradation is the result of human-induced processes that result in a decline in biodiversity, ecosystem services and resilience. Nature on Aruba is vulnerable due to its small area and inherently small populations of species, and therefore, particularly vulnerable to habitat loss, fragmentation, and degradation.

In Aruba, habitat degradation occurs in terrestrial, marine and coastal ecosystems. Examples of habitat degradation on land are the excavations - property lands excavated for (unregulated) sand mining as mentioned in section 2.1. Often the soil is contaminated by the underlying waste to the degree in which ecosystem services are lost. Examples of habitat degradation in marine and coastal areas include the poor conditions of our coral reefs due to eutrophication, among other causes (Vermeij et al., 2019). As coral reefs degrade, they lose their ability in protecting the coastline from powerful waves, affecting the sediment in mangrove environments. Mangrove forests are under enormous pressure due to urbanization and sedimentation. At the beginning of the 19th century, many mangrove forests in Aruba were logged to construct houses and to fuel stoves and lime kilns (Versteeg and Ruiz 1995). Today, increased sedimentation from upstream erosion chokes the mangroves while increasing the salinity to toxic levels. Formal designation of additional areas with high biodiversity value is crucial, along with implementing restoration plans for terrestrial, coastal, and marine ecosystems and habitats.





Subgoal c: Action to halt extinction of threatened species

In aiming to restore populations of threatened and (critically) endangered endemic species, some need added support in-situ, like Cetacea, Sea Turtles, Shoco, and Cascabel, and some ex-situ in order for their species to survive. The Lora, for example, was extinct in Aruba, but after the Coast Guard intercepted 32 individuals from illegal trade, a breeding and release program was set up. Next to the Lora, other fauna species like the Prikichi, Coneu, Patrishi, and Molly need a dedicated breeding and release program. A plant nursery is also necessary for the protection of locally endangered flora.

Subgoal d: Reduce human-caused threats to marine and land life

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has identified the five key drivers of biodiversity loss: (1) changes in land and sea use; (2) direct exploitation of natural resources; (3) pollution; (4) invasion of alien species and (5) climate change. By protecting and restoring 30% of (degraded) land, coastal, and marine areas, the first two threats on the list are addressed. To tackle the next topics of pollution and alien species, integrated approaches are required.



For decades, Aruba has struggled with waste challenges such as illegal dumping, uncontrolled landfilling, open-air burning of waste, littering, lack of environmental legislation, lack of financial resources, inefficient waste handling systems, and a lack of enforcement. Pollutants damage the quality of air, water and land. One of the hidden threats is nitrogen and phosphorus pollution. Due to the increased nutrient availability caused by wastewater disposal from raw sewage water (and overflow of the Bubali pond), hotel gardens (fertilizers) and the salina outlets, Aruba's coral reefs are declining (Vermeij et al., 2019). Last year, a FOG (Fat, Oil and Grease) taskforce was established. This multidisciplinary working group investigates how the quality of wastewater can be improved, and how a circular economy can be achieved. Some steps have also already been taken to tackle solid waste. After the closure of the Parkietenbos landfill in 2022, all waste streams had to be redirected to other locations/waste processing companies. Hereto, the Ministry of Nature published a blueprint with the new destinations for the various waste streams, and currently, a circular assessment is being conducted toward additional interventions to maximize material recovery and minimize leakage. The efforts by the taskforce should persist to advance prevention and restrictions on FOG, and to reduce wastewater pollution. Efforts by the Ministry of Nature to support waste management toward circularity together with the public and private sectors, the waste sector, and key NGOs, should also continue.

Another human-caused threat to marine and land life is high-impact recreation by the improper use of utility terrain vehicles (UTV's) and all-terrain vehicles (ATV's). The UTV's and ATV's will be phased out by 2030. No new permits will be issued, and it will be prohibited to replace old vehicles with new ones. To minimize the negative impacts of ATV's and UTV's (see chapter 2.1) only three routes will be available until 2030, after which this activity will no longer be legal in Aruba.

Finally, specific attention must be paid to invasive alien species by creating an invasive species action plan. As described in chapter 2.2., both the lionfish (*Pterois volitans*) and seagrass (*Halophila stipulacea*) have become a common, unwelcome site in Aruban waters. However, other invasive species are also harming life on land and below the Aruban waters. The action plans should comprise a list of known invasive species and an assessment of the threat level of each species, including eradication, control and awareness measures and how to prevent new introductions (trade, travel, transportation, and landscaping plans).

Subgoal e: Reduce the climate impact on biodiversity

Another key driver of biodiversity loss, according to IPBES, is climate change. To maximize outcomes for advancing national climate resilience, Aruba must streamline and align climate efforts and actions. In April 2024, the National Climate Resilience Council (NCRC; ncrc-aruba.org; Aruba National Climate Resilience Council: Action Plan) was formally launched. The purpose of the NCRC of Aruba is to contribute to the systemic strengthening of climate resilience for the inter- and intra-generational wellbeing of society and nature. One of the primary mandates of the NCRC is to coordinate the execution of climate risks and resilience assessments, in addition to advancing climate analytics and a national climate resilience research program. Hereto, the NCRC is working on scoping with the Stimson Center on Aruba's Climate and Ocean Risk Vulnerability Initiative (CORVI, see Figure 17), and with Climate Adaptation Services on a Climate Impact Atlas. These will function to structure existing data as well as to gain new insights toward a baseline to prioritize climate action. Based on the strategy and roadmap developed by the Ministry of Nature (1. Scoping; 2. Costing; 3. Financing), the International Monetary Fund (IMF) and the International Panel on Deltas and Coastal Areas (IPDC) will then support with expertise toward the costing perspective of the priorities. Aruba can then move to a financing phase for implementation and monitoring of its climate actions toward resiliency, with nature at its core.



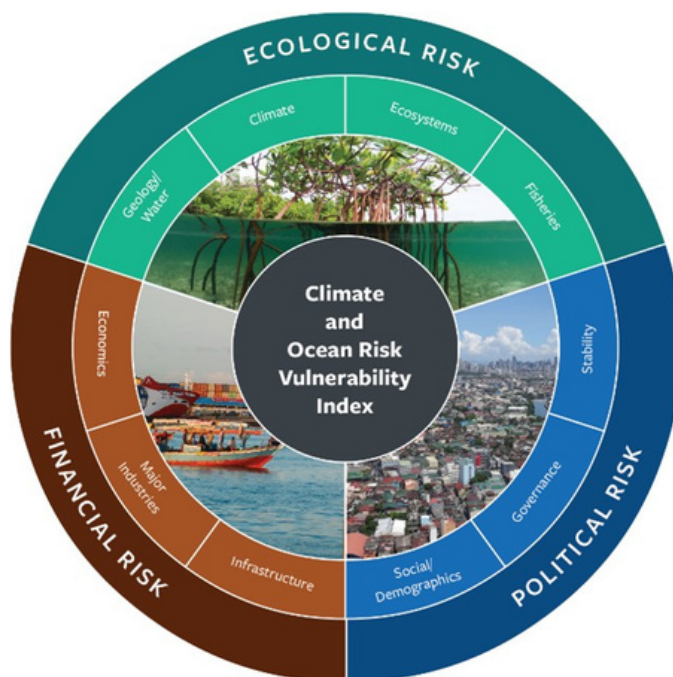


Figure 17. CORVI risk categories, Stimson Center.

3.3.2. Strategic goal 2: Sustainable usage of natural resources for the people of Aruba

Aruba's natural resources, including its land and marine ecosystems, are valuable resources that sustain the economy, culture, climate resilience and the livelihoods of its residents (see chapter 2.3 for more information on ecosystem services). The island's nature, through its beaches, diverse marine life and National Parks, attract tourists from around the world and is the primary driver of Aruba's tourism industry.

Both visitors and locals alike appreciate and value Aruba's natural surroundings, and make use of our beaches, visit the rock formations, and use park areas to walk and cycle. In this landscape, cultural activities take place, including seasonal fruits and fish as part of Aruba's culinary dishes. The high winds season inspires kids and adults to make their own kites often from dried cacti branches, and it is the favorable season for international windsurfing competitions. The beaches are lined with local trees providing shade for daily recreation out of the hotspots. Additionally, trees and shrubs are used as green infrastructures in urban areas providing safety, shade, beauty and clean air, which also contribute to the health and happiness of the residents of Aruba (Stakeholder consultations (physical meetings), 2024). In this nature rich landscape, children and young people are growing up with sustainable competencies and respect for economic development in balance with nature.

Moreover, traditional industries such as agriculture and fishing rely heavily on the health of natural ecosystems for their sustenance. Therefore, it is crucial to manage these resources responsibly to safeguard the wellbeing of Aruba's people.

Subgoal a: Tourism in balance with nature

Aruba's economy is strongly dependent on the quality of nature. The beaches, Arikok National Park, the Bubali Bird Sanctuary, the rock formations, mangrove forests, and coral reefs all attract an average of 24.000 stayover visitors daily (ATA, 2023). The economy of Aruba thus primarily depends on tourism, and tourism in its turn, depends for a large part on the natural ecosystems – Aruba's economy is nature.

The Aruba National Action Plan (NAP) report, "Nos Plan, Nos Futuro" 2023 – 2025, highlights that the prosperity and livability on the island will come under further pressure due to the expected growth of tourism the coming years (approximately 22% increase of hotel rooms). Our concerns are that unsustainable tourism development will further destabilize and weaken the balance to the detriment of our nature. The NAP 2023 – 2025, therefore, underscores the need for Aruba to transition to a responsible and inclusive economic model. For decades, Aruba has experienced an unbalanced tourist development. If Aruba wishes for nature to be considered toward harmonious development - the very essence of its economy - cross-sectoral and a whole-of-nation commitment will be needed to achieve this.

The UN World Tourism Organization defined sustainable tourism as: *'Tourism that takes full account of its current and future economic, social and environmental impacts whilst addressing the needs of visitors, the industry, the environment and host communities'* (March 2024). To achieve sustainable tourism on Aruba, the NAP, Aruba's Investment Strategy 2019 – 2024, and the Masterplan 'Repositioning our sails' must form the basis for further harmonizing nature into tourism development. The ATA is currently updating its Multi-Annual Corporate Strategy (MACS). Its next MACS 2025-2035 is scheduled to be completed this year.

Further regulation and enforcement of irresponsible and unsustainable tourism developments is necessary. On the other hand, sustainable interventions with low impact should be stimulated. Aruba is currently in a transition phase where nature inclusive actions are taken. High-impact tourist activities should be phased out with nature-friendly activities. Nature guidelines must be established for hotels, parallel to a nature Code of Conduct for tourists. Additionally, visitors can be made aware of the value of nature by providing them with information. To sustain the significant economic advantages derived from tourism, prioritizing innovation and value creation within the tourism sector becomes paramount ('High Value, Low Impact'), such as focusing on cultural, sports, adventure, and medical tourism, hereto preventing damage to the local flora and fauna. Partnerships with hotels can also serve to accelerate environmental initiatives.





Subgoal b: Promote local sustainable agricultural practices and sustainable fisheries.

Highlighting the mission stated in Aruba's Masterplan 'Repositioning Our Sails' (2020), there is great value in strengthening and safeguarding the sustainability, security and quality of (local) food production for the people of Aruba. In Aruba, the agricultural sector is still quite limited. Challenges, such as limited water resources, high energy and the cost of water, lack of biodiversity-friendly practices and agricultural knowledge, food safety and quality standards, access to, and availability of, infrastructures, and the minimum availability of financing options (NAP, 2023. p12) should be addressed to promote local sustainable agricultural practices in harmony with nature. Moreover, limited space for traditional forms of agriculture requires modern, innovative forms of food production (e.g., vertical farming, etc.). Together with the Minister of Economic Affairs, the Minister of Nature is stimulating sustainable agriculture. Through Qredits Aruba, farmers can apply for financing at a reduced interest rate of 2% for business loans between AFL. 5,000 to AFL. 200,000. These loans facilitate investments by farmers to continue upscaling their agricultural businesses and produce products for the local market. To ensure food safety and disincentivize pesticide use, 'good agricultural practices' guidelines and certifications are in the last phases of development and will provide farmers with appropriate guidelines within their operations. Cooperation will be key to achieving sustainable agriculture and fostering a nature-inclusive society. Hereto, a new body for food quality regulations and ensuring quality assurance in the catering industry are necessary steps.

To preserve marine resources for the benefit of the people of Aruba, knowledge of local fisheries must be strengthened, and sustainable management of fishery resources must be fortified. A fishery management plan, including a report on the current state, use and management of Aruba's fisheries, can structure these efforts, especially if developed in collaboration with local (small-scale) fishmen and/or communities.



Subgoal c: Enhance connectivity and quality of nature in urban areas

In urban zones, green pockets must be abundant and connected to each other through green veining along roads and dry riverbeds, combined with a mix of native trees along roads to provide shade for pedestrians and cyclists. In 2019, the policy framework "Build with Nature" was implemented to include nature in the physical planning process in a structured manner. This new policy provides guidance and tools to shape the further infrastructural and urban development of Aruba in a sustainable manner, while also safeguarding high-quality natural landscapes, and local flora and fauna.



In Appendix 3, an overview is given of the Build with Nature concept applied to urban development. This subgoal aims to further implement the Build with Nature concept in urban development projects of Aruba to ensure the enhancement of native biodiversity.

The ROPV describes different zones on land and sea, specifying urbanization restrictions per zone. 'Natuur en Landschap' is a zone dedicated to nature, stipulated in the ROPV. Protected areas are those appointed in accordance with the Nature Conservation Ordinance, also described in the ROPV as dedicated areas with high ecological values. The restrictions of both zones are identical: intentionally so to safeguard nature and its ecosystem services. In each ROPV zone, nature has a role. Hereto, nature-inclusive urban planning aims to enhance native biodiversity, ensure ecological connectivity (incl. functioning as wildlife corridors), and maintain the integrity of the areas. Herewith, nature is guaranteed its space to exist and grow. Nature-inclusive aspects are bioswales, bees and bats boxes, brown roofs, rainwater ponds, nesting walls, wilderness walls, and fauna passages. Urban areas (ROPV zones) are managed zones with mutual purpose for nature and community. In this case, the goal is to create and duly manage publicly accessible natural areas for people to enjoy and connect with nature. Where the design, revitalization or management of recreational areas demands renewed spatial planning, it is key to use a participatory approach to meet the needs of local communities. Nature-inclusiveness is not primarily about conservation, although a key element, it is about taking nature and its benefits for people into account in advance within the planning phase rather than compensating for potentially adverse effects afterwards.

Figure 18 demonstrates an example of infrastructure development in harmony with nature. Plans for the construction of new roads are subject to an ecological value check (permit requirement). Yet the ecological value assessment often remains at the advisory stage, limiting the potential to develop in harmony with nature.



Figure 18. Example of road construction in harmony with nature (personal collection), TG 2024.

3.3.3. Strategic goal 3: Tools and solutions for implementation and mainstreaming

This strategic goal emphasizes the importance of effectively implementing restoration and conservation measures, as well as integrating the value of nature into all development initiatives (mainstreaming). However, without tools and solutions for this strategic goal, effective progress in the conservation, restoration, and strengthening of nature in Aruba is at risk of being minimal. Therefore, the aim is to mainstream nature in policy by formalizing the Rights of Nature in law, improving nature legislation and its enforcement, ensuring the availability of high-quality and accessible research data, providing nature education, and securing funding for nature-inclusive projects. These efforts are essential for conserving, restoring, and strengthening Aruba's natural environment.

Subgoal a: Rights of Nature in all developments

The values of nature and the notion of development in harmony with nature must be incorporated in all governmental policies and development processes. With the introduction of Rights of Nature, Aruba is already adding, next to the anthropocentric approach, an ecocentric approach to all developments, addressing the challenges that impact nature. A legal process was initiated in 2023 to enshrine the Rights of Nature in Aruba's Constitution. This will grant citizens the legal right to act as stewards and guardians in the interest of nature in all developments. Access to information (*subgoal c*) is crucial for carrying out effective stewardship and guardianship. Additionally, all governmental officials and NGOs should receive education regarding the importance of the Rights of Nature for the people of Aruba. After all, nature-conscious action begins with awareness of the Rights of Nature itself (*subgoal d*). And in informing stakeholders about the Rights of Nature, the changes required to better align their actions in harmony with nature should be explicit.

Subgoal b: Improved legislation and enforcement of policy related to nature

To achieve the ambitions outlined in this NBSAP, one of the key steps will be to review and update current national policy and laws relevant to nature, and particularly the Nature Conservation Ordinance, the Physical Development Plan, the Build with Nature Policy, the Environmental Impact Assessment and the Waste Management Ordinance.

The Nature Conservation Ordinance (Natuurbeschermingsverordening) is the primary policy tool to protect, and conserve endangered and threatened species and their habitats. This law implements the Convention of Biological Diversity, the Convention of International Trade of Endangered Species, the Specially Protected Areas and Wildlife, and the Ramsar Convention.

The Nature Conservation Ordinance should be revised to incorporate practical measures for implementing the Rights of Nature, considering the Act currently only focuses on threatened and endangered species and their habitats - it does not legally recognize and value the broader ecosystem services that nature provides. Alongside this revision, the Act could be extended to protect the genetic diversity of species (with particular attention to coral reefs) and address the management of invasive species to allow locally (endangered) species to regenerate.

The Physical Development Plan with Specification (ROPV), including the '*Build with Nature*' policy framework, must be further developed into a decision-making tool facilitating nature-inclusive and climate resilient development. Ecological values, habitats and species must be protected more effectively in both governmental and private urban projects (including road construction, housing development, and water projects).

The ROPV should be specified further to require 20% of newly developed land to be allocated for green spaces within urban areas. In residential areas, as well as areas with high value and urban zones, the allocation should range from 30% to 40%. Additionally, the possibility of including the 3-30-300 rule-of-thumb for urban forestry and greening cities (Konijnendijk, C. 2021) should be analyzed as an alternative. Rooted in scientific research (e.g. Rugel, 2019), this rule-of-thumb associates mental health, wellbeing, and resilience with green spaces, whereby it is beneficial to ensure a maximum distance of 300 meters to the nearest green space, 30 % canopy cover in every neighborhood and three trees (of decent size) from every home.

The formalization of the *Environmental Impact Assessment (EIA)* and the Waste Management Ordinance in our legislation is also imperative. This is to guarantee an EIA for every new development project and for waste to be properly managed (during construction and operations) to minimize the impact to the environment. Given Aruba's limited size and available space, and ongoing development, the *Building Law (Bouwverordening and Bouwbesluit)* should also be adapted to be nature-inclusive to, for example, make it mandatory by law to allocate smaller property sizes. During the final design and construction phases, the project must be continuously monitored and inspected to ensure compliance. In instances of damage and biodiversity loss, compensation should be binding and obligatory.

Finally, ensuring effective enforcement of nature legislation is a priority of this NBSAP. At present, enforcement is deficient due to capacity limitations and insufficient awareness of nature among inspectors and legal officers.

Merging the nature and environment inspectorate and the city inspectors will result in an efficient and effective monitoring and enforcement body. Violations of nature laws are usually not fined, even though this is imperative toward realizing an authentic transition.

Currently, the park rangers have no legal authority to address those exerting nature-unfriendly behavior, although this is necessary toward desired pro-environmental cultural and individual values, norms, attitudes and behaviors. Furthermore, DNM's authority within infrastructure decision-making processes needs revision in terms of its adequacy.

Subgoal c: Ensure qualitative and accessible research data on nature

Decisions should be grounded in the most current and comprehensive knowledge available, which must be updated through regular monitoring efforts. Improvements are needed in data collection and monitoring, including the establishment of a comprehensive database. A thorough list of endangered species, categorized according to the International Union for Conservation of Nature (IUCN) Red List criteria (vulnerable, threatened, keystone species, etc.), should be compiled, along with establishing an ecosystem-level baseline to assess the current state, *and* initiate trend monitoring in line with strategic goal 1 of this NBSAP, i.e., set-up specific restoration targets. Priority should be given to providing data on restoring populations of threatened and (critically) endangered endemic species.

This subgoal would also benefit from the implementation of a two-year state-of-nature monitoring report cycle, while also making these reports available to the public. Satellite imagery and remote sensing can be valuable tools for monitoring, and collaboration with organizations like the Metabolic Foundation and the University of Aruba may facilitate monitoring efforts. Additionally, the potential of utilizing citizen science as a monitoring tool should also be explored toward increasing resources and capacity.

The Department of Nature and Environment (DNM) will serve as the repository for nature and environmental data and publications, conducting research and issuing calls for applied research to support policy development. Collaborating with other government agencies, NGOs, academia, and international organizations is essential to address environmental data gaps. Additionally, providing open access to high-quality nature information is crucial for fostering an informed and engaged local community committed to nature-friendly behavior. Considerations should be given to the Escazú Agreement, granting citizens access to nature information, hereto enhancing transparency and public participation in environmental decision-making processes.

Subgoal d: Nature education for a new Aruban narrative

Before taking steps to actively conserve and restore nature, reduce waste and incorporate responsible consumption patterns, both governmental, business and societal actors must be aware of nature's value. Hereto, throughout the stakeholder engagement process for this NBSAP, the significance of crafting a new 'Aruban narrative' was emphasized, aimed at embedding the value of nature into the core identity of the Aruban people.

Education is key to enhance the awareness and establish this new Aruban narrative that values nature. A strong communication campaign, initiated by the government (and in alignment of the Education Plan of the Direction of Education) can support the establishment of the new Aruban narrative across government and society. The campaign must be tailor-made for governmental actors, students (primary and secondary schools), business (particularly the tourism branch, fishing sector, agricultural sector and industry), tourists and the local community.

New or innovative approaches to communication must be included, such as storytelling, social media and visually attractive digital information brochures. Strategically, requiring environmental training for all Members of Parliament and new governmental employees, with a priority for inspectors, permit issuers and regulators could prove to be effective, and thus, the feasibility of providing such trainings should be explored. These governmental workers should be well-informed of the Rights of Nature, the value of nature, and of the existing (updated) legal framework for nature. Basic environmental knowledge should also be integrated into the curriculum of boating and spearfishing courses.

Subgoal e: Financing nature-inclusive projects

Funding and investments for nature-based projects, structurally, are of the utmost importance to provide economic, cultural and social benefits for the people of Aruba – now and in the future. Failing to invest in the preservation of Aruba's natural environment and its ecosystem services in the short term will lead to significantly higher restoration costs (public and private) in the long term.

In the search for funding and investment opportunities for nature-inclusive projects, the regular governmental budget is not sufficient and does not provide a structural source of additional finance opportunities during the period of this NBSAP (2024 – 2030). Therefore, the level of financial resources must be increased. Additional financial opportunities must be explored in collaboration with nature NGO's, academia and the private sector. Banks and insurance companies are important stakeholders to engage, especially when considering the current trend towards (re-)investing in green- and blue regenerative projects (ESGs). Financial arrangements for nature-inclusive projects must be tested in Aruba in financial labs (or: pilots) to organize finance opportunities that are advantageous to both public and private stakeholders (win-win opportunities). The subsidy policy for nature conservation must be expanded to include structural data-providing services and project-based nature conservation actions. Knowledge on innovative and financing opportunities can be exchanged through collaboration within, among others, the countries within the Kingdom of the Netherlands.

Next to the exploration of private financial investment opportunities, it is imperative to prioritize collaboration with the Department of Economic Affairs Commerce and Industry (DEACI) to explore additional public finances at the governmental level within the Kingdom of the Netherlands, the European Union, the United Nations, and the Convention on Biological Diversity (CBD). Representation of small island states on international conventions is important to address the funding challenges available to SIDS. Additionally, other innovative approaches to financing nature conservation and restoration projects at the local level need to be analyzed and considered. An example is to ensure the payment of ecosystem services within new urban developments. This requires research on the economic value of ecosystem services. Finally, the income from the Environmental Tax should morally and reasonably be allocated to nature conservation and restoration projects instead of the general funds of the government.

4. Ensuring effective implementation and evaluation

Appendix I outlines the milestones targeted for the period 2024-2030, listing the concrete steps to achieve the three main strategic goals and vision toward harmonizing developments of Aruba with nature. To effectively reach the targets, a multitude of enabling conditions must first be realized, and implementation of Aruba's NBSAP plan hereto begins by detailing these as priority actions for the initial phase (2024 – 2026). Subsequently, accelerating ongoing projects toward quick wins will be the second focus within the initial phase for the same timeframe.

4.1. Enabling conditions: priorities for implementation of the strategic framework

For sustained policy action, certain key conditions are preconditional. The absence of key enabling conditions can present a barrier to management or sustained policy action (IPBES, n.d.). This is further substantiated during the stakeholder engagement process for this NBSAP (April – June 2024), where it was stated that without a shared ambition, a whole-of-government support, structural funding streams, (ecosystem) baseline studies and sufficient capacity for implementation and enforcement, it is challenging to pursue ambitious nature goals.

Therefore, to enable the effective implementation of the strategic framework of this NBSAP, the following key enabling conditions are identified: A. Shared values to develop in harmony with nature; B. Strong coordinating structures and C. Cross-sectoral collaboration for research, revised legislation, structural funding, and implementation and enforcement capacity. This sub-chapter outlines the priority actions that are needed to establish these enabling conditions in the initial phase of implementation (2024 – 2026).

4.1.1. Shared values to develop in harmony with nature

Understanding and appreciating the value of nature and ecosystem services establishes the basis of any future nature-inclusive action and development in harmony with nature. Whereas this NBSAP outlines the importance of ecosystem services to the people of Aruba, effort must still be made in the upcoming years to incorporate the shared value of nature across government and society. In this regard, priorities for 2024 - 2026 include formalizing the Rights of Nature in Aruba's Constitution, finalizing the nature-inclusive vision for Aruba, promotion across various governmental sectors and societal groups, executing the research on the economic valuation of ecosystem services including the economic valuation of the losses due to nature degradation to inform decision-making (see Table 1). The inclusion of Rights of Nature in Aruba's Constitution will provide a significant change in approach on how nature can be included toward a harmonious and balanced development.

Table 1 Priority actions for a shared value of nature across government and society

	Priority actions 2024 - 2026	Key partner(s)
Shared (economic) value of nature across government and society, fostering development in harmony with the natural environment.	Enshrine the Rights of Nature in Aruba's constitution	MinTINO, DNM in consultation with DWIJ, RvA & Parliament
	Finalize and promote (presentations/roadshow) the Nature-Inclusive 2050 Vision for Aruba (finished in December 2024)	Wageningen University in collaboration with DNM
	Research on the (economic) valuation of ecosystem services and an economic valuation of the losses due to nature degradation to support decision-making	DNM, DEACI, ATA, University of Aruba, Vrije Universiteit Amsterdam

4.1.2. Strong governance structure for coordination, monitoring and evaluation

To achieve a broader range of milestones, a strong governance structure must be established as this ensures clear roles and responsibilities, fosters accountability, and provides the necessary oversight and coordination. A strong governance framework (government-led) facilitates effective decision-making, optimizes resource allocation, and enables consistent monitoring and evaluation of progress. This structure supports further collaboration across different sectors and stakeholders (enabling condition C), ensuring that efforts are aligned and that strategic goals are met efficiently and effectively. Without such a structure, initiatives may lack direction, suffer from fragmented efforts, and fail to achieve their full potential.

The structure, covering a cross-sectoral governmental steering group and working groups with a broader representation of societal actors, should coordinate the implementation, monitor progress, and evaluate achievements toward the main strategic goals and subgoals of Aruba's NBSAP. The Department of Nature and Environment (DNM) will be primarily responsible for this coordinating function or role. The DNM is a policy department, and functions as the technical focal point for the Planet Goals in the SDG framework, as well as the technical focal point for CBD, SPAW, and other international multilevel agreements on nature and the environment. Furthermore, the DNM is a co-author (and lead author of the Planet goals) of the National Strategic Plan (NSP), coordinated by DEACI. While the DNM is the primary responsible partner, commitment and support from MinTINO, relevant other Government Departments, NGO's, private sector and Academia are also crucial for participation, monitoring and evaluation of the NBSAP. This underscores that the conservation of Aruba's nature and ecosystem services is a whole-of-government and whole-of-society shared responsibility.

In the process of forming the cross-sectoral steering group and working groups it is crucial to collectively determine the following questions to effectively start with the implementation of the NBSAP:

- *Motivation*: why are we going to work together? Do we share the same ambition to develop in harmony with nature, in line with this NBSAP?
- *Organizational*: how do we work together? Consider the frequency of meetings, chairmanship, capacity and resources, planning, inclusion of all relevant stakeholders, decision-making structure, and formal status of the Steering and Working Groups.
- *Interaction*: how are we going to interact? Consider aspects such as a sense of equality, inclusion, governance structure, transparent interests, and mutual respect.
- *Outcome*: what are the outcomes of the steering/working groups? Define tangible results in relation to this NBSAP and reach consensus on regular monitoring and evaluation plan.

In summary, Table 2 highlights the priority actions for the enabling conditions. Next to the establishment of the steering and working groups, this includes the establishment of an adequate monitoring and evaluation framework, which can also be used for reporting progress to Parliament.

Table 2 Priority actions for a strong coordinating structure for coordination, monitoring and evaluation

	Priority actions 2024 - 2026	Key partner(s)
Strong governance structure for coordination, monitoring and evaluation	Establish a cross-sectoral governmental steering group, which will meet quarterly to oversee the implementation of this NBSAP, including shared yearly priorities	DNM, DIP, DEACI, DO, ATA, SDG commission (Foreign Affairs)
	Establish working groups, which will meet monthly with representatives of the government, nature NGO's, university and civil organizations	DNM, DOW, Nature NGO's, University of Aruba, IPA, AHATA, ATIA, civil organizations
	Construct a monitoring and evaluation framework including key-indicators, in line with the Monitoring Framework of the GBF, the Red List of the IUCN and aligned with the SDG monitoring framework.	DNM, CBS, NGO's, academia
	2-yearly reports on the progress of this NBSAP published on open-source platform, including presentation to Parliament and within the Kingdom	DNM, stakeholders

4.1.3. Collaboration for funding of nature projects, legislation, enforcement, and research

Once the steering and working groups are established, it is crucial to focus on the proposed milestones for the strategic goals outlined in this NBSAP (Appendix I). However, to effectively pursue these goals, it is widely acknowledged that, next to a strong governmental coordinating structure, initial targets must be achieved in critical areas such as securing funding and investments, enhancing nature-related legislation, advancing research, and strengthening enforcement capacity (see Table 3).

While the DNM bears primary responsibility for the steering and implementation of this NBSAP, strong collaboration agreements are essential to progress in these crucial areas. Therefore, it is recommended that these areas be prioritized as primary agenda items for the steering and working groups during the 2024-2026 period. Next to the working groups in collaboration is facilitated, *Memorie of Understandings* must be formulated to state clear the contributions and roles of the different stakeholders like DIP, DOW, nature NGO's, the University of Aruba, AHATA, private parties and civil organizations, and collaboratively detail action plans in the following areas:

Funding and investments: current structural sources of financing are through the National budget and/or subsidy schemes, yet additional funding and investments are needed to further implement nature-related actions. An analysis of the most promising public and private investments opportunities for further implementation of this NBSAP must be undertaken (more background information in chapter 3.3.3.).

Legislation: With the proposed amendment of Aruba's Constitution to include the Rights of Nature, if passed, the Nature Conservation Ordinance will also have to be amended to make the Rights of Nature practical and enforceable. Furthermore, park rangers must be given the proper authority to legally act and hold those accountable for violations committed. In addition, the ROPV needs to be adapted given the 5-year cycle expiring in 2026. After an evaluation in 2025, the findings can be used as feedback for an amended ROPV.

Enforcement: The growing attention for nature and amended nature legislation means enforcement must also be improved in 2024-2026. A bottleneck is the lack of capacity and expertise in the enforcement of nature legislation and the ROPV. To expand the enforcement capacity and expertise with supervisors (toezichthouders) and inspectors, including park rangers with authorities, inspector training will be organized with specific attention to local conditions.

Qualitative and accessible research data on nature: Recognizing the Rights of Nature does not define the state of nature, nor does it translate to accessible information on its state. The Nature Conservation Ordinance protects species and the habitat of these species, while the Rights of Nature is regulated at the ecosystem level. Alignment requires data at the ecosystem level - essential for establishing baselines and monitoring the effectiveness of interventions, hereby serving as the foundation for all subsequent conservation efforts. This subgoal is a high priority as it is the basis of all conservation actions. Working with academia, local community and international organizations will be essential to address environmental data gaps. In the period 2024 – 2026, a State of Nature assessment including baseline measurements at species, habitat and ecosystem level will inform the succeeding targets and actions.

Table 3 Priority actions for collaboration for sustainable investments, legislation, enforcement and research (in support of strategic goal 3, tools and solutions for implementation)

	Priority actions 2024 - 2026	Key partner(s)
Collaboration for legislation, enforcement, qualitative and accessible research data, and sustainable finance and investments for nature-based projects	Legislation: Revise the Nature Conservation Ordinance (Natuurbeschermingsverordening) and enshrine the Rights of Nature in Aruba's constitution. Additionally, evaluation and revision of the ROPV, as the 5-year cycle will expire in 2026.	DNM in consultation with MinTINO, DWJZ, DIP, RvD & Parliament
	Enforcement: setting up a plan for capacity building for enforcement of nature legislation. Education of governmental workers and park rangers.	DNM, BCI, ACF, DIP, DHR, Douane, Impact Blue, DWJZ
	Qualitative and accessible research data on nature: Preparation of a State of Nature report that includes baseline measurements at species, habitat and ecosystem level. Expanding a comprehensive list of endangered species and determining the genetic diversity of endangered species.	DNM, ACF, University of Aruba, Academia, Nature NGO's, DCNA.
	Funding and investments: Analysis of the most promising public and private sustainable investments opportunities for further implementation of this NBSAP, including structural coordination with the DEACI, DBB, Kingdom of the Netherlands, and EU for finding funding opportunities and financial labs to explore public private collaboration for nature-inclusive projects (pilot)	MinTINO, DEACI, DBB, ATA, AHATA, ACF

4.2. Quick-Wins and prioritization of targets for 2024 - 2026

Chapter 4.1 outlines the essential conditions and associated priority actions necessary to establish a solid foundation for this NBSAP. These priority actions contribute to the advancement of strategic objective 3 of this NBSAP (tools and solutions for implementation). These actions should be prioritized as primary agenda items for the steering and working groups during the 2024-2026 period.

Simultaneously, identifying specific priorities and/or quick wins will also contribute to advancing the strategic objectives 1 and 2. The tables in Appendix I outline targets for each strategic goal and subgoal, serving as the implementation guide. Although the targets are the roadmap for achieving all strategic goals, not all targets are realistic within the 2024-2026 initial phase. The new Steering Group for this NBSAP can identify the quick-wins and priority targets for strategic objectives 1 and 2 (listed in tables 4 and 5) at the beginning of its formal establishment. Finally, the flagged quick-wins and priority targets must each be further detailed into action plans, including actions, budget, planning and responsibilities.

Table 4 Quick-Wins and/or priorities 2024 – 2026 for strategic goal 1

Strategic goal 1	Quick-Wins and/or priority milestones 2024 - 2026	Key partner(s)
Reducing threats to biodiversity loss	Protect an additional 6% of land areas with high biodiversity by 2025.	DNM, DIP, DWJZ, ACF
	Restore former Parkietenbos landfill area and degraded land and coastal areas by 2026.	MinTINO, DNM, Serlimar, DTI, DVG and Witteveen & Bos NV
	Investigate, map and report on climate vulnerability and security by 2026.	NCRC, Stimson Center, IMF, IPDC, CORVI Partners, CAS, Nature NGOs, public/private sectors, academia
	Conserve Western wetlands/Ramsar	MinTINO, ACF, ABC, DOW, AWWWS, WUR, Iberostar
	Establishment and implementation of adequate conservation management plans for all land, coastal and marine protected areas.	ACF, WUR and stakeholders
	50 % of the solid waste is reused and recycled.	MinTINO, DNM, Waste Management Companies, Impact Blue, Metabolic
	90 % of the Fat-Oil and Grease waste is prevented and recycled	Taskforce FOG, DNM, DOW, DVG, AWWWS, DEACI, BCI, KPA, Fire department
	Amend list of prohibited hazardous products	MinTINO, RvA, DWJZ, Impact Blue, ACF, DLVV, DNM, and stakeholders

Table 5 Quick-Wins and/or priorities 2024 – 2026 for strategic goal 2

Strategic goal 2	Quick-Wins and/or priority milestones 2024 - 2026	Key partner(s)
Sustainable usage of natural resources for the people of Aruba	Implement Build with nature policy to enhance connectivity and quality of green and blue corridors in urban areas	DNM, DIP, DOW, ACF, ATA, ADIAA
	Promote local sustainable agricultural practices and sustainable fisheries	MinTINO, DLVV, UF, Hadicurari, ATIA, CUA, ACF
	Promote tourism in balance with nature	DNM, DOW, ATA, AHATA
	Establishment of publicly accessible natural areas (such as parks)	DOW & ACF, DIP, ATA, AHATA
	Partnerships with hotels / tourist industry to accelerate environmental initiatives	AHATA, AHATA members
	Enforce plan for bounding high impact tourist activities (ATV's/UTV's)	KPA, DOW, DIP, DNM, ATA, BCI, ACF

5. Final remarks

We look back with pleasure on the process of creating this NBSAP. Over the years, the working relationships between governmental organizations and nongovernmental organizations have grown, as well as that with academia and the business community. When all stakeholders are aligned, we know we can achieve more together. It is not only the island that unites us - it is also our common goals. It is a pleasure to work with passionate people and we look forward to reaching our targets toward celebrating our first nature-inclusive milestones.

With this beginning, we are going to conserve and restore nature. And continue to focus on nature's positive development. If you are inspired and still on the sidelines, please get in touch: we need everyone at the table!



Appendices

Appendix 1. Milestones per strategic goal

Chapter 4 outlines the essential initial steps to create the enabling conditions for implementation, along with the priority actions and quick wins for the first period of this NBSAP (2024–2026). Yet, more effort and activities must be undertaken to advance on the strategic goals and the vision of Aruba the develop in harmony with nature. Tables 6 through 8 provide an overview of the necessary targets for each strategic goal to be undertaken during the period 2024–2030. To advance each target, further detailing is needed in the form of policy action plans, as described in Chapter 4.

The final column of the tables presents potential indicators per sub goal. Indicators must be further determined when constructing the monitoring and evaluation framework (priority action period 2024–2026), in line with the Monitoring Framework of the GBF, the Red List of the IUCN and aligned with the SDG monitoring framework. The Monitoring Framework must be realistic, considering efficient monitoring techniques and available budget and capacity.

Table 6 Actions 2024 – 2030 for strategic goal 1

Strategic goal 1: Reducing threats to biodiversity loss				
Sub goals	Milestone	Partner(s)	Proposed deadline	Potential indicators
Protect 30% of land, coastal, and marine areas	Protect an additional 6% of land areas with high biodiversity	MinTINO, DNM, DWJZ, DIP, ComF&F, RvA	2025	<ul style="list-style-type: none"> - Protected area coverage (Km²) of key biodiversity areas and protected species - Red list Index - Proportion of species populations with effective population size
	Conserve the Western wetlands/Ramsar.	MinTINO, ACF, ABC, WUR, DNM, DOW, AWWWS, Iberostar	2025	
	Establishment and implementation of adequate conservation management plans for all land, coastal and marine protected areas.	ACF, WUR	2025	
	Designated protection of marine areas, creating an island round MPA.	DNM, ACF, MinTINO, international NGOs, DSA	2027	
	Establishment of an amendment to the Nature Conservation Ordinance.	MinTINO, DNM, DWJZ, RvA & Parliament	2028	
Restore 30% of degraded land, coastal, and marine areas	Restore former Parkietenbos landfill area.	MinTINO, DNM and Witteveen & Bos NV, Serlimar, DTI, DVG	2026	<ul style="list-style-type: none"> - Status of high biodiversity areas - Restoration plans
	Inventory of degraded land, coast and marine areas (with high former biodiversity value) plus needed restoration measures.	DNM, ACF, Metabolic Foundation, Universiteit van Utrecht, Wageningen	2027	

Table 6 Actions 2024 – 2030 for strategic goal 1

		Environmental Research Centre.		
	Formal designation of new protected areas with high biodiversity value.	DNM, Nature Consultants, ACF	2027	
	Formalize policy plan for the restoration and repurposing of quarries, with a new social function	DNM, DIP, DOW, ACF, MinTINO	2027	
	Formalize habitat restoration plans, including budget and capacity plan. Example: 'Turning the Tide' project.	ACF, UoA, ScubbleBubbles, WUR	2028	
Action to halt extinction of threatened species	Establish and implement a dedicated breeding and release program for the Prikichi, Coneu, Patrishi, and Molly	ACF	2027	
	Develop a plant nursery for locally endangered flora	ACF, Ban Lanta y Planta, DLVV	2028	
Reduce human-caused threats to marine and land life	30 % of the solid waste is reused and recycled	MinTINO, DNM, Waste Management Companies, Impact Blue, Metabolic	2025	<ul style="list-style-type: none"> - Rate of invasive alien species establishment - Fertilizer use - Proportion of domestic and industrial wastewater flow safely treated - Litter density - Amount of UTV and ATV - Number of circular or zero waste (new) businesses - Number of SUP products prevented - Adoption rate (s) (retailers or businesses) - Number of new recycling companies - % of solid waste diverted from Sero Teishi for recycling
	90 % of the Fat-Oil and Grease waste is prevented and recycled	Taskforce FOG, DNM, DOW, DVG, BCI, KPA, Fire department, AWWWS, AHATA, AGA, Chinese Association	2025	
	Amend the list of prohibited hazardous products	MinTINO, RvA, DWJZ, Impact Blue, Space & Nature Foundation, ACF, DLVV	2025	
	Invasive species action plan	ACF	2027	
	Reducing and phasing out of UTV and ATV	MinTINO, DNM, ACF, ATA, AHATA	2030	
Reduce climate impacts on biodiversity	Formalize Climate adaptation action plan and investment plan	NCRC, NCRC, Stimson Center, CAS, IMF, IPDC, CORVI Partners	2024	<ul style="list-style-type: none"> - Climate adaptation action plan 2024 - 2029 - Climate investment plan 2024 - 2029 - Climate Impact Stories - Climate Ordinance
	Investigate, map and report on climate vulnerability and security by 2026.	NCRC, Stimson Center, CAS, IMF, IPDC, CORVI Partners	2026	
	Ratification of the UNFCCC by the Proclamation of the National Law on Climate Change.	NCRC, MinTINO, RvA, DWJZ	2027	

Table 7 Milestones 2024 – 2030 for strategic goal 2

Strategic goal 2: Sustainable usage of natural resources for the people of Aruba				
Sub goal	Milestones	Partner(s)	Proposed deadline	Potential indicators
Enhance connectivity and quality of green and blue corridors in urban areas	Implement Build with Nature policy to enhance connectivity and quality of green and blue corridors in urban areas	DNM, DIP, DOW, ACF, ATA	2024	Share of urban area that is green/blue and for public use.
	Establishment of publicly accessible natural areas (such as parks)	DOW, ACF, DIP	2026	
Promote local sustainable agricultural practices and sustainable fisheries	Promote local sustainable agricultural practices and sustainable fisheries	MinTINO, DLVV, UF, Hadicurari, ATIA	2025	<ul style="list-style-type: none"> - Good Agricultural Practice certification - Proportion of agricultural area under productive and sustainable agriculture
	Established body for food quality regulations	DVG	2027	
	Implementation of a fishery management plan	MinTINO, DLVV, ACF	2027	
Tourism in balance with nature	Promote tourism in balance with nature	DNM, DOW, ATA, AHATA, ACF, Nature NGOs	2025	<ul style="list-style-type: none"> - Number of ATV's and UTV's - Number of partnerships with hotels - Number of locations with information signs - Number of cleanups - Number of streets / neighborhoods adopted
	Partnerships with hotels/tourist industry to accelerate environmental initiatives	AHATA, Nature NGOs	2026	
	Enforce plan for bounding high impact tourist activities (ATV's/UTV's)	KPA, DOW, DIP, DNM, ATA, BCI, ACF	2026	
	Information materials, signs and digital brochures, at the airport, protected areas, beaches and other biodiversity hotspots.	DNM, ATA, AAA, ACF, nature NGOs	2027	

Table 8 Milestones 2024 – 2030 for strategic goal 3

Sub goal	Milestone	Partner(s)	Proposed deadline	Potential Indicator
Appropriate governance structure for coordination, monitoring and evaluation:	Establish a cross-sectoral governmental steering group, which will meet quarterly to oversee the implementation of this NBSAP, including shared yearly priorities	DNM, DIP, DEACI, DO, ATA, SDG commission (Foreign Affairs)	2025	alignment of policy documents and activities
	Establish working groups, which will meet monthly with representatives of the government, nature NGO's, university and civil organizations	DNM, DOW, Nature NGO's, University of Aruba, AHATA, civil organizations, IPA	2025	alignment of activities (1) and progress reports (2)
Ensure qualitative and accessible research data on nature	Construct a monitoring and evaluation framework including key-indicators, in line with the Monitoring Framework of the GBF, the Red List of the IUCN and aligned with the SDG monitoring framework	DNM, NGO's, academia, IPA	2025	<ul style="list-style-type: none"> - Open-source platform - IUCN Red list - Baseline on ecosystem level - State of Nature report
	2-yearly report on the progress of this NBSAP published on open-source platform, including presentation to Parliament and within the Kingdom	DNM, stakeholders	2026	
	Preparation of a State of Nature report	DNM, NGO's, academia	2026	
	Ensure accessible research data on nature by publishing an open-source platform with reliable nature data	DNM, ACF, UoA, NGO's, academia, CBS	2027	
	Comprehensive list of endangered species (IUCN)	DNM, ACF, AMF, ABC, Turtugaruba, academia	2027	
Nature education for a new Aruban narrative	Awareness campaign on the value of nature, targeted on tourists, businesses (fishing sector, agricultural sector and industry), students, local community	Directorate of Education, DNM, Aruban influencers, representatives of business sector, universities, schools, nature	2027	-

Table 8 Milestones 2024 – 2030 for strategic goal 3

		NGOs, ATA, AHATA, AGA, CUA, ATIA, KvK, SNBA		
	Environmental training for governmental employees (priority for inspectors, permit issuers and regulators). Presentation on the Rights of Nature and the goals of this NBSAP.	DNM in collaboration with other ministries	2027	
	Integrating environmental knowledge into the curriculum of boating and spearfishing courses.			
Rights of Nature in all developments	Enshrine the Rights of Nature in Aruba's constitution.	MinTINO, RvA, DWJZ, Parliament, DNM	2025	- Aruba's constitution in line with Rights of Nature.
Improved legislation and enforcement of policy related to nature	Setting up a plan for capacity building for enforcement of nature legislation. Education of governmental workers and park rangers	DNM, DHR, BCI, ACF, DIP, DWJZ, Impact Blue	2025	- Revised Nature Conservation Ordinance, including Rights of Nature, value of ecosystem services, protection of endemic species and management of invasive species.
	Revise the Nature Conservation Ordinance	MinTINO, RvA, DWJZ, Parliament, DNM	2026	- New nature guidelines following the Ecocentric policy approach
	Evaluation and revision of the Build with Nature policy framework.	MinTINO, Policy departments, SDG commission, ADIAA	2026	- Revised Building law
	Revise the Building law	DOW, DNM, MinTINO		
	Formalization of the Environmental Impact Assessment	MinTINO, RvA, DWJZ, DNM	2027	
	Formalization of Waste Management Ordinance	MinTINO, RvA, DWJZ, DNM	2027	

Table 8 Milestones 2024 – 2030 for strategic goal 3

Financing nature-inclusive projects	Analysis of the most promising public and private investments opportunities, including finance labs for nature-inclusive projects (pilot).	DEACI, DNM, MinTINO, DNM, DBB, ATA, AHATA, ACF, Financial specialist, Kingdom of the Netherlands, private parties, University of Aruba	2025	<ul style="list-style-type: none"> - Multi-annual nature conservation budget - Structural budget for nature-inclusive projects. - % of funding from the private sector.
	Explore and register public financing opportunities for nature	DEACI, DBB, Kingdom of the Netherlands, EU, CBD, MinTINO	Ongoing	
	Research on the (economic) valuation of ecosystem services and an economic valuation of the losses due to nature degradation to support decision-making	DNM, DEACI, ATA, UoA and consultants, MinTINO	2026	
	Explore the possibility of directing the income of the Environmental Tax directly to nature positive projects	MinTINO, DF	2027	

Appendix 2. Legal and institutional context for nature

Table 9 Sectorial and Cross-sectorial Integration/Mainstreaming of Biodiversity Considerations

National and Sectorial Policies and Plans	Institutional Arrangements	Legislation	International Treaties/Conventions
Structuurnota Natuur en Landschap (1996)	Public Works Department (1939 - present)	Natuurbeschermingsverordening (1995)	UN Convention on Biological Diversity (CBD) (1992)
Ondernemend afvalverwerkend: het eerste integraal afvalstoffenplan (1996)	Directorate of Public Housing, Physical Development and Environment (DVRM, 1992 - 2001)	Landsbesluit Parke Nacional Arikok (2000)	Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971)
Project dossier Parke Nacional Arikok (2000)	Directorate Infrastructure and Planning (DIP) (2004 - present)	Landsbesluit Verbod Onderwaterjachtmiddelen (2001)	Convention on International Trade in Endangered Species (CITES) (1973)
Duurzame Economische Ontwikkeling Plan 2001-2004	Directorate of Nature and Environment (DNM, 2012 - present)	Landsbesluit aanwijzing Spaans Lagoen-gebied als natuureservaat (2017)	Convention for the Protection and Development of the Marine Environment of the Wider Caribbean; Protocol Concerning cooperation in Combating Oils Pills in the Wider Caribbean (1983)
Aruba: Op weg naar een duurzame ontwikkeling; middels een op Agenda 21 gebaseerd milieubeleid (2003)	Department of Animal Agriculture, Husbandry, and Fisheries (1976)	Landsbesluit bescherming inheemse flora en fauna (2017)	Protocol on Specially Protected Areas and Wildlife (SPA) (1990)
Duurzame Economische Ontwikkeling Plan 2005-2009	Veterinary Services (1986)	Landsbesluit Parke Marino Aruba (2018)	International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1992)
Ruimtelijk Ontwikkelingsplan (ROP) (2009)	Fundacion Parke Nacional Arikok (2000-2017)	Landsbesluit nieuwe aanwijzing domeingronden als natuureservaat (2020)	International Convention on Civil Liability for Oil Pollution Damage (1969)
Onze Natuur & Ons Milieu, op weg naar een evenwichtige toekomst; Natuur- en Milieubeleidsnota 2018-2021 (2018)	Fundacion Parke Nacional Aruba (2017-2024)	Landsverordening Ruimtelijke Ontwikkeling (2006)	
Ruimtelijk Ontwikkelingsplan (ROP) (2019)	Aruba Conservation Foundation (2024 - present)	Ruimtelijk Ontwikkelingsplan met voorschriften (ROPV) (2021)	

Table 9 Sectorial and Cross-sectorial Integration/Mainstreaming of Biodiversity Considerations

Building with Nature policy (2019)	Commissie Flora en Fauna	Landsverordening Milieu schadelijke Producten (2019)	
National Education Policy (2019)	Sustainable Development Commissie (2017 – present)	Hinderverordening (1988)	
National Strategic Plan (NSP) Sustainable Development Goals 2020 – 2022		Hinderbesluit (1995)	
Nationaal Actieplan 2023 – 2025: Aruba's Transitie naar een Duurzaam en Inclusief Economisch Model. Ministerie Economische Zaken. (2023).		Algemene Politieverordening (1998)	
Inrichtingsvoorwaarden voor Afvalverwerkingsbedrijven (2023)		Landsverordening Voorkoming van Verontreiniging door Schepen (1993)	
Aruba Standard Operating Procedures for detecting, assessing, and responding to coral disease outbreaks (2023)		Landsverordening Openbare Wateren en Stranden (1987)	
Inrichtingsvoorwaarden voor het Behandelen van Stedelijk Afvalwater (2023)		Landsbesluit Openbare Wateren en Stranden (1987)	
Standaard operationele procedures voor onderhoud en verzorging van mangroves (2023)		Landsverordening Schadefonds Olie tankschepen (2005)	
		Landsverordening Aansprakelijkheid Olie tankschepen (2005)	

Appendix 3. Build with Nature

Bijlage B. Build with Nature concept uitgewerkt voor urbanisatie

<p>Bouwen</p> <p>Natuurgebied & Natuur en Landschap:</p> <p>a. De maximale goothoogte bedraagt 3 m;</p> <p>b. De maximale bouwhoogte bedraagt 6 m;</p> <p>c. Het maximale oppervlakte per gebouw bedraagt 50 m².</p> <p>Stranden, Marine park Overig Kustwater:</p> <p>Het is niet toegestaan bouwen, werken, bouwen, geen gebouwen, pieren en steigers te bouwen.</p>	<p>Bouwen</p> <p>a. Het aantal woningen per ha voor de gehele bestemming mag niet meer dan 6 bedragen;</p> <p>b. De woning moet aansluiten op bestaande infra- en bebouwingsstructuur;</p> <p>c. De situering van de woning moet aansluiten op de karakteristiek van het landelijk gebied;</p> <p>d. De maximale goothoogte bedraagt 3,5 m;</p> <p>e. De maximale bouwhoogte bedraagt 6 m;</p> <p>f. De minimale afstand ten opzichte van de weg bedraagt 10 m;</p> <p>g. De minimale afstand ten opzichte van achterste en zijdelingse erfgronden bedraagt 5 m.</p>
<p>Herbeplanting/compensatie</p> <p>Natuurlijke aanwas van inheemse flora, exotische soorten worden actief bestreden.</p> <p>Het is niet toegestaan te beplanten.</p>	<p>Herbeplanting/compensatie</p> <p>Natuurlijke aanwas van inheemse flora te planten, invasieve soorten worden actief bestreden.</p>
<p>Luchtkwaliteit</p> <p>AQI = 0 - 50</p>	<p>Luchtkwaliteit</p> <p>AQI = 0 - 100</p> <p>Luchtkwaliteit</p> <p>AQI = 0 - 151</p>
<p>Maximumsnelheid</p> <p>Terrestrisch/Maritiem</p> <p>15 km/u en 15 km/u</p>	<p>Maximumsnelheid/ Maritiem</p> <p>25 km/u en 40 km/u</p>
<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt: 65 db(A).</p>	<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt: 70 db(A).</p>
<p>Natuur en Landschap</p> <p>Strand</p> <p>Marine park</p> <p>Overig kustwater</p>	<p>Landelijk gebied</p>
<p>Bouwen</p> <p>Zie voorschriften ROPV</p>	<p>Bouwen</p> <p>Verticaal bouwen met verticale groenvoorzieningen om ruimte te sparen</p>
<p>Bouwen</p> <p>Verduurzamen of hergebruik van leegstaande gebouwen en landgoed</p>	<p>Bouwen</p> <p>Verduurzamen of hergebruik van leegstaande gebouwen en landgoed</p>
<p>Maximumsnelheid/ Maritiem</p> <p>40 km/u en 60 km/u</p>	<p>Maximumsnelheid/ Maritiem</p> <p>60 km/u en 100 km/u</p>
<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt 80 db(A).</p>	<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt 80 db(A).</p>
<p>Woongebied met waarden</p> <p>Havenfront Oranjestad</p> <p>Toeristisch gebied westkust</p> <p>Toeristische zone oostkust</p>	<p>Industriegebied</p> <p>Luchthaven</p> <p>Bedrijventerrein Barradera</p> <p>Bedrijventerrein San Nicolas</p>
<p>Herbeplanting/compensatie</p> <p>VER systeem</p>	<p>Herbeplanting/compensatie</p> <p>VER systeem</p>
<p>Maximumsnelheid/ Maritiem</p> <p>60 km/u en 100 km/u</p>	<p>Maximumsnelheid/ Maritiem</p> <p>60 km/u en 100 km/u</p>
<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt 80 db(A).</p>	<p>Geluidsniveau</p> <p>De maximale geluidsniveau bedraagt 80 db(A).</p>
<p>Stedelijk woongebied</p> <p>Centrumgebied Oranjestad</p> <p>Centrumgebied San Nicolas</p> <p>Transformatiegebied</p> <p>Oranjestad</p>	<p>Infrastructuur</p> <p>Hoofdwegen</p>

Appendix 4. Abbreviations

A	AAA	Aruba Airport Authority
	ABC	Aruba Birdlife Conservation
	ACF	Aruba Conservation Foundation
	ADIAA	Association of Engineers and Architects of Aruba
	AHATA	Aruba Hotel and Tourism Association
	ATA	Aruba Tourism Authority
	ATIA	Aruba Trade Industry Association
	ATV	All-Terrain Vehicles
B	BCI	Bureau of City Inspectors
C	CARMABI	Caribbean Research and Management of Biodiversity
	CAS	Climate Adaptation Services
	CBD	Convention on Biological Diversity
	CES	Cultural Ecosystem Services
	CITES	Convention on International Trade in Endangered Species
	ComF&F	Committee on protected flora and fauna
	CORVI	Climate & Ocean Risk Vulnerability Index
D	DBB	Department of Foreign Affairs
	DIP	Department of Infrastructure and Planning
	DLVV	Department of Agriculture, Animal Husbandry and Fisheries
	DNM	Department of Nature and Environment
	DO	Department of Education
	DOW	Public Works Department
	DRH	Department of Human Resources
	DVG	Department of Public Health

	DVROM	Department of Public Housing, Spatial Development and Environment
	DWJZ	Department of Legislation and Legal Affairs
E	EIA	Environment Impact Assessment
	EU	European Union
F	FPNA	Aruba National Park Foundation
G	GDP	Gross Domestic Product
	GO	Governmental Organization
I	IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
	IPCC	Intergovernmental Panel on Climate Change
	IUCN	International Union for Conservation of Nature
K	KPA	Aruba Police Force
L	LNV	Ministry of Agriculture, Nature and Food Quality
M	MACS	Multi-Annual Corporate Strategy
	MinTINO	Minister of Transport, Integrity, Nature and Elderly Affairs
N	NAP	National Action Plan
	NBSAP	National Biodiversity Strategic and Action Plan
	NCRC	National Climate Resilience Council
	NGO	Non-Governmental Organization
	NOAA	National Oceanic and Atmospheric Administration
	NSP	National Strategic Plan
O	ORD	Off-road driving
R	RIS	Ramsar Information Sheet
	ROPV	Physical Development Plan with Specification

R	RvA	Council of Advice
	SDGC	Sustainable Development Goals Council
S	SDG	Sustainable Development Goals
	SPA	Protocol on Specially Protected Areas and Wildlife
T	Taskforce FOG	Taskforce Fat, Oil and Grease
	TEEB	The Economics of Ecosystems and Biodiversity
	TG	TwynstraGudde
U	UF	United Farmers
	UoA	University of Aruba
	US\$	United States Dollars
	UTV	Utility Terrain Vehicles
W	WUR	Wageningen University and Research Center
	WWTF	Wastewater Treatment Facility

Appendix 5. Reference list

Antilliaans Dagblad, March 8th, 2024.

<https://antilliaansdagblad.com/aruba/29146-een-toeristenkamer-per-vier-inwoners>

Aruba Tourism Authority. (2023). Monthly report

Building Resilience in Aruba's Food Security During the Pandemic and Beyond. (2020). The World Bank. Source: https://www.deaci.aw/wp-content/uploads/2021/01/Building-Resilience-in-Arubas-Food-Security-During-the-Pandemic-and-Beyond_11.pdf.

De León, R., K. Vane, P. Bertuol, V. C. Chamberland, F. Simal, E. Imms, and M. J. Vermeij. (2013). Effectiveness of lionfish removal efforts in the southern Caribbean. *Endangered Species Research* 22:175-182.

Fundacion Parke Nacional Aruba. (2020). Environmental Impact Report for Off Road Driving (ORD) in Parke Nacional Arikok. Fundacion Parke Nacional Aruba (FPNA), San Fuego 70, Aruba.

Government of Aruba. (2019). [Build_with_Nature.pdf \(dip.aw\)](#).

Government of Aruba. (2019). Nationaal Onderwijsplan <https://www.ea.aw/pages/wp-content/uploads/p/PEN-2030-v201907.pdf>

Government of Aruba. (2020). National Strategic Plan (NSP) Sustainable Development Goals 2020 – 2022. Source: <https://www.deaci.aw/wp-content/uploads/2020/11/FINAL-NSP-REPORT-STRATEGY-10202020.pdf>

Government of Aruba. (2021). [Master-Plan-Repositioning-Our-Sails.pdf \(deugdelijkbestuuraruba.org\)](#).

Government of Aruba. (2023). https://cuatro.sim-cdn.nl/arubaoverheid2858bd/uploads/eng-v1-def-national-actionplan-sci-2023-2025_2.pdf https://cuatro.sim-cdn.nl/arubaoverheid2858bd/uploads/eng-v1-def-national-actionplan-sci-2023-2025_2.pdf

IPBES. No date. Description of Enabling Conditions. Retrieved from: [IPBES Home page | IPBES secretariat](#)

Jurgens S.S., Mijts E. and Van Rompaey A. (2024). Are there limits to growth of tourism on the Caribbean islands? Case-study Aruba. *Front. Sustain. Tour.* 3:1292383. doi: 10.3389/frsut.2024.1292383

Konijnendijk, C. (2021). The 3-30-300 Rule for Urban Forestry and Greening Cities. Biophilic cities journal.

Ministry of Economic Affairs. (2019). Investment Strategy Aruba 2019 – 2024.

Ministry of Economic Affairs. (2023). Nationaal Actieplan 2023 – 2025: Aruba's Transitie naar een Duurzaam en Inclusief Economisch Model.

NOAA. What is coral bleaching?

https://oceanservice.noaa.gov/facts/coral_bleach.html

accessed on 20/06/2024.

Pachauri, R., and A. Reisinger. (2007). IPCC fourth assessment report. IPCC, Geneva:2007.

Palacios E., van Beukering P.P.J.H., van Zanten B., Lacle F., Schep S., Soellner I. (2021). Linking ecosystem services and the Sustainable Development Goals in Small Island Developing States: the case of Aruba. One Ecosystem 6: e71033.

<https://doi.org/10.3897/oneeco.6.e71033>

Polaszek T., Lacle F., van Beukering P., Wolfs E. (2018). The Economics of Ecosystems and Biodiversity, Aruba.

Perry, C. T., Kench, P. S., O'Leary, M. J., Morgan, K. M., & Januchowski-Hartley, F. (2015). Linking reef ecology to island building: Parrotfish identified as major producers of island-building sediment in the Maldives. *Geology*, 43(6), 503-506.

Rugel, E. J. (2019). Connecting natural space exposure to mental health outcomes across Vancouver, Canada (T). University of British Columbia.

Retrieved from

<https://open.library.ubc.ca/collections/ubctheses/24/items/1.0377727>

Royal Haskoning DHV. (2022). Masterplan wastewater Aruba, Fact Finding & Upgrade STP Bubali.

Sanders, M.E., Henkens R.J.H.G. & Slijkerman D.M.E. (2019). Verdrag inzake biologische diversiteit; Zesde nationaal rapport van het Koninkrijk der Nederlanden. Wettelijke Onderzoekstaken Natuur & Milieu.

Stakeholder consultations (online feedback round lasting for at least 2 weeks), May 24th – June 8th, 2024.

Stakeholder consultations (physical meetings), April 15th-17th 2024. Cocolishi, Lloyd G. Smith Blvd 76, Oranjestad, Aruba.

Stolte J.J., van Kammen A.J., Deekens A.H. (2017). Palm Beach Aruba Sludge investigation.

Taylor M. A., Clarke L.A., Centella A., Bezanilla A., Stephenson T.S., Jones J.J., Campbell J.D., Vichot A., and Charlery, J. (2018). Future Caribbean climates in a world of rising temperatures: the 1.5 vs 2.0 dilemma. *Journal of Climate* 31:2907-2926.

Valuing Benefits of Mangroves and Coral Reefs in the Caribbean. (2019). Resilient Islands
https://media.coastalresilience.org/Resilient_Islands/BenefitsOfMangrovesAndCorals_TechReport.pdf.

Van Halewijn, R., Higler, L. W. G., & Spaans, A. L. (1992). Ecologisch onderzoek Bubali-plas, Aruba. (RIN - rapport; No. 92/30). IBN-DLO.
<https://edepot.wur.nl/384655>

Van Zanten B., Laclé F., van Duren S., Soberón V., van Beukering P. (2018). The Value Natural Capital for the Tourism Industry of Aruba. TEEB Aruba.

Vermeij M., Marhaver K., Estep A. and Sandin S. (2019). Coral reefs baseline study for Aruba.

Versteeg A. and Ruiz A. (1995) Reconstructing Brasil wood Island: The archaeology and landscape of Indian Aruba, Archaeological Museum Aruba

Verweij P., Cormont A., de Rooij B., Walters L.J., Kramer H. (2023). Draft Exploring images of a future Aruba, A positive future for people and nature.

Wolfs E., Laclé F., Bubalo M., van Beukering P., Pols R. (2017). Cultural Ecosystem Services (CES) for Local Community in Aruba.

Wolfs E., Laclé F., Bubalo M., van Beukering P., Pols R. (2017/18). The Economics of Ecosystems and Biodiversity (TEEB), Aruba.