

Aruba's Marine Environment: A Scientific Overview to Support Marine Protection

Prepared by Blue Marine Foundation

On behalf of

Aruba Directorate of Nature and Environment

October 2026



Acknowledgements

This report was developed through collaboration with national, regional, and international partners. We thank all those who contributed their time, expertise, and data. We are particularly grateful to the Aruba Conservation Foundation and the Aruba Directorate of Nature and Environment for their guidance and support throughout the development of this report. We also acknowledge the contributions of the Aruba Marine Mammal Foundation, the Caribbean Cetacean Society, Terra Mare, and Turtugaruba, whose work and shared knowledge have informed this assessment.

Executive summary

Aruba's marine environment, located within the South Caribbean ecoregion, includes a diverse range of interconnected habitats, including coral reefs, seagrass meadows, lagoons, inland bays and open ocean. These waters support numerous vulnerable and endangered marine species, including oceanic whitetip and great hammerhead sharks, whale sharks, sperm and humpback whales, green and hawksbill turtles, Nassau groupers and black-capped petrels. Together, these ecosystems and associated megafauna provide a wide range of ecological and cultural services, including carbon sequestration, coastal protection, nutrient cycling, and essential nursery and spawning habitats. Marine megafauna are key indicators of climate and ecosystem change (Sequeira et al., 2025), while also supporting ecotourism, education, and cultural connection.

Aruba's waters are shaped by a distinctive oceanographic setting, with nutrient-rich waters from the southern Caribbean upwelling system supporting important feeding, breeding and migratory routes for a wide range of marine species. These conditions contribute to the ecological importance of Aruba within the wider southern Caribbean.

In 2018, Aruba's natural capital value for tourism, culture, fishing and carbon was reported to exceed US\$ 287.3 million per year (TEEB Aruba, 2018); when adjusted for inflation, this estimate is closer to US\$ 340 million in 2026. Degradation of the marine environment could halve Aruba's welfare (TEEB Aruba, 2018). It is therefore essential that these ecological and cultural values are safeguarded for the future.

Aruba has committed to meeting the Kunming-Montreal Global Biodiversity Framework target of protecting at least 30% of its land, freshwater and marine environments by 2030 – the '30x30 target'. The Government of Aruba has already taken important steps to protect its nearshore waters through the establishment of four coastal marine protected areas (MPAs), which together protect 0.24% of Aruba's marine area. Achieving the 30x30 target will require marine protection to be expanded across the nearshore area and into Aruba's offshore waters.

Effective protection of Aruba's marine environment would help secure the future of one of the island's most valuable natural assets. Highly protected, offshore MPAs could play a central role in safeguarding Aruba's exceptional marine biodiversity while maintaining the ecological functions that underpin tourism, culture, fisheries and climate resilience.

MPAs can increase fish abundance, support larger fish sizes and enhance biodiversity both within protected areas and in surrounding waters through spillover effects, whereby protected populations

replenish those beyond MPA boundaries (Grorud-Colvert et al., 2021; Sala & Giakoumi, 2018). These ecological gains are associated with socioeconomic benefits, including healthier fisheries and increased tourism (Baker et al., 2023). Evidence indicates that highly and fully protected MPAs are most effective at restoring ecosystems and maintaining associated ecosystem services.

Purpose and scope of report

In partnership with the Aruba Conservation Foundation (ACF) and the Aruba Directorate of Nature and Environment (DNM), Blue Marine Foundation has prepared this report to provide a scientific overview of Aruba's marine environment, including both nearshore and offshore ecosystems within the island's 25,267.81 km² Exclusive Economic Zone (EEZ). The report synthesises the best available scientific information on marine habitats, biodiversity, ecosystem functions and human pressures to support marine spatial planning and marine conservation efforts.

The primary purpose of this assessment is to inform the identification and establishment of Marine Protected Areas (MPAs) as part of Aruba's commitment to conserving 30% of its marine environment by 2030 ("30x30"). Available ecological data have been used to identify ecologically significant areas and conservation priorities that may warrant enhanced protection or management. Particular attention has been given to species of conservation, ecological and economic importance, including those protected under national legislation and international agreements.

Through a desk-based review of published literature, monitoring programmes and existing datasets, the report identifies areas that are important for key species and habitats across Aruba's marine environment. These include feeding grounds, breeding and nesting sites, nursery habitats, migration corridors and areas supporting rare or vulnerable ecosystems. It should be noted that significant knowledge gaps remain, particularly in offshore and deepwater environments, where scientific surveys have been limited. As a result, the areas identified in this report should be considered as an initial evidence base that can be refined as additional information becomes available.

Between February and March 2026, DNM, ACF and Blue Marine held stakeholder meetings with representatives of government departments, non-governmental organisations, community groups and marine industries. These discussions formed the first stage of consultation supporting Aruba's 30x30 commitment and provided insights into marine resource use, environmental pressures and management challenges, particularly in coastal and nearshore areas. Although many observations were anecdotal and fall outside the scientific scope of this report, they provide context for subsequent marine spatial planning, further consultation, and the design and implementation of future MPAs.

Contents

Acknowledgements	2
Executive summary.....	2
Purpose and scope of report	3
Reference maps	6
Tables.....	9
Figures.....	9
Acronyms and abbreviations	10
1. Introduction	12
1.1 The role of MPAs	13
2. Country profile	14
2.1 Location and geography.....	14
2.2 Exclusive Economic Zone	15
2.3 Oceanographic features.....	16
2.4 Climate.....	18
2.4.1 Climate change resilience.....	18
2.5 Socio-economic features.....	20
2.5.1 Tourism and recreation	20
2.5.2 Fishing	21
2.5.3 Infrastructure (including offshore renewables).....	22
2.6 Environmental degradation	23
3. Policy frameworks.....	24
3.1 International and regional governance.....	24
3.2 National legislation and policy for marine environmental protection.....	26
3.2.1 Legislation	26
3.2.2 National policy	27
3.3 Current marine protection in Aruba.....	28
3.3.1 Offshore.....	29
3.3.2 Nearshore	29
4. Existing natural and ecological values: Habitats	34
4.1 Offshore habitats.....	35

4.1.1 Mesophotic reefs.....	35
4.1.2 Benthic habitats	36
4.1.3 Pelagic habitats	37
4.2 Nearshore habitats	37
4.2.1 Coral reefs	38
4.2.2 Seagrass meadows.....	40
4.2.3 Mangroves	42
5. Existing natural and ecological values: Species	44
5.1 Summary of nationally protected marine species in Aruba.....	44
5.2 Elasmobranchs	46
5.3 Cetaceans	49
5.4 Turtles.....	54
5.5 Reef and commercially important fish.....	58
5.6 Invertebrates	63
5.7 Seabirds	67
6. Conclusion	72
7. References.....	74

Reference maps

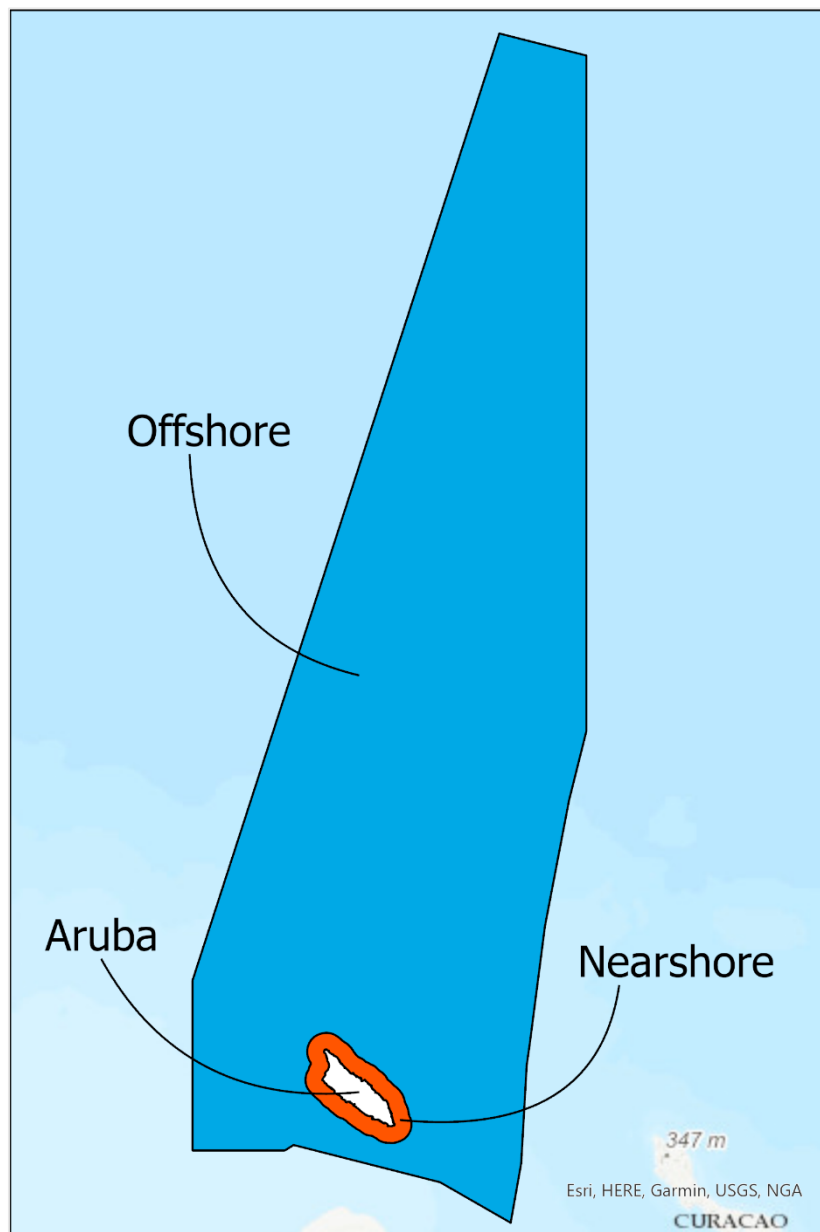


Figure 1: Aruba's Exclusive Economic Zone (EEZ), with a simple delineation of offshore waters (beyond 5 km from the coastline) and nearshore waters (from the coastline to 5 km offshore).

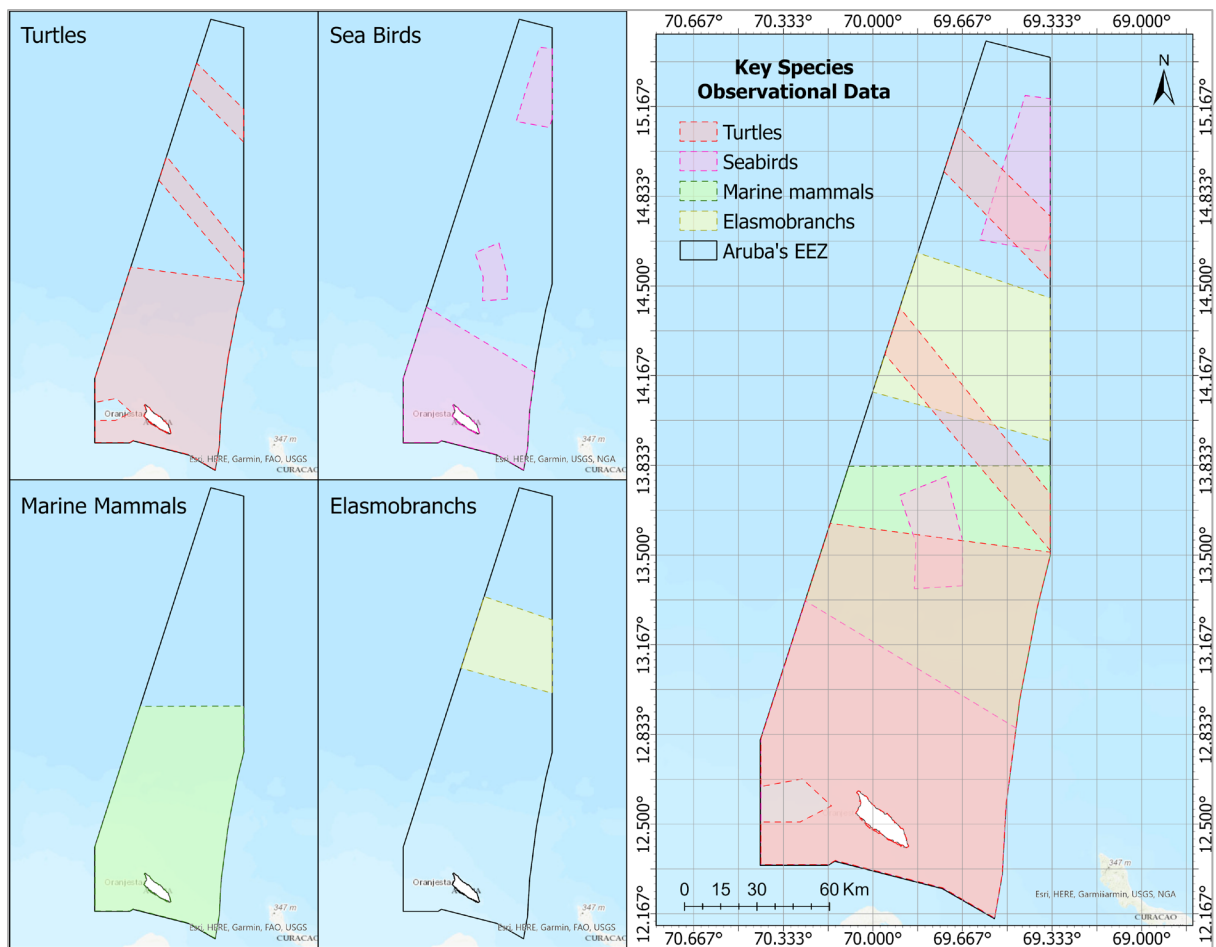


Figure 2: Synthesis of observational data of key species groups within Aruba's EEZ: 1) turtles; 2) seabirds; 3) marine mammals; 4) elasmobranchs. Areas shown represent locations where species have been recorded in published scientific literature and monitoring datasets. However, data gaps do remain in some deep water and offshore areas.

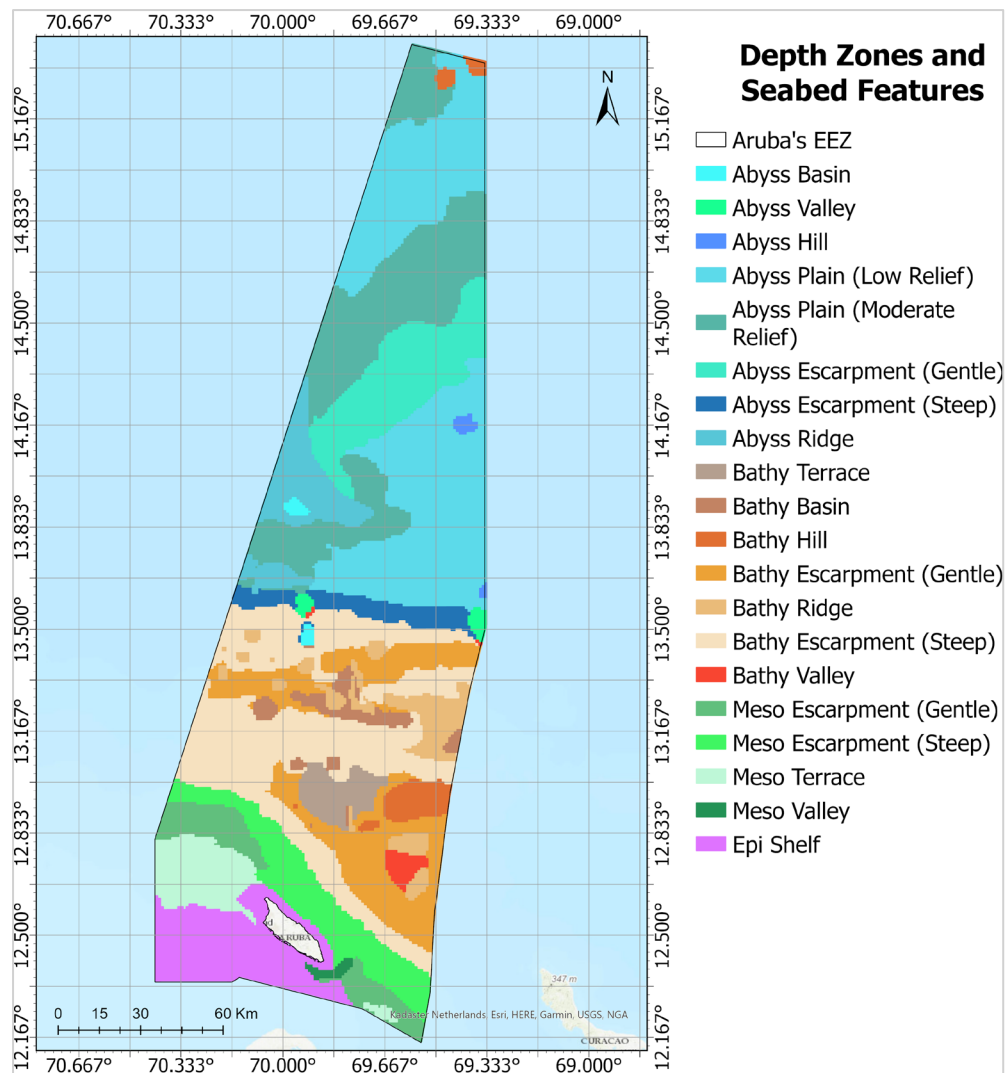


Figure 3: Depth zones and seabed features of Aruba's EEZ.

Figure 3 explanation: A detailed analysis of bathymetry data was used to map and classify the Aruba EEZ into depth zones and seabed topographic features, producing a habitat map of the seafloor.

The classification of seabed topography within Aruba's EEZ was based on open-access bathymetric GIS data from the General Bathymetric Chart of the Oceans (GEBCO). A digital elevation model (DEM) was extracted for the seabed within the EEZ. A regular 1×1 km polygon grid, comprising 25,387 polygons, was created, and clipped to the EEZ boundary, and the average depth and slope were calculated for each polygon. The average depth was used to assign each polygon to one of four depth zones; the depth classifications used are Epibenthic (0–200 m), Mesobenthic (200–1,000 m), Bathybenthic (1,000–4,000 m) and Abyssobenthic (4,000–6,000 m).

Seafloor topographic features were identified using a combination of GIS tools and manual assessment. Expansive seabed areas, including shelves, terraces and escarpments, were classified using the depth zone and slope class calculated for each polygon. Raised features, including hills and ridges, were identified using landform-element classification and depth contours extracted from the DEM, while other seabed-mapping tools were used to identify depressed features such as valleys and basins. All topographic features were checked manually against the DEM (viewed in 3D) and depth contours, to produce a GIS map in which each 1 km^2 was assigned a depth zone and a seabed topographic feature.

Tables

Table 1: Current marine protected area coverage and additional area required to achieve Aruba's 30x30 target.

Table 2: Aruba's Ramsar sites, principal habitats and key biodiversity features.

Table 3: Area of Aruba's EEZ seabed falling within standard depth zones.

Table 4: Key reef-building corals of conservation importance in Aruba.

Table 5: Seagrass species recorded in Aruba's marine environment.

Table 6: Mangrove species recorded in Aruba's marine environment.

Table 7: Marine species and habitats protected under Aruba's Nature Protection Ordinance (Natuurbeschermingsverordening; AB 1995 No. 2).

Table 8a: Elasmobranch species confirmed from Aruba's waters.

Table 8b: Elasmobranch species expected to occur in Aruba's EEZ but not yet confirmed in Aruba-specific records.

Table 9: Cetaceans observed in Aruba's waters.

Table 10: Species of turtles observed in Aruba's waters.

Table 11: Protected and ecologically or commercially important bony fish (Osteichthyes) species recorded in Aruba's marine waters.

Table 12: Key marine invertebrate species of conservation, fisheries and ecological importance in Aruba.

Table 13: Seabirds recorded in Aruba's marine and coastal environment.

Figures

Figure 1: Aruba's Exclusive Economic Zone (EEZ), with a simple delineation of offshore waters (beyond 5 km from the coastline) and nearshore waters (from the coastline to 5 km offshore).

Figure 2: Synthesis of observational data of key species groups within Aruba's EEZ: 1) turtles; 2) seabirds; 3) marine mammals; 4) elasmobranchs.

Figure 3: Depth zones and seabed features of Aruba's EEZ.

Figure 4: Impact and effectiveness of MPAs.

Figure 5: Maritime boundaries of Aruba, Curaçao and Bonaire.

Figure 6: Maritime limits and boundaries of the Kingdom of the Netherlands (depth in metres).

Figure 7: Bathymetry, main currents, and ecosystems of the Caribbean Sea.

Figure 8: Overall Climate Vulnerability of the fisheries sector in 33 Caribbean countries or territories.

Figure 9: Contract area for oil and gas exploration between CAP and AOGX.

Figure 10: Aruba's four current coastal MPAs, designated in 2018 and managed by Aruba Conservation Foundation.

Figure 11: Aruba's five Ramsar sites, covering 14,408 hectares in total.

Figure 12: A 3D view of the seabed, showing biozones based on seabed depth within Aruba's EEZ.

Figure 13: Marine ecosystem services.

Figure 14: Spatial distribution of calf stranding records.

Figure 15: Turtle nesting sites across Aruba.

Figure 16: Sea turtle migratory routes across the Caribbean Sea.

Figure 17: Maps of CCS sightings of seabird families recorded during Expedition 7 of 2024 across the ABC Islands: A) booby sightings; B) tern sightings; C) noddy sightings; and D) other sightings.

Figure 18: Plots of all records found of Black-capped Petrels in the Caribbean Sea by numbers per sighting.

Acronyms and abbreviations

ABC Islands: Aruba, Bonaire, Curaçao

ACF: Aruba Conservation Foundation

CARICOMP: Caribbean Coastal Marine Productivity Program

CBD: Convention on Biological Diversity

CCS: Caribbean Cetacean Society

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

CMS: Convention on Migratory Species

CPUE: Catch per Unit Effort

CSW: Caribbean Surface Water

DCNA: Dutch Caribbean Nature Alliance

DNM: Directie Natuur en Milieu

EEZ: Exclusive Economic Zone

FAD: Fish Aggregating Device

GBF: Global Biodiversity Framework

KBA: Key Biodiversity Areas

IBA: Important Bird Areas

IPCC: the Intergovernmental Panel on Climate Change

ITCZ: Inter-Tropical Convergence Zone

IUCN: International Union for the Conservation of Nature

IUU: Illegal, Unreported and Unregulated Fishing

LDC: Leeward Dutch Caribbean

MCE: Mesophotic coral ecosystem

MPA: Marine Protected Area

NBSAP: National Biodiversity Strategy and Action Plan

SRZ: Sensitive Resource Zone

SUW: Subtropical Under-Water

WCR: Wider Caribbean Region

1. Introduction

The purpose of this report is to provide a scientific overview of Aruba's marine environment, including its habitats and the species found within the 25,267.81 km² Exclusive Economic Zone (EEZ). For the purposes of this report, the EEZ is considered to encompass the full extent of Aruba's marine area, from the coastline to the outer EEZ boundary. Aruba's territorial waters extend from the coastline to 12 nautical miles (nm) offshore and form part of this wider EEZ.

The evidence presented will inform the establishment of marine protected areas (MPAs) across both Aruba's territorial waters and the wider EEZ. This document also supports the Government of Aruba's commitments under the Kunming–Montreal Global Biodiversity Framework, specifically Target 3, which calls for the protection of 30% of land, sea and freshwater by 2030 (the '30x30' target). For the purposes of this report, 'offshore' refers to marine areas beyond existing coastal MPAs within the Aruban EEZ (approximately 2–370 km from shore).

Aruba's marine environment harbours a rich array of habitats, from coral reefs and seagrass meadows to lagoons, inland bays and the open ocean. These ecosystems support many vulnerable and endangered marine species, including oceanic whitetip and great hammerhead sharks, whale sharks, sperm whales, green and hawksbill turtles, Nassau groupers and black-capped petrels. Aruba's waters are shaped by a distinctive oceanographic setting, with nutrient-rich waters from the southern Caribbean upwelling system supporting important feeding, breeding and migratory routes. Aruba is also thought to lie within a key biodiversity hotspot alongside Bonaire and Curaçao (Debrot et al., 2025).

Effective protection of Aruba's marine environment would help secure the future of one of the island's most valuable natural assets. Offshore MPAs could play a central role in safeguarding Aruba's exceptional marine biodiversity while maintaining the ecological functions that underpin tourism, culture, fisheries and climate resilience. Aruba's natural capital value for tourism, culture, fishing and carbon was estimated at more than US\$ 287.3 million per year in 2018 (TEEB Aruba, 2018); adjusted for inflation, this is equivalent to approximately US\$ 340 million in 2026.

Healthy marine ecosystems are fundamentally important to the continued viability and success of tourism in the Caribbean region as well as local livelihoods, food security and climate resilience. The attraction of the Caribbean for tourists is deeply rooted in its pristine marine environment, characterised by clear waters, beautiful coastlines, vibrant coral reefs, and diverse marine biodiversity. These natural assets underpin popular tourist activities such as snorkelling, diving, and general coastal enjoyment, directly influencing the region's appeal as a premier tourism destination (Caribbean Biodiversity Fund, 2023).

Furthermore, marine ecosystems, particularly coral reefs and mangroves, provide crucial coastal protection against increasingly severe storms and erosion, safeguarding the very infrastructure that supports tourism operations and coastal communities. The degradation of these vital habitats, whether from pollution, physical damage, or the impacts of climate change, directly threatens the economic engine of Caribbean tourism and the unique natural heritage that draws millions of visitors each year. Given the reliance of island economies on tourism, and the dependence of tourism on natural assets, protecting these ecosystems is critical.

1.1 The role of MPAs

MPAs are a vital area-based conservation tool that can help achieve and maintain healthy, resilient ecosystems while also delivering multiple benefits for people. MPAs can operate at different levels of protection, broadly defined as fully, highly, lightly, or minimally protected (Grorud-Colvert et al., 2021). Fully protected MPAs are often described as complete ‘no-take’ and ‘no-anchor’ zones, where all forms of fishing and other destructive activities are prohibited, and where non-extractive human activities are also strictly regulated. This is broadly equivalent to an International Union for Conservation of Nature (IUCN) Category I MPA¹. In contrast, lightly or minimally protected MPAs allow fishing and other activities to continue at a managed intensity, subject to specific restrictions; these areas may align with the objectives of IUCN Category VI protected areas in some circumstances (Blue Marine Foundation, 2023).

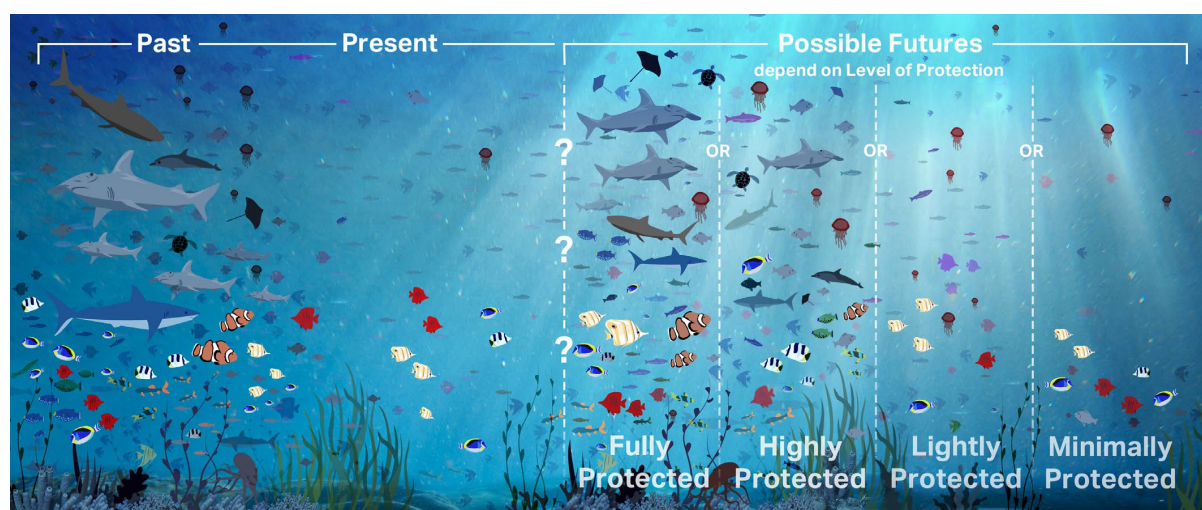


Figure 4: The level of protection, and therefore the effectiveness of MPAs, will greatly influence the future state of the ocean. Source: Grorud-Colvert et al. (2021).

Fully and highly protected MPAs can support the long-term recovery of species, habitats and ecosystem functioning, helping to build resilience (Sala & Giakoumi, 2018). Spillover of adults, eggs and larvae can benefit surrounding fisheries and may contribute to increased catches, income and long-term fishery sustainability (Grorud-Colvert et al., 2021). Protecting blue carbon ecosystems such as mangroves and seagrass can enhance carbon sequestration and safeguard critical carbon stores (Millington-Drake et al., 2025). Highly protected MPAs may also deliver positive social outcomes through community involvement, improved water quality, increased income, and better nutrition and food security (Baker et al., 2023). Tourism can benefit from healthier marine ecosystems and greater abundance of charismatic megafauna.

MPAs with light or minimal protection generally deliver weaker outcomes for species, habitats and communities than fully or highly protected areas. Where extractive pressure remains high, populations and ecosystems may have limited opportunity to recover, potentially altering ecosystem functioning and reducing resilience (Grorud-Colvert et al., 2021).

¹ IUCN (2008). *Guidelines for Applying Protected Area Management Categories*. International Union for Conservation of Nature. Category Ia and Ib define strict nature reserves and wilderness areas with the highest levels of protection.

Well-connected MPA networks, spanning both offshore and nearshore waters, are essential for delivering effective conservation outcomes. Such networks better reflect ecological linkages and species movements across seascapes (FAO, 2022). The ecological connections between habitats underpin the functioning and effectiveness of MPAs and are increasingly recognised as a key component of ecologically coherent networks (Gardner et al., 2024). These linkages should therefore be considered in MPA design and designation. In addition, MPAs that extend across EEZ boundaries can play a vital role in conserving habitats and ecological processes, while also providing safe passage for migratory species. By promoting international, cross-border management, these approaches can strengthen ecological linkages at a broader scale.

Indigenous Peoples and local communities should be fully involved in decision-making processes from the outset of MPA design and designation. Free, prior and informed consent should be obtained, and the benefits of marine conservation should be equitably shared. MPAs should be developed using multi-disciplinary and participatory approaches, integrating local knowledge. All stakeholders should be engaged from the outset, highlighting how MPAs can deliver economic, cultural and social benefits to communities. This is an effective and enduring way of achieving effective protection (Blue Marine, 2023).

In addition, MPA design and placement should adopt a ‘climate-smart’ approach that integrates climate change mitigation, adaptation and resilience to deliver lasting conservation benefits. This includes safeguarding climate-resilient habitats and regions from human disturbance, while also considering adaptive management measures, such as flexible boundaries that can respond to climate-driven shifts in species distributions (Millington-Drake et al., 2025).

2. Country profile

2.1 Location and geography

The Greater Caribbean forms part of the Tropical Northwestern Atlantic Province, and comprises nine distinct ecoregions (Miloslavich, et al., 2010). The autonomous Dutch territory of Aruba is located within the South Caribbean ecoregion (12.5211° N, 69.9683° W), along with its adjacent islands of Curaçao and Bonaire, and the northern coast of Venezuela.

The island of Aruba measures approximately 33 km in length and 8–9 km in width, and is generally flat, barren and riverless; its main topographical features are some rolling volcanic hills, such as Hooiberg and Mount Jamanota which peak at 165 m and 188 m elevation, respectively (Del Nevo, n.d.).

Aruba, Bonaire and Curaçao, commonly referred to as the ABC Islands, form the southern, or Leeward Islands of the Dutch Caribbean; the northern, or Windward islands of the Dutch Caribbean comprise Saba, St. Eustatius and St. Maarten, located across the Caribbean Basin at the northern edge of the Lesser Antilles island chain. Despite being the smallest of the Leeward Dutch Caribbean (LDC) islands (179 km²), Aruba is also the most densely populated, with a population of approximately 108,000 (World Bank, 2024).

2.2 Exclusive Economic Zone

Aruba became a constituent country within the Kingdom of the Netherlands in 1986, with responsibility for managing economic activities within its maritime zone (ACF, 2025a). The outer limits of the EEZ are defined under Kingdom legislation in accordance with the United Nations Convention on the Law of the Sea, extending to 200 nautical miles (370 km) from the coast, or to agreed maritime boundaries where these overlap with neighbouring states (Verhagen & Hirsch Ballin, 2010), covering a total area of 25,267.81 km² (Ministry of Defence of the Netherlands, 2025) (Figures 5 and 6).

Aruba is further distinguished from Bonaire and Curaçao by its geological setting. Unlike the other Leeward Dutch Caribbean (LDC) islands, Aruba is not separated from the Venezuelan mainland by the deepwater Bonaire Basin, but instead forms part of the continental shelf extending northwards from South America. As a result, waters immediately south of Aruba are considerably shallower than those surrounding Bonaire and Curaçao, reaching depths of approximately 190 m compared with more than 1,500 m in the Bonaire Basin (Van Duyl et al., 2024).

Despite its position on the continental shelf, the seabed surrounding Aruba descends rapidly beyond the narrow shelf edge into the deep waters of the Venezuelan Basin. Consequently, much of Aruba's Exclusive Economic Zone (EEZ) encompasses deep pelagic and benthic habitats, with water depths exceeding 3,000 m in offshore areas. This bathymetric profile is broadly comparable to that of many other Caribbean EEZs, where relatively narrow insular shelves transition quickly into deep oceanic environments (Miloslavich et al., 2010).

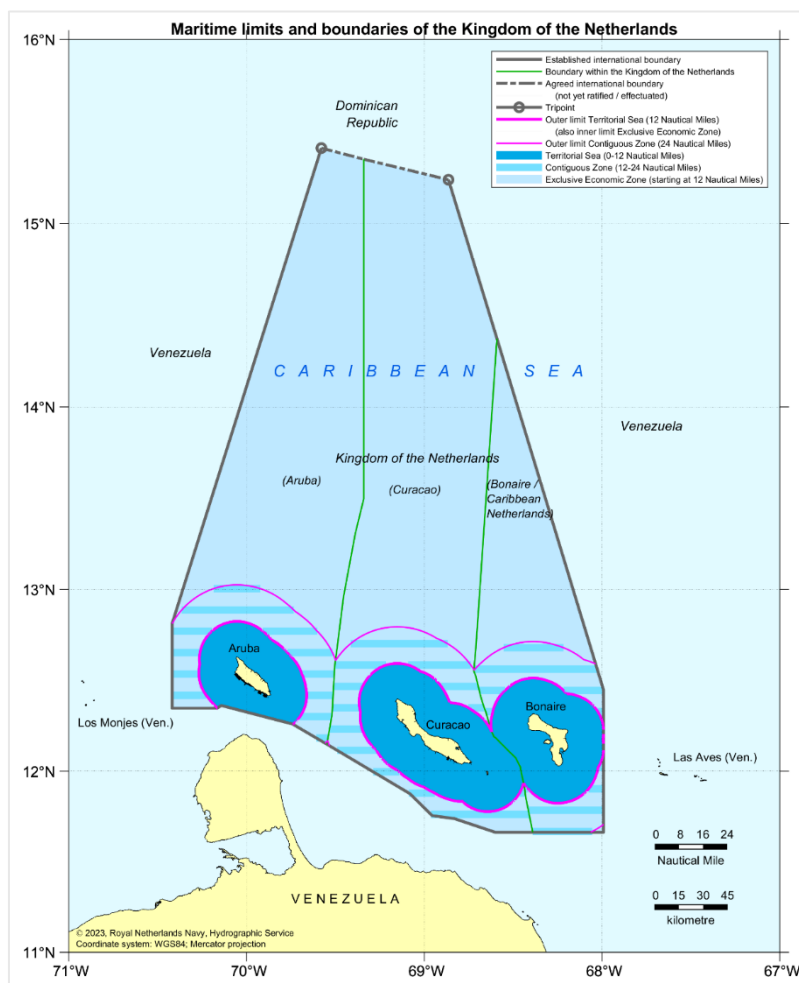


Figure 5: Maritime boundaries of Aruba, Curaçao and Bonaire.
Source: Royal Netherlands Navy, 2023, Hydrographic Service.

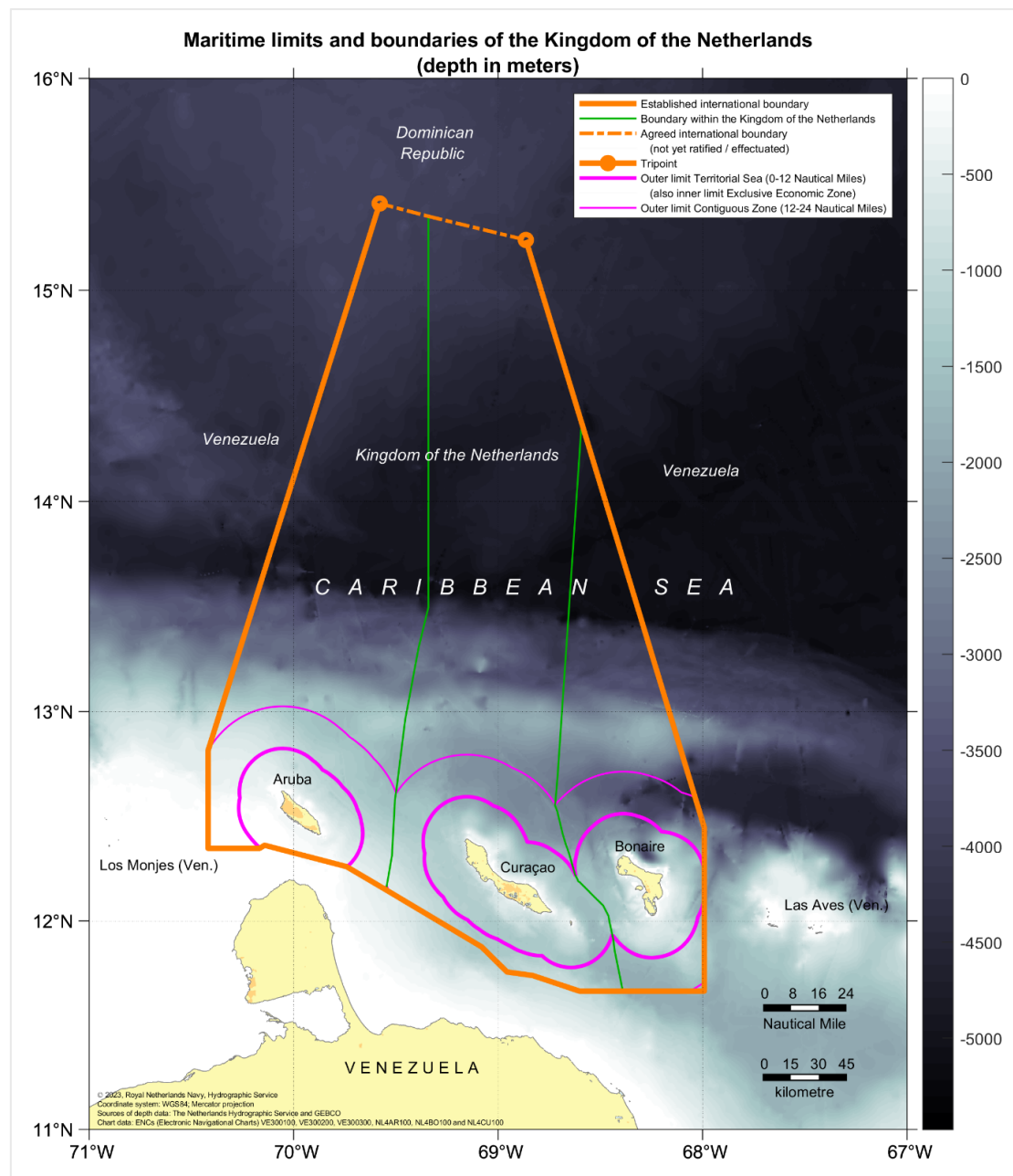


Figure 6: Maritime limits and boundaries of the Kingdom of the Netherlands (depth in metres). Source: Royal Netherlands Navy, 2023, Hydrographic Service.

2.3 Oceanographic features

The presence of trade winds and marine currents within the Venezuelan Basin has a major influence over the biodiversity and species distribution of the region. Northeasterly and southeasterly Atlantic trade winds converge at the equatorial Inter-Tropical Convergence Zone (ITCZ) to form strong easterly winds, which lend themselves to the formation of the Caribbean current travelling westwards along the coast of South America and the Venezuelan Basin (Van Duyl et al., 2024). The Caribbean current consists of three layers, the deepest of which is comprised of cold-water masses originating from the Arctic region, carrying significantly greater nutrient concentrations than that of the upper two layers (Van Duyl et al., 2024).

The strong easterly winds occurring in the Venezuelan Basin drive the South American Upwelling Zone, a phenomenon which sees the upwelling of colder nutrient-rich water to the ocean surface (Figure 7). These waters are subsequently transported downstream towards Aruba and the LDC islands by the Caribbean Current and Ekman transport processes, reflecting broader regional circulation patterns in the southern Caribbean (Debrot et al., 2011; van Duyl et al., 2024).

The upwelling is particularly strong in December to March, with a second, weaker pulse in July. As a result, the LDC islands experience elevated marine productivity relative to much of the wider Caribbean, which supports the biodiversity of offshore ecosystems, including fish, plankton, seabirds and cetaceans (Debrot et al., 2011).

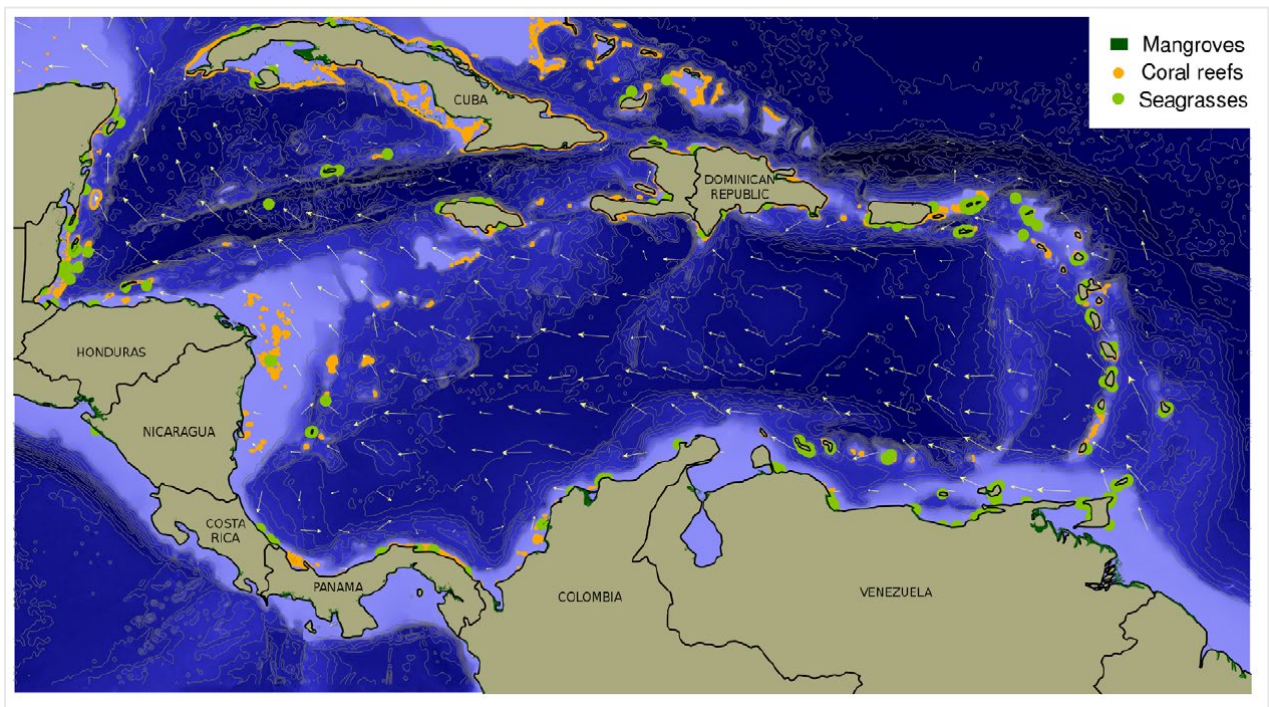


Figure 7: Bathymetry, main currents, and ecosystems of the Caribbean Sea. Lighter blue represents shallower depths, while darker blue indicates deeper bathymetry. Arrows represent average surface ocean currents, derived from the Hybrid Coordinate Ocean Model. Source: Miloslavich et al. (2010).

In addition to the deepest, nutrient-rich layer of the Caribbean Current, the two upper layers also shape Aruba's hydrology. The top layer, Caribbean Surface Water (CSW), is usually about 100 m thick, but around Aruba it extends only to about 80 m deep because of the island's shallower bathymetry. CSW consists of North Atlantic surface water mixed with rainfall and freshwater from South American rivers, mainly the Amazon and Orinoco. This freshwater brings extra nutrients and, together with the South American Upwelling Zone, helps support the high marine productivity of the southern Caribbean (Romero et al., 2000; Debrot et al., 2011).

A halocline (a layer where salinity changes rapidly with depth) has been reported within the Caribbean Surface Water (CSW) at depths of approximately 35–60 m (DCNA, 2018). Beneath the CSW lies the North Atlantic Subtropical Underwater (SUW), a distinct water mass originating in the central tropical Atlantic that typically occurs between about 100 and 175 m depth. The SUW is characterised by higher salinity and elevated nitrate concentrations compared with the overlying surface waters. Within this layer, a pycnocline (a zone of rapid density change) occurs at approximately 120–140 m depth,

reflecting mixing between the SUW and the deeper Western North Atlantic Central Water (Van Duyl et al., 2024).

These oceanographic layers create distinct physical and chemical conditions at different depths, influencing nutrient availability, species distributions, larval transport and the structure of marine communities. They are also important in determining the depth ranges of coral reef ecosystems and other marine habitats around Aruba (Van Duyl et al., 2024).

The Caribbean Current travels through the LDC islands at a steady velocity of 70 cm/s, although higher values of up to 123 cm/s have been reported (Van Duyl et al., 2024). As the Current flows north-westerly into the Yucatan Channel and the Gulf of Mexico, it increases velocity and eventually leaves the Caribbean Basin through the Greater Antilles to form part of the Gulf Stream (Miloslavich et al., 2010).

2.4 Climate

Owing to their proximity, Aruba shares many climatic characteristics with Bonaire and Curaçao. The three islands form part of the South Caribbean dry zone (Potter et al., 2017), characterised by a semi-arid climate, annual rainfall of 400–500 mm and an average temperature of 28°C, in contrast to most other Caribbean islands. These conditions are largely shaped by the near-constant influence of Atlantic trade winds. Along Aruba's leeward south-western coast, shelter from these winds creates calm stretches of sandy beach, whereas the windward north-eastern coast is more exposed and therefore prone to rougher waters and high-energy waves. The northern and southern tips of the island experience moderate swells where these contrasting coastal conditions converge. The LDC islands also lie at the southern edge of the main hurricane belt (Potter et al., 2017), experiencing substantially fewer hurricanes than the Windward Dutch Caribbean islands (Meesters et al., 2010).

2.4.1 Climate change resilience

The latest Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) outlines the following trends for small islands, including the Caribbean region (IPCC, 2021):

- Observed warming (high confidence) will continue in the 21st century for all projected global warming levels and future emissions scenarios, further increasing heat extremes and heat stress (high confidence).
- Marine heatwaves and ocean acidification will increase further with 1.5°C of global warming (high confidence) and with larger increases at 2°C and higher.
- More intense but generally fewer tropical cyclones (medium confidence at a global warming level of 2°C and above).
- Decline in precipitation (high confidence) and increased evapotranspiration² (medium confidence, both of which can lead to changes in salinity patterns).

² Evapotranspiration is the sum of all processes by which water moves from the land surface to the atmosphere via evaporation and transpiration.

- Sea level rise coupled with storm surges and waves will exacerbate coastal inundation and the potential for increased saltwater intrusion into aquifers (high confidence).

These regional trends are reflected in assessments of climate vulnerability across the Caribbean, where Aruba is classified as having high overall climate vulnerability in the fisheries sector (Figure 8). Collectively, these projected changes are expected to increase environmental, social and economic vulnerability across Caribbean small island states, including Aruba.

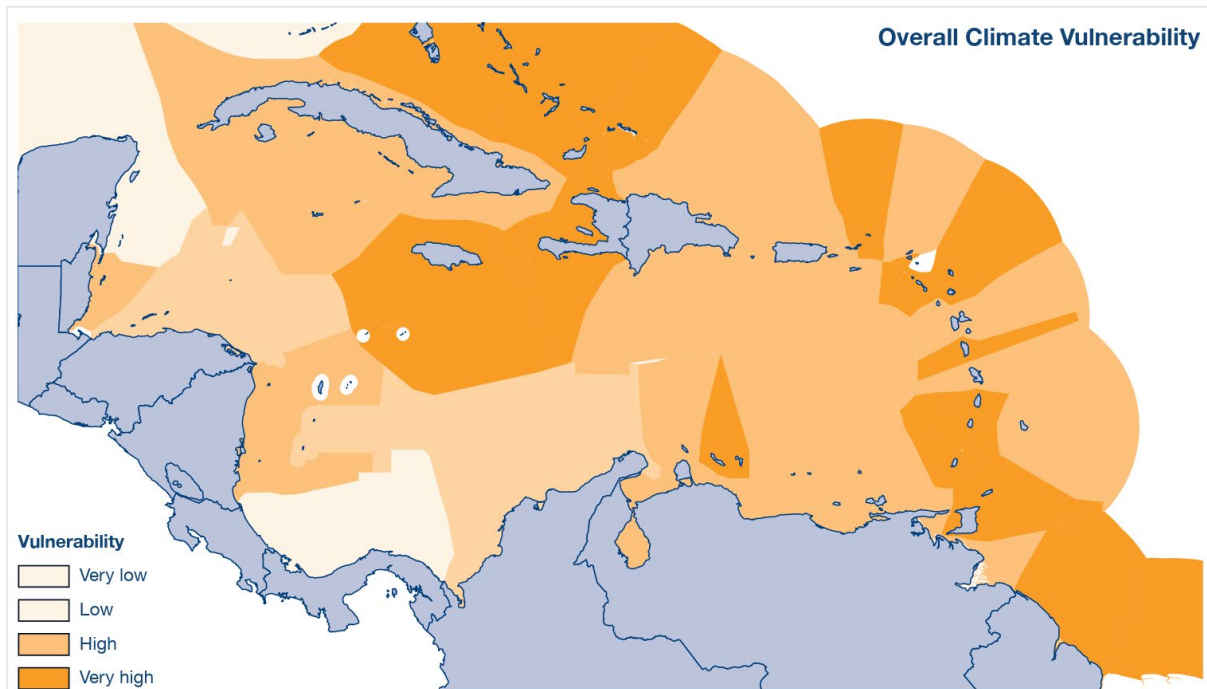


Figure 8: Overall climate vulnerability of the fisheries sector in 33 Caribbean countries or territories. Source: CMEP (2021).

These broader regional trends are reflected in national-scale vulnerability assessments for Aruba funded by the Government and its Climate and Ocean Risk Vulnerability Initiative (CORVI) partners. The Stimson Centre's CORVI assessment identifies climate change as an existential challenge for Aruba due to the island's heavy dependence on healthy coastal and marine ecosystems.

The report highlights three interconnected risk clusters: declining ecosystem health, changing demographic patterns and the vulnerability of a tourism-dependent economy. Coral reefs, mangroves, seagrass beds and coastal dunes are under increasing pressure from warming seas, coastal development, pollution and erosion, threatening both biodiversity and the natural systems that protect coastlines and support fisheries and tourism. Aruba's economy is particularly exposed because tourism accounts for most economic activity and employment, with many critical assets concentrated in low-lying coastal areas (Gruber et al., 2025).

The assessment concludes that strengthening ecosystem resilience should be a central pillar of Aruba's climate adaptation strategy. Protecting and restoring coastal and marine habitats can reduce climate risks while supporting biodiversity, fisheries and sustainable tourism. The report recommends investing in nature-based solutions, integrating climate resilience into spatial planning, and improving long-term management of coastal and marine ecosystems. Marine protection offers a practical way to

build resilience to these impacts (Gruber et al., 2025). MPAs are known to help enhance carbon sequestration, coastal protection, biodiversity recovery, and support increased resilience in fisheries with positive economic outcomes (Jacquemont et al., 2022; White et al., 2025; Millington-Drake et al., 2025). These findings reinforce the importance of expanding effective marine conservation measures to safeguard Aruba's ecological, economic and social resilience in the face of accelerating climate change (Gruber et al., 2025).

2.5 Socio-economic features

2.5.1 Tourism and recreation

In 2024, Aruba welcomed more than 1.42 million visitors, including 897,273 cruise passenger arrivals, representing a 20% increase from 2023 (Government of Aruba, 2025). This makes Aruba one of the most visited destinations in the Caribbean.

Tourism is closely linked to Aruba's coastal and marine environment, which underpins many of the experiences that attract visitors to the island. Beaches, coral reefs, coastal waters and marine wildlife support a diverse tourism sector centred on swimming, snorkelling, scuba diving, boating and other water-based recreation. More than 70% of visitors choose Aruba primarily for its beaches, demonstrating the economic importance of maintaining healthy and attractive coastal and marine ecosystems. Aruba also attracts a relatively affluent visitor base, with recent official reporting indicating growth in the number of visitors from the United States earning more than US\$ 100,000 annually, suggesting strong demand for high-quality tourism experiences (Government of Aruba, 2025).

Beyond beach tourism, Aruba's marine environment supports a wide variety of recreational activities, including windsurfing, kitesurfing, kayaking, paddleboarding, jet skiing, recreational fishing, sightseeing cruises and sunset boat tours. Collectively, these activities make an important contribution to the national economy and depend on the continued health, accessibility and aesthetic value of coastal and marine ecosystems.

However, Aruba's marine environment faces increasing pressures associated with tourism growth, driven by both stay-over and cruise visitors. Cruise tourism can contribute to air and water pollution, waste generation, underwater noise and increased vessel traffic, while expanding coastal infrastructure and recreational use place additional pressure on nearshore habitats. These impacts affect marine ecosystems including coral reefs, seagrass meadows and coastal waters.

Tourism-related pressures are compounded by broader environmental challenges, including rising sea temperatures, coral bleaching, coastal erosion and declining reef condition. As much of Aruba's tourism infrastructure and attractions are concentrated along the coastline, increasing demands on wastewater management, freshwater resources and coastal development can further exacerbate habitat degradation and biodiversity loss. Together, these pressures highlight the close relationship between environmental health, tourism revenue and the long-term sustainability of Aruba's tourism-dependent economy, reinforcing the importance of effective marine conservation and management.

2.5.2 Fishing

Fishing is not a primary industry in Aruba, but it remains culturally significant and includes several distinct components: industrial, artisanal, commercial, subsistence and recreational fisheries (including both local and tourism-based activities), targeting pelagic and reef species. Activity is concentrated along Aruba's west and south coasts, reflecting the distribution of demersal stocks (Meesters et al., 2010). The sector is an important source of food and contributes to local food security, while also holding cultural and social value through its role in community life, contributing to social cohesion by strengthening family and community ties (ACF, 2025a).

Industrial fishing within Aruba's waters has historically been limited, with much of the pressure arising from illegal, unreported and unregulated (IUU) fishing by foreign fleets operating more broadly across the Caribbean region, often linked to limited monitoring and enforcement capacity (FAO, 2023; InSight Crime, 2022). There have also been documented incursions by Venezuelan industrial vessels into Antillean waters (Meesters et al., 2010).

Illegal industrial catches in the wider region were estimated at just under 700 tonnes in 2014, with a value exceeding US\$ 2 million, based on modelling approaches applied in the TEEB Aruba study (TEEB Aruba, 2018). More recent global assessments continue to highlight illegal, unreported and unregulated (IUU) fishing as a persistent and significant pressure on marine resources, although these do not provide updated quantitative estimates of catch volumes, and no Aruba-specific figures are currently available (Global Initiative Against Transnational Organized Crime and Poseidon Aquatic Resource Management, 2023).

In contrast, Aruba's domestic fisheries sector is small-scale and predominantly artisanal, supplying local markets and supporting tourism-related demand. While fishing contributes less than 1% of GDP, it remains socially and economically important for coastal livelihoods. The Economics of Ecosystems and Biodiversity (TEEB Aruba, 2018) estimated that the small-scale sector contributed approximately US\$ 4.45 million in natural capital value in 2018. Commercial landings were estimated at around 143 tonnes in 2014, with a further 31 tonnes attributed to subsistence fishing. FAO data suggest that reported commercial catches have remained broadly stable since 2000, typically ranging between 140 and 170 tonnes annually.

Recreational and sports fishing represent a particularly significant component of Aruba's fisheries. This includes both local fishers and charter operations catering to tourists, with total catches estimated to exceed 750 tonnes in 2014, potentially surpassing commercial landings (FAO, 2018). Key target species include wahoo, snappers and groupers, with reported catches of approximately 50 tonnes, 45 tonnes and 15 tonnes respectively; all three stocks were classified as overfished by FAO in 2018. However, these figures likely include uncertainty, particularly regarding the extent of catch-and-release practices.

Overall fishing effort is difficult to quantify due to inconsistent and partially overlapping data sources. FAO (2018) records indicate 622 registered vessels in 2016. Estimates based on survey data collected for the TEEB Aruba study suggest that participation in fishing and nature-based activities may be widespread across the local population, although definitions of participation vary (TEEB Aruba, 2018).

Long-term catch reconstructions further highlight uncertainties in fisheries reporting. Pauly et al. (2015) estimated total catches between 1950 and 2010 at approximately 36,000 tonnes, around 75%

higher than the adjusted FAO reconstruction of 20,677 tonnes, suggesting substantial underreporting, particularly within artisanal fisheries. In addition, foreign industrial fleets, including Taiwanese and Venezuelan longliners and Venezuelan bottom trawlers, have historically contributed to regional catches of species such as billfish, wahoo, dolphinfish, king mackerel, rainbow runner and albacore tuna.

Fisheries in Aruba are subject to increasing pressure from illegal, unreported and unregulated (IUU) fishing, as well as unregulated or poorly regulated activities such as spearfishing. In 2014, the Aruban Coast Guard recorded 28 arrests for illegal fishing, compared with 15 in Sint Maarten and four in Saba and Sint Eustatius (TEEB Aruba, 2018). These figures highlight ongoing enforcement challenges, particularly given the difficulty of distinguishing between legal, illegal and unreported activity. As a result, the true extent of IUU fishing is likely underestimated, and effective monitoring remains a key limitation for fisheries management.

Climate change adds an additional layer of pressure. Changes in ocean temperature, currents, salinity, pH and storm intensity are expected to affect fish distribution, recruitment and overall fisheries productivity. Across the Caribbean and Latin America, climate change is projected to result in annual losses in landed fish value of between US\$ 1.21 and US\$ 2.72 billion (CMEP, 2021). Strengthening fisheries governance, monitoring and marine protection will therefore be critical to improving resilience and supporting long-term sustainability.

2.5.3 Infrastructure (including offshore renewables)

Port infrastructure includes the cruise vessel facilities and limited cargo at Oranjestad, as well as general cargo facilities at Barcadera. Shipping activity at San Nicolas Port has all but ceased, following the closure of the oil refinery. Several small jetties and piers around the island serve local commercial and recreational vessels.

In May 2024, an agreement was signed between Compania Arubano di Petroleo (CAP) and Andicuri Oil & Gas Exploration VBA (AOGX), a local subsidiary of Armstrong International LLC (AI), for the exploration, development, and production of hydrocarbons in the maritime area of Aruba (Figure 9). The area for exploration covers 14,356 km² (approx. 50% of EEZ), with a provisional exploration timetable of 18 months.

A submarine fibre optic cable, connecting Aruba, Martinique, Antigua, Puerto Rico and the USA has been proposed with the expectation of going live in the third quarter of 2027. The current route proposes a landing location on the south-east of Aruba at Baby Beach.

There are no offshore renewable energy facilities currently in operation in Aruba. The public utility WEB Aruba commissioned a feasibility study into offshore wind in 2025. Ocean Thermal Energy Conversion (OTEC) is a possible technology that has been considered but not taken forward commercially.



Figure 9: Contract area for oil and gas exploration between CAP and AOGX. Source: CAP.

2.6 Environmental degradation

Aruba's ecosystems have undergone sustained degradation in recent years as a result of local pressures including coastal development, overfishing, physical habitat destruction, and disturbance associated with recreational use and tourism (Government of Aruba, 2024). This decline increasingly threatens the island's ability to provide essential ecosystem services. Some of these effects are already apparent in tourism: deteriorating water quality, inadequate waste disposal and beach pollution can reduce the attractiveness of coastal areas for visitors, while the loss of coral reefs and marine biodiversity diminishes opportunities for activities such as snorkelling and scuba diving.

However, the consequences are not limited to tourism. The degradation of reefs, seagrass beds and mangroves can weaken nursery habitats for fish, undermine the productivity and resilience of fisheries, and ultimately affect local livelihoods and food security. The loss of these habitats also reduces natural coastal protection, increasing Aruba's exposure to erosion, flooding and storm impacts, with implications for coastal communities, infrastructure and the wider economy.

More broadly, environmental decline can generate public health and quality-of-life challenges through poorer water quality, marine litter and reduced access to clean, healthy coastal spaces. These pressures are closely linked to patterns of spatial development: between 1986 and 2020, Aruba's built environment expanded from 29 to 60 km², equivalent to roughly one-third of the island, illustrating the scale of land-use change and the growing challenge of balancing urban expansion with the protection of natural systems (Jurgens et al., 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” (Government of Aruba, 2024).

3. Policy frameworks

This section provides an overview of the international, regional and national policy frameworks that guide the conservation and management of Aruba's marine environment. These frameworks establish the legal and institutional basis for biodiversity protection, including the designation and management of marine protected areas (MPAs), and underpin Aruba's commitments to global and regional conservation targets, including the '30x30' goal.

3.1 International and regional governance

Convention on Biological Diversity

The Convention on Biological Diversity (CBD) was created and adopted at the 1992 Rio Earth Summit. Its mandate covers all life on Earth, and its aim is to conserve biodiversity, use its components sustainably and ensure fair sharing of genetic resource benefits. The CBD entered into force in Aruba in 1995 with the implementation of the Nature Protection Ordinance.

Aruba has committed to protecting 30% of its marine area by 2030, as set out in the National Biodiversity Strategy and Action Plan 2024–2030 (Government of Aruba, 2024) and in Target 3 of the Kunming–Montreal Global Biodiversity Framework, the implementing agreement of the Convention on Biological Diversity (CBD, 2022). To meet these commitments, Aruba must protect an additional 29.76% of its EEZ, equivalent to approximately 7,520.14 km². The establishment of an offshore MPA, alongside the expansion of nearshore MPAs, would make a substantial contribution towards achieving these important global targets.

Ramsar Convention

The Convention on Wetlands of International Importance (Ramsar)³ aims to protect wetlands of international importance and provides a framework for the conservation and wise use of wetlands and their resources. The first Ramsar site in Aruba, Spaans Lagoen, was designated in 1980. Further information on Ramsar sites in Aruba is outlined in section 3.3.2.

³ <https://www.ramsar.org/>

Specially Protected Areas and Wildlife Protocol, Cartagena Convention

The Caribbean Environment Programme's Specially Protected Areas and Wildlife (SPAW) Protocol⁴ is particularly relevant to this report. SPAW aims to strengthen the establishment and management of protected areas, conserve threatened and endangered species, and promote the conservation and sustainable use of marine and coastal ecosystems. Its three Annexes list protected species, including many marine taxa such as seagrasses, mangroves, corals, cetaceans, turtles and seabirds. Annexes I and II provide the highest level of protection for flora and fauna, respectively, while Annex III lists species of flora and fauna that may be used, subject to regulation to ensure sustainability. Annex II includes corals, elasmobranchs, turtles, seabirds and cetaceans. Annex III includes mangroves, seagrasses, corals and elasmobranchs.

The Convention on International Trade of Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)⁵ is a multilateral treaty that regulates international trade in wild animals and plants to ensure that such trade does not threaten their survival. Internationally, CITES applies to more than 30,000 plant species and around 5,600 animal species. Under Article 8(1), Parties must take appropriate measures to enforce the Convention and prohibit trade in specimens traded in violation of its provisions, including through penalties, confiscation, and, where appropriate, return to the State of export.

For Aruba, CITES has been in force since 1995. This means Aruba must implement and enforce these obligations in relation to CITES-listed specimens within its jurisdiction. Aruba's waters include many species listed under CITES, particularly among corals, cetaceans, turtles and elasmobranchs, making the Convention directly relevant to the protection and regulation of marine biodiversity associated with the island.

Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), also known as the Convention on Migratory Species or Bonn Convention, is a global treaty that supports the conservation of migratory animals across their ranges. It is particularly relevant to Aruba because many marine species recorded or expected in its waters move across national boundaries, including cetaceans, sea turtles, sharks, rays and seabirds. The Netherlands accepted the Convention in 1981, and it entered into force in 1983.

CMS lists species in two appendices. Appendix I covers migratory species considered endangered and calls on range states to provide strict protection, conserve and restore habitats, remove or reduce obstacles to migration, and control other factors that may endanger them. Appendix II covers migratory species with an unfavourable conservation status, or those that would benefit from coordinated international action. For Aruba, CMS reinforces the need for cross-border conservation measures, regional cooperation and effective area-based protection for migratory marine species using Aruba's EEZ as feeding, breeding, nursery or transit habitat.

⁴ <https://www.car-spaw-rac.org/?The-SPAW-Protocol-769>

⁵ <https://cites.org/eng>

3.2 National legislation and policy for marine environmental protection

This section outlines the key national legislation and policy instruments that support the protection and management of Aruba's marine environment. Together, these frameworks define the legal basis for conservation, spatial planning and sustainable use, and play a central role in enabling the expansion and effective management of marine protected areas within Aruba's territorial waters and wider EEZ.

3.2.1 Legislation

Nature Protection Ordinance (AB 1995 no. 2)

Under Aruba's Constitution, the country has the authority to enact environmental regulations. The principal national instrument for nature conservation is the Nature Protection Ordinance (*Natuurbeschermingsverordening*; AB 1995 No. 2, as amended), adopted in 1995 to replace earlier legislation and establish a national framework for the protection of nature and indigenous flora and fauna. It was introduced in the context of Aruba's accession to international biodiversity agreements, including CBD, CITES and the SPAW Protocol, and provides the legal basis for implementing such obligations through national measures.

The Ordinance protects native species and, through subsequent implementing decrees, supports the conservation of endangered and ecologically important species within Aruba's ecosystems. However, while it allows areas to be designated as strict nature reserves, it does not provide a framework for applying different levels of protection. This limits its usefulness for the planned expansion of Aruba's nearshore Marine Park, where zonation and varied protection levels will be needed to reflect different patterns of marine use and management needs.

A more flexible legal framework would enable differentiated protection across areas of high and low use, in line with international standards such as the IUCN protected area categories. To support the expansion of nearshore protection towards an island-round MPA, the Ordinance requires review and amendment to allow a more adaptive management approach. The Spatial Development Ordinance (*Landsverordening Ruimtelijke Ontwikkeling*) may also serve as a complementary tool for biodiversity conservation.

National decrees on protected areas and nature reserves in Aruba

Aruba's protected area system is established through a series of national legal instruments under the Nature Protection Ordinance (AB 1995 no. 2), including the designation of terrestrial, coastal, and marine areas as protected nature reserves. These instruments include the establishment of Parke Nacional Arikok under A.B. 2000 no. 59, the designation of the Spaans Lagoen area as a nature reserve under A.B. 2017 no. 11, the establishment of Parke Marino Aruba under A.B. 2018 no. 77, and the subsequent new designation of domain lands as nature reserves under AB 2020 no. 67. Together, these measures form the backbone of Aruba's protected area framework.

AB 2020 no. 67, issued on 5 May 2020 and published on 8 May 2020, implements Article 10 of the Nature Protection Ordinance and designates mapped state-owned lands as nature reserves. The

decree states that these areas are protected with a view to conserving native flora and fauna, maintaining biological diversity, and preserving the characteristic natural beauty of the designated areas. It further provides that the areas are to be jointly managed as a nature park and requires the preparation and periodic updating of a management plan.

Each protected area contributes differently to Aruba's ecological resilience. Parke Nacional Arikok protects extensive terrestrial ecosystems and important geological, ecological, and cultural features. Spaans Lagoen, one of Aruba's most valuable coastal wetlands and a long-recognized Ramsar site, supports mangroves, mudflats, seagrass-linked nursery functions, and birdlife. Parke Marino Aruba protects marine habitats including coral reefs, seagrass beds, mangroves, and reef islands across four marine protected areas. The additional areas designated under AB 2020 no. 67 strengthen habitat protection and ecological connectivity across the island.

The day-to-day conservation management of Aruba's principal protected areas is carried out by the Aruba Conservation Foundation (ACF), an independent non-profit organization that manages protected terrestrial and marine areas on behalf of Aruba's conservation framework. This includes Arikok National Park, Spaans Lagoen, and Parke Marino Aruba (ACF, 2025a).

Aruba's Spatial Development Plan – ROPV (AB 2021 no. 123)

The Spatial Development Plan with Regulations (ROPV), adopted in 2021 under the National Ordinance on Spatial Development, is Aruba's legally binding framework for land use and spatial planning. It translates the policy directions of the 2019 Spatial Development Plan (ROP) into enforceable rules governing the designation, use and development of Aruba's land territory and coastal waters.

Through zoning and permit controls, the ROPV specifies what forms of development are allowed, which functions may occur in particular areas, and the conditions under which construction and land-use permits may be granted or refused. This makes the ROPV directly relevant to marine protection in Aruba: because it extends to coastal waters and regulates activities along the land–sea interface, it can help prevent incompatible coastal development, reduce pressures on coral reefs, seagrass beds, mangroves and coastal water quality, and safeguard ecologically sensitive marine and shoreline areas. In practice, the ROPV provides an important legal mechanism for integrating biodiversity conservation into spatial planning and for aligning coastal development decisions with Aruba's broader marine conservation and 30x30 objectives.

3.2.2 National policy

National Biodiversity Strategy and Action Plan (NBSAP) 2024–2030

Aruba's National Biodiversity Strategy and Action Plan (NBSAP) 2024–2030⁶ sets out the national framework for conserving, restoring and sustainably using biodiversity, in line with the Kunming–Montreal Global Biodiversity Framework (Government of Aruba, 2024). It gives particular attention to the protection and sustainable management of Aruba's terrestrial, coastal and marine ecosystems. The strategy is organised around three overarching themes:

⁶ <https://dnmaruba.org/pa/publicacion/aruba-nbsap-2024/>

1. **Reduce threats to biodiversity:** tackling key drivers of biodiversity loss, including habitat degradation, invasive alien species, pollution and climate change, with particular focus on protecting and restoring Aruba's coral reefs, mangroves and seagrass beds.
2. **Sustainable use of natural resources:** promoting sustainable practice in sectors such as agriculture, fisheries and tourism to maintain ecosystem functions, protect marine biodiversity and support a resilient blue economy.
3. **Tools and solutions for implementation and mainstreaming:** strengthening the policies, legislation, financing, knowledge and governance needed to deliver biodiversity action, including better coordination, spatial planning, enforcement and public awareness.

Overall, the NBSAP aims to secure Aruba's natural capital by balancing conservation, restoration and sustainable development, so that terrestrial and marine ecosystems continue to provide essential services for current and future generations.

Built with Nature Policy 2019 (BwN)

The Built with Nature (BwN) Policy⁷ provides a framework to guide Aruba's spatial development in harmony with nature. It addresses the negative impacts of past uncontrolled development, such as habitat loss, reduced biodiversity and environmental degradation, by integrating ecological values into all planning and construction processes.

- **Reduce environmental damage and protect biodiversity:** protecting habitats, native flora and fauna, and ecosystem services by avoiding unnecessary land clearing, maintaining ecological connectivity, and preventing development in vulnerable areas such as waterways and salinas.
- **Nature-inclusive and sustainable development:** designing urban areas in line with natural systems through green infrastructure, retention of existing vegetation, use of native species, and development that supports long-term environmental quality and community well-being.
- **Implementation through integrated tools and governance:** using legislation, environmental assessment, GIS mapping, stakeholder collaboration, enforcement, and financial and legal mechanisms to support effective implementation.

Overall, the ambition is that Aruba's communities will be developed in balance with nature, where ecosystems are preserved, biodiversity thrives and residents benefit from improved quality of life (Government of Aruba, 2019).

3.3 Current marine protection in Aruba

Aruba's marine environments harbour a rich array of habitats, from coral reefs and seagrass meadows to lagoons, inland bays and open ocean. These ecosystems are home to diverse marine life, including crucial breeding grounds for sea turtles, marine mammals, sharks, bony fish and marine invertebrates such as sea urchins, crabs, lobster and conch (ACF, 2025a).

⁷ dnm-aruba.org/wp-content/uploads/2021/12/Build_with_Nature.pdf

3.3.1 Offshore

Aruba currently has no offshore MPAs. However, Aruba has recognised the need to protect its offshore waters and has committed to 30x30, as outlined in Section 3.1. Sections 4 and 5 describe the key habitats and species of Aruba's offshore environment.

3.3.2 Nearshore

Legally established in December 2018 by National Decree (AB 2018 no. 77), Parke Marino Aruba comprises four MPAs that together cover approximately 60.2 km² of coastal waters. These are:

- MPA Arikok
- MPA Sero Colorado
- MPA Mangel Halto
- MPA Oranjestad Reef Islands

These MPAs are protected under Article 10 of the Nature Protection Ordinance (Natuurbeschermingsverordening, AB 1995 no. 2, article 10), and ACF was appointed as the managing organisation for Parke Marino Aruba. Its first management plan was published in 2019 and updated in 2025 as the *ACF Ramsar & Marine Protected Areas Conservation Management Plan 2025–2029* (ACF, 2025a).

The four sites were selected because each contains one or more Key Biodiversity Areas (KBAs) that support essential ecological functions and communities. These include coral reefs, seagrass meadows, mangrove systems, Important Bird Areas (IBAs) used by seabirds for nesting, resting and breeding, potential nursery habitat for sharks and marine mammals, seahorse habitat, sea turtle nesting, resting and foraging grounds, endemic and/or endangered species, white sandy beaches and distinctive geological features (ACF, 2025a). These KBAs also provide ecosystem services that are important to Aruba's economy and to the well-being of its residents, including harvested resources such as food, water and craft materials, as well as coastal protection, carbon sequestration, ecotourism, recreation and natural amenity value.

Each MPA is multi-use, with areas designated for certain activities to allow different stakeholders to utilise the MPA without compromising its conservation aims. For example, the most fragile, geographically limited resources (coral reefs, mangroves, nesting sites and nursery habitats) are designated as Sensitive Resources Zones (SRZs), and follow IUCN Protected Area Category 1a guidelines to strictly limit human presence and protect biodiversity (ACF, 2025a; Dudley, 2008). However, areas of MPA outside the SRZs are General Conservation Zones, comparable to IUCN Protected Area Category 2 in that they provide recreational and visitor opportunities alongside large natural protected areas (Dudley, 2008); it is in these areas that activities such as swimming, snorkelling and kayaking are permitted. Zoning the MPAs in this way allows the delivery of conservation objectives while separating them from conflicting human activities.

Aruba's current MPA designations are vital for the protection of its nearshore coastal habitats. However, each MPA extends no more than 2 km seawards of the island's coastline, and combined, cover a small area (60.2 km²), accounting for only 0.24% of Aruba's EEZ (Table 1). This means that a large proportion (99.76%) of the EEZ is not under any form of protection. Furthermore, none of these

coastal MPAs are recognised on WDPA Protected Planet⁸ and MPA Atlas⁹ as of April 2025, two of the leading global protected area databases.

Table 1: Current marine protected area coverage and additional area required to achieve Aruba's 30x30 target. Based on Aruba's EEZ of 25,267.81 km².

Marine protected area	Total area (km²)
MPA Arikok	16.5
MPA Sero Colorado	18.7
MPA Mangel Halto	16
MPA Oranjestad Reef Islands	9
Total current protected area	60.2
Total unprotected area	25,207.61
Additional protected area required to achieve 30% EEZ protection	7,520.14

⁸ <https://www.protectedplanet.net/en/thematic-areas/wdpa>

⁹ <https://mpatlas.org/>

Management Areas



Figure 10: Aruba's four coastal MPAs, which together form Parke Marino Aruba. MPA Oranjestad is shown as two separate sections, north and south, divided by the shipping lane serving the Aruba Cruise Terminal. Each MPA extends approximately 2 km seaward (ACF, 2025a).

Ramsar sites

Spaans Lagoen, Aruba's first Ramsar site, was designated in 1980 and expanded from 90 ha to 259 ha in 2023 (Ramsar, 2023). In November 2023, four additional sites were designated, increasing the total Ramsar area to 14,408 ha (144.08 km²) (ACF, 2025a). Together with Aruba's MPAs, these sites contribute to the implementation of Article 4 of the SPAW Protocol, which calls for the establishment of protected areas to conserve and restore coastal and marine ecosystems in the Wider Caribbean Region (UNEP, n.d.).

Three of the new Ramsar sites, East Point, South Coast, and West Point, extend conservation beyond the marine park's boundaries, covering a wide range of ecosystems that support biodiversity, genetic exchange, and sustainable activities such as snorkelling, diving, and small-scale fishing (the fourth new site, Western Wetlands, is a terrestrial area). This network strengthens ecological and economic resilience by safeguarding critical habitats, while supporting the long-term survival of species and their migratory routes (ACF, 2025a).

Table 2: Aruba's Ramsar sites, principal habitats and key biodiversity features. Source: Adapted from ACF (2025).

Ramsar site	Area (km ²)	Key biodiversity features	Main habitats
West Point	21.85	- Important nesting beaches for four sea turtle species: loggerhead (<i>Caretta caretta</i>), green (<i>Chelonia mydas</i>), hawksbill (<i>Eretmochelys imbricata</i>) and leatherback (<i>Dermochelys coriacea</i>). - Supports extensive stands of Critically Endangered elkhorn coral (<i>Acropora palmata</i>). - Seagrass meadows provide nursery and feeding habitat for fish and invertebrates, including queen conch (<i>Strombus gigas</i>) and parrotfish.	Beaches, sand dunes, limestone terraces, seasonal wetlands, coral reefs, seagrass beds and shallow marine waters.
South Coast	39.75	- Contains Aruba's largest mangrove and seagrass complex. - Important nursery habitat for reef fish and invertebrates, including hogfish (<i>Lachnolaimus maximus</i>), cubera snapper (<i>Lutjanus cyanopterus</i>) and Atlantic tarpon (<i>Megalops atlanticus</i>). - Supports significant stands of elkhorn coral (<i>Acropora palmata</i>) and blade fire coral (<i>Millepora complanata</i>). - Provides habitat for species such as the whitespotted eagle ray (<i>Aetobatus narinari</i>) and tiger shark (<i>Galeocerdo cuvier</i>).	Mangroves, seagrass beds, beaches, reef islets, coral reefs and shallow coastal waters.

East Point	75.97	• Largest Ramsar site in Aruba. • Internationally important seabird area supporting breeding colonies of at least 10 tern species. • Important nesting habitat for sea turtles and feeding habitat for migratory birds. • Supports high biomass of herbivorous reef fish. • Important habitat for dolphins, whales and whale sharks, including breeding habitat for spinner dolphin (<i>Stenella longirostris</i>) and pantropical spotted dolphin (<i>Stenella attenuata</i>).	Reef islands, mangroves, coral reefs, seagrass beds and offshore marine waters.
Spaans Lagoen	2.59	• Important mangrove and tidal-flat ecosystem. • Nursery habitat for reef fish, crustaceans and waterbirds. • Supports juvenile hogfish (<i>Lachnolaimus maximus</i>), cubera snapper (<i>Lutjanus cyanopterus</i>) and Atlantic tarpon (<i>Megalops atlanticus</i>).	Mangroves, tidal flats and sheltered lagoon habitats.

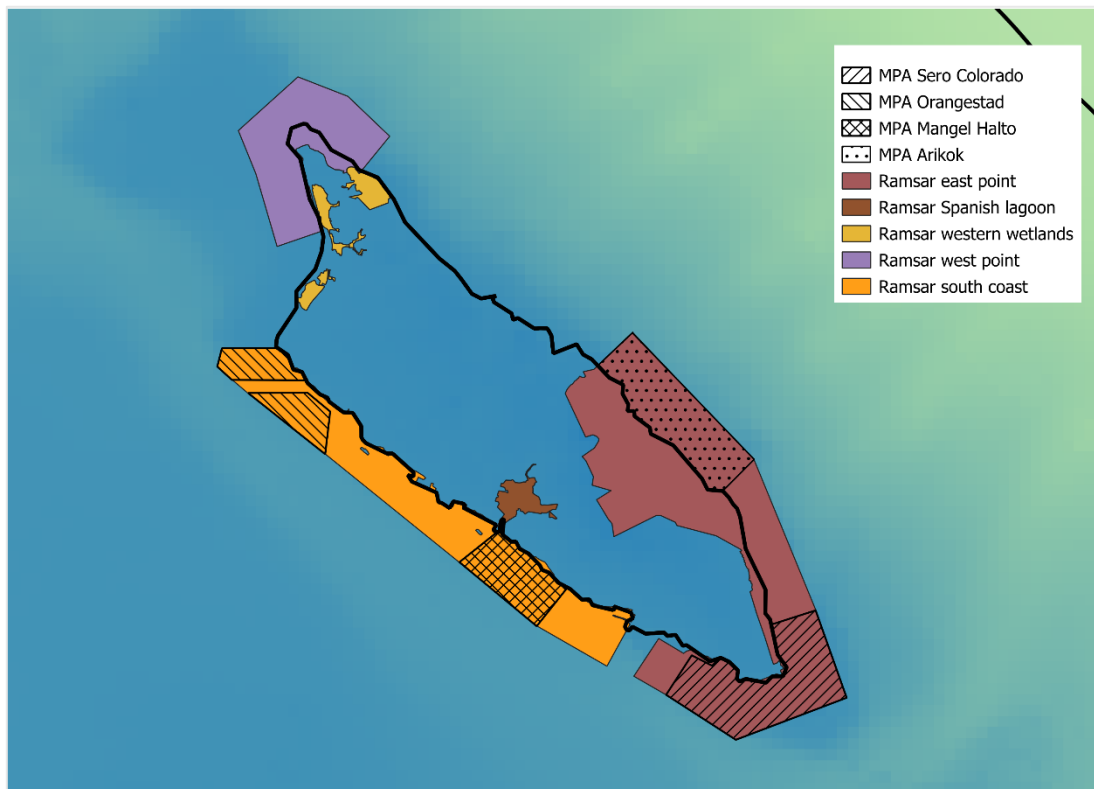


Figure 11: Aruba's five Ramsar sites, covering 14,408 hectares in total. Source: Terra Mare for Blue Marine (2025).

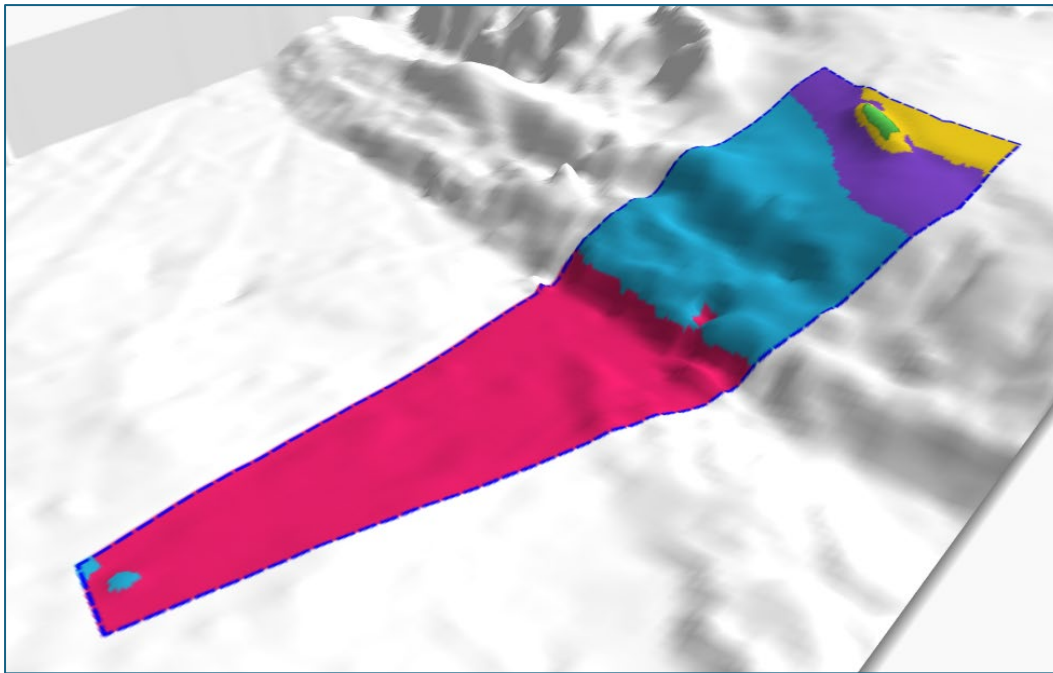


Figure 12: A 3D view of the seabed, showing biozones based on seabed depth within Aruba's EEZ. Developed by Terra Mare on behalf of Blue Marine (2025). Pink indicates abyssobenthic habitat, blue bathybenthic habitat, purple mesobenthic habitat and yellow epibenthic habitat, with the island of Aruba shown in green. Source: Terra Mare for Blue Marine (2025).

4. Existing natural and ecological values: Habitats

Aruba's epibenthic zone (0–200 m depth; infralittoral and circalittoral) covers approximately 6% of the marine area, or 1,543 km² (Terra Mare for Blue Marine Foundation, 2025). This zone contains most of the island's identified key species and habitats, including coral reefs, seagrass meadows and mangroves. It is also where most marine economic activity takes place, particularly tourism, fishing and port infrastructure.

Deeper offshore waters below 200 m make up most of Aruba's EEZ and include mesobenthic, bathybenthic and abyssobenthic seabed habitats. Biodiversity data for these deeper habitats around the Leeward Dutch Caribbean islands remain limited (Meesters et al., 2010). However, research suggests that the waters around Bonaire form part of a broader Caribbean biodiversity hotspot that also includes the marine areas of Aruba and Curaçao and is characterised by high species richness and endemism (Debrot et al., 2025). This lack of data reflects the remoteness and inaccessibility of these offshore environments (DCNA, 2018), as well as the fact that, within the region, only Mexico, Colombia and Venezuela have the vessels and infrastructure needed for deepwater sampling (Miloslavich et al., 2010). Nonetheless, some research has been carried out around Aruba, and additional information is available from neighbouring Bonaire and Curaçao, which share similar hydrological, geological and climatological characteristics (Potter et al., 2017). Together, these studies provide useful insight into Aruba's otherwise data-poor offshore habitats.

The main benthic habitats are coral reefs, sand and sediment fields, seamounts, ridges and troughs, while the pelagic zone supports planktonic and free-swimming fauna, including fish and migratory species (Meesters et al., 2010). These zones are closely connected through ecological and physical

processes rather than functioning as distinct systems. In the Caribbean, the principal nearshore benthic habitats are coral reefs, which depend on light and therefore generally occur in waters shallower than –60 m, with their greatest abundance at depths of less than 30 m (Meesters et al., 2010). Around Aruba, steep offshore slopes mean this –60 m depth limit is often reached within 1 km of the coast (Global Fishing Watch, 2025).

Table 3: Area of Aruba’s EEZ seabed falling within standard depth zones. Source: Terra Mare for Blue Marine (2025).

Depth zone	Depth range (m)	Area (km ²)
Epibenthic	0 to 200	1,543
Mesobenthic	200 to 1,000	3,031
Bathybenthic	1,000 to 4,000	8,647
Abyssobenthic	4,000 to 6,000	12,166

Note: Areas are approximate and were calculated using a 1 × 1 km analytical grid. The combined grid-cell area slightly exceeds the official EEZ area because cells intersecting the EEZ boundary were included in the analysis.

4.1 Offshore habitats

4.1.1 Mesophotic reefs

Mesophotic coral ecosystems (MCEs) are coral, sponge and algae communities found at depths of approximately 30–150 m, below the typical depth range of shallow coral reefs. Like other deepwater habitats, MCEs remain poorly understood, but emerging research suggests that they have considerable ecological value. They are thought to supply larvae and offspring to shallow coral reefs (Bongaerts et al., 2010; Holstein et al., 2015; DCNA, 2018), helping those habitats recover following disturbances such as sedimentation and bleaching. Live coral cover in the Caribbean has declined by as much as 80% since 1970 (Jackson et al., 2014; Almond et al., 2022, cited in Eicher, 2023), making the potential role of MCEs particularly relevant to the persistence of these globally important ecosystems.

MCEs may also act as refugia for shallow reef species that are affected by thermal stressors. Since they are situated at or below the 35–60 m halocline, found within the upper layer of the Caribbean Sea, they often experience lower temperatures than shallower reefs (Riegl & Piller, 2003; Leichter & Genovese, 2006) and so are buffered from the impacts of bleaching events. Scleractinia, or stony corals, are known to occur in deep water (Miloslavich et al., 2010; Smith et al., 2015), suggesting links between shallow and mesophotic reef zones through larval dispersal or refugia.

MCEs are important not only to shallow coral reef species but also because they harbour diverse and distinctive biological communities. The seven coral taxa comprise approximately 5,080 species overall, of which 66% occur in water deeper than 50 m (Cairns, 2007). The coral species *Agaricia grahamae*, *Agaricia undata* and a deepwater lineage of *Madracis pharensis* are associated with specialist photosynthetic endosymbionts adapted to deepwater, low-light environments. This allows them to thrive in large colonies at depths of approximately 90 m (Bongaerts et al., 2015).

In the deeper zones of MCEs (below 60 m), a distinct zonal pattern can be observed, whereby a decrease in coral cover is balanced by an increase in sponge cover (Liddell et al., 1997). Many species found in these deeper zones do not occur on shallow reefs (Lesser & Slattery, 2011; Slattery & Lesser, 2012). These include Caribbean sponges such as *Callyspongia vaginalis*, *Agelas conifera*, *Aplysina fistularis* and *Plakortis anguluspiculatis*. Sponges are crucial components of MCEs: they increase water-column productivity through filter feeding, create habitat for fish and invertebrates, and contribute to the rich biodiversity of coral reefs (de Goeij et al., 2013; Lesser, 2011; Slattery & Lesser, 2012).

Diverse mesophotic coral communities also support rich communities of other marine fauna. A total of 66 fish species have been recorded on MCEs in Curaçao across different functional groups, including invertebrate feeders (*Coryphopterus* spp., *Antilligobius nikkiae*), planktivores (*Chromis* spp.), and herbivores (*Stegastes partitus*). This demonstrates the importance of MCEs to fish communities (Pinheiro et al., 2016a).

The use of scientific submersibles has significantly advanced understanding of deep-reef ecosystems in the southern Caribbean, revealing that mesophotic and deeper reefs, to at least 300 m, host high levels of previously undocumented biodiversity (Cairns, 2007; Baldwin & Robertson, 2013, 2014, 2015; Tornabene et al., 2016a, 2016b). Numerous new fish species have been described from these depths, particularly among gobies and sea basses, alongside a range of invertebrate taxa, including molluscs, bivalves and sponges. These findings demonstrate that deep reefs remain comparatively underexplored and continue to yield new species discoveries.

Research conducted around Curaçao and Bonaire indicates that mesophotic coral ecosystems can support high coral cover, with values reaching up to 100% at depths of 70–85 m (Frade et al., 2019). Surveys have also recorded an absence of coral and sponge disease at these depths over extended monitoring periods (Lesser & Slattery, 2011), suggesting that deeper reef systems may be less impacted by some of the pressures affecting shallow reefs. Together, these studies indicate that mesophotic ecosystems in the leeward Dutch Caribbean are not only diverse but may also represent comparatively intact and resilient reef habitats. Much of the current understanding of these systems is based on research conducted in this region, highlighting its importance for advancing knowledge of Caribbean deep-reef ecosystems more broadly (Bongaerts et al., 2015; Baldwin & Robertson, 2015).

Although research into MCEs around Aruba is limited, surveys from Curaçao and Bonaire suggest that suitable conditions may occur in Aruba's offshore environment. Terrestrial inputs from the Amazon and Orinoco rivers, together with the South American Upwelling Zone, may support conditions favourable to MCE development. Because MCEs in Bonaire and Curaçao harbour highly specialised communities, further Aruba-specific survey work would help establish their presence, extent and conservation value (Frade et al., 2019).

4.1.2 Benthic habitats

The mesophotic and deeper benthic communities outlined above are typically associated with consolidated substrates at depths of approximately 200–1,000 m (Cairns, 2007), indicating the presence of hard substrates interspersed with areas of sediment accumulation along Aruba's steep volcanic island slopes. Around Aruba, Debrot et al. (2014) describe the offshore seabed as a complex, steeply sloping volcanic formation characterised by clear depth-related zonation of substrate types.

At depths of 80–100 m, hard substrates dominated by coralline rock support deep reef communities, including sponges and hydrocorals. Between 100 and 300 m, bare volcanic rock is interspersed with steep sandy slopes. At 300–600 m, gentler sandy or muddy slopes (approximately 20–40°) occur at the base of the island formation, where debris and fine sediments are most likely to accumulate. These are followed by steeper rocky slopes of approximately 30–60° between 600 and 800 m, with maximum depths in the study reaching 914 m (Debrot et al., 2014).

Additional geomorphological features described from submersible surveys include rock faces, ledges, pavements and vertical walls, as well as large seafloor boulders, some exceeding 10 m in height (Debrot et al., 2014). More broadly, the offshore environment of the southern Caribbean is characterised by a mosaic of habitat types, including ridges, slopes and sedimentary basins, which contribute to the region's high marine biodiversity (Miloslavich et al., 2010).

4.1.3 Pelagic habitats

The South American upwelling zone creates a nutrient-rich water column that supports abundant plankton and, in turn, a diverse food web within Aruba's EEZ, including commercially important tuna and wahoo stocks as well as dolphins, whales, sea turtles and sharks (Romero et al., 2000; Meesters et al., 2010; Luksenburg, 2014).

Aruba's offshore habitat is important for pelagic and migratory species (Geelhoed et al., 2016). It supports a diverse range of marine fauna, including cetaceans and sharks (Meesters et al., 2010; DCNA, 2024a), as well as seabirds (Murphy, 2000). Section 5 provides detail on the species documented throughout Aruba's EEZ.

4.2 Nearshore habitats

Aruba is notable for the ecological importance of its coastal and nearshore habitats, including mangroves, wetlands, seagrass meadows and coral reefs, all of which play important roles in supporting biodiversity, providing nursery habitat, improving water quality, storing carbon, and enhancing coastal protection.

Coral reefs, seagrass meadows and mangroves are interconnected, forming a blue carbon ecosystem that combines the functions of three key coastal habitats (ACF, 2024; Guannel et al., 2016). For example, seagrass meadows and mangroves absorb excess nutrients and filter the water, which benefits adjacent coral reefs. Together, these habitats provide essential habitat and nursery grounds for a wide range of marine species and are linked through ecological connectivity across coastal seascapes (ACF, 2024; Swadling et al., 2024). Many species depend on all three habitats at different stages of their life cycle (Grober-Dunsmore et al., 2006), meaning that degradation in one habitat can affect species that otherwise spend much of their lives in another (ACF, 2024; Du et al., 2020). In addition, changes in megafauna populations can disrupt trophic balance and alter ecosystem functioning (Christianen et al., 2022).

Across the Caribbean, mangroves and seagrass beds provide an estimated US\$ 6.7 billion in ecosystem services, while coral reefs contribute nearly US\$ 6.2 billion (Heck et al., 2019). Carbon sequestration and tourism are among the most valuable of these services. In Aruba, ecosystem service values have

been estimated at US\$ 10.6 million for biodiversity protection, US\$ 3.7 million for cultural values, and US\$ 492 million annually for tourism and recreation (TEEB Aruba, 2018).

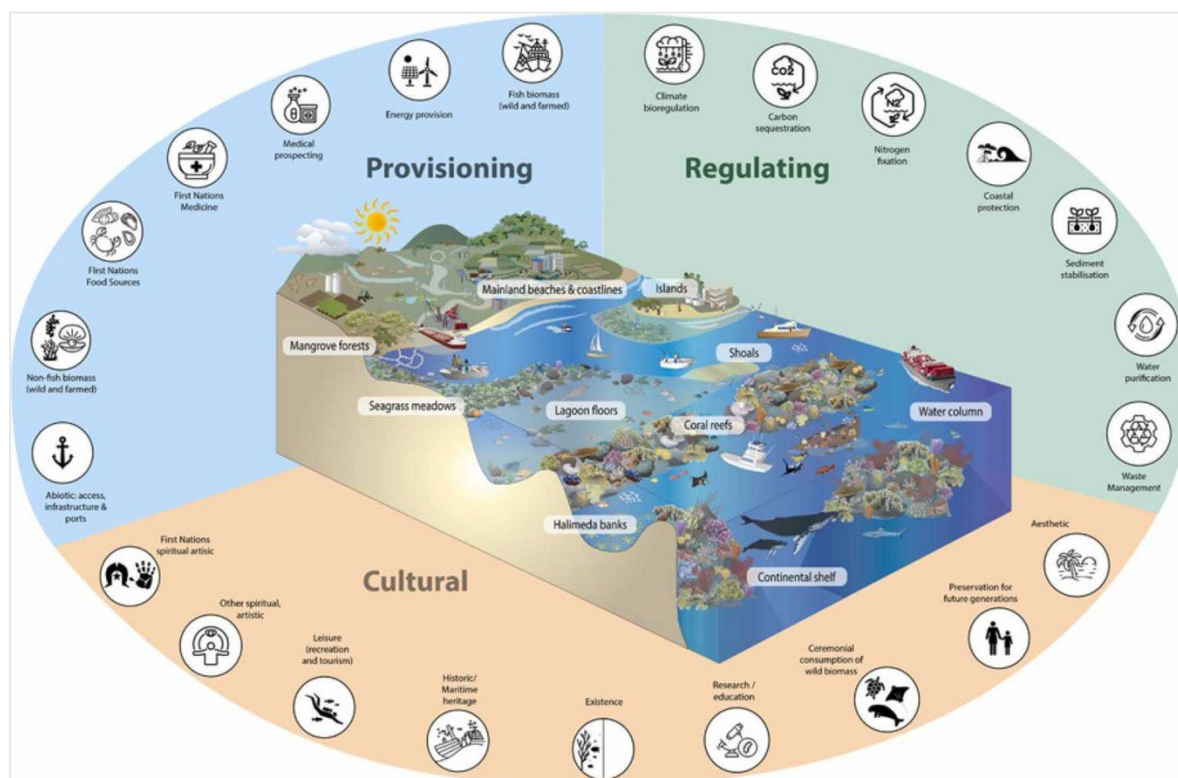


Figure 13: Marine ecosystem services. Source: De Valck et al. (2023).

4.2.1 Coral reefs

Coral reefs are among the most valuable marine ecosystems in the Caribbean, providing shoreline protection, fisheries production, tourism opportunities, beach formation and cultural value. Across the Dutch Caribbean, coral reefs contribute substantially to economic activity through ecosystem services and tourism, with reef-associated benefits accounting for a significant share of island economies (Vermeij et al., 2019). Ecologically, coral reefs are biodiversity hotspots, supporting an estimated 25% of all marine species globally, despite covering less than 1% of the ocean floor (UNEP, n.d.a).

Aruba's reef islands form a critical component of the island's marine environment; locally known as 'rif' or 'cay' (ACF 2025). The coral reefs within Parke Marino Aruba cover approximately 20 km² and support relatively high coral diversity by Caribbean standards. Around 68 species of reef-building corals have been recorded from Aruba's shallow fringing reefs, including the threatened elkhorn coral (*Acropora palmata*) and blade fire coral (*Millepora complanata*) (Vermeij et al., 2019). Among the most abundant reef-building corals are mountainous star coral (*Orbicella faveolata*) and boulder star coral (*Orbicella annularis*) (Eicher, 2023).

Coral reef development is greatest along Aruba's leeward coast, where a near-continuous forereef extends along much of the shoreline and is interrupted only by channels between reef islands. Reef communities are less developed along the exposed windward coast and on the sandy flats of the south-west coast, although scattered coral colonies occur where these habitats slope into deeper

water. Reef-building corals are concentrated primarily in shallow waters, while mesophotic reefs and deeper coral communities occur at greater depths offshore (Lesser et al., 2009).

Although average coral cover has remained relatively stable since 2019, multiple indicators point to a long-term decline in reef condition (Eicher, 2023). Localised coral cover has declined from approximately 22% to 8% over the past three decades (Vermeij et al., 2019), while the abundance of key reef-building species has decreased significantly compared with historical baselines. Similar long-term declines have been documented throughout the Caribbean, where coral cover has decreased substantially since the 1970s as a result of disease outbreaks, overfishing, coastal development and climate-related disturbances (Gardner et al., 2003; Jackson et al., 2014). Reef health is generally associated with coral cover exceeding 30% and the continued presence of framework-building corals such as *Acropora* spp.; notably, *Acropora* corals were still relatively abundant around Aruba during the 1980s (Bak, 1987).

Table 4: Key reef-building corals of conservation importance in Aruba. Sources: Vermeij et al. (2019); Eicher (2023).

Scientific name	Common name	Relevance to Aruba	IUCN Red List	CITES	SPAW
<i>Acropora palmata</i>	elkhorn coral	Major reef-building coral; extensive stands remain at West Point and other shallow reef areas.	Critically Endangered	Appendix II	Annex II
<i>Acropora cervicornis</i>	staghorn coral	Historically important framework-building coral throughout the Caribbean.	Critically Endangered	Appendix II	Annex II
<i>Orbicella annularis</i>	mountainous star coral	One of the dominant reef-building corals recorded in Aruba.	Endangered	Appendix II	Annex II
<i>Orbicella faveolata</i>	boulder star coral	One of the most abundant reef-building corals on Aruba's reefs.	Endangered	Appendix II	Annex II
<i>Colpophyllia natans</i>	boulder brain coral	Important framework-forming coral contributing to reef structure.	Vulnerable	Appendix II	Annex III
<i>Agaricia tenuifolia</i>	ribbon coral	Threatened Caribbean coral associated with shallow reef habitats.	Critically Endangered	Appendix II	Annex III
<i>Dendrogyra cylindrus</i>	pillar coral	Rare Caribbean reef-building coral that has undergone severe regional declines.	Critically Endangered*	Appendix II	Annex III
<i>Millepora complanata</i>	blade fire coral	Locally abundant and ecologically important reef-forming hydrocoral found in several protected areas.	Not Evaluated	Appendix II	Annex III

Aruba's coral reefs are closely linked to adjacent seagrass meadows and mangrove systems, forming interconnected coastal habitats that support a wide range of marine species throughout different stages of their life cycles. These habitats provide nursery grounds, feeding areas and refuge for numerous fish and invertebrate species, while also supporting threatened and regionally important

fauna (Nagelkerken et al., 2000). For example, the South Coast Ramsar Site contains important coral recruitment areas and habitat for species such as the whitespotted eagle ray (*Aetobatus narinari*), while the West Point Ramsar Site supports extensive stands of critically endangered elkhorn coral (*Acropora palmata*) and habitat for queen conch (*Strombus gigas*) and parrotfishes (Scaridae). Coral and seagrass habitats within the East Point Ramsar Site also support a range of cetaceans, including bottlenose dolphins (*Tursiops truncatus*) and striped dolphins (*Stenella coeruleoalba*) (ACF, 2025a).

Threats

Aruba's coral reefs are under increasing pressure from both local stressors and global environmental change. Recreational activities, coastal development, anchoring, sedimentation and declining water quality can cause direct physical damage to reefs and reduce coral health. Nutrient enrichment and other forms of pollution promote the proliferation of algae and cyanobacteria, which compete with corals and disrupt the ecological processes that sustain reef ecosystems.

Coastal development along Aruba's coastline has also contributed to reef degradation through habitat modification, increased sedimentation and declining water quality. Land reclamation, dredging, shoreline engineering and construction activities can increase turbidity and sediment deposition on reefs, reducing light availability and impairing coral growth, recruitment and survival. In addition, nutrient enrichment from wastewater discharges, sewage leakage and urban runoff can stimulate algal growth and alter reef community structure, reducing the competitive advantage of reef-building corals. These impacts are particularly important in nearshore environments, where reefs are closely connected to coastal watersheds and areas of intensive human use (Jackson et al., 2014; Vermeij et al., 2019).

Invasive species represent an emerging threat. Lionfish (*Pterois volitans*) alter reef food webs through predation on native fishes, while the invasive seagrass *Halophila stipulacea* has already transformed coastal habitats elsewhere in the Caribbean. The rapidly spreading soft coral *Unomia stolonifera*, which is established in nearby Venezuela, poses a particular concern due to its ability to overgrow benthic habitats and outcompete native reef organisms if introduced to Aruba (ACF, 2025a).

Disease continues to be a major driver of coral decline. White-band disease caused widespread losses of *Acropora* corals throughout the Caribbean during the 1970s and 1980s, while stony coral tissue loss disease (SCTLD) now represents one of the most significant threats to contemporary reef communities (Cramer et al., 2020; Papke et al., 2024).

These pressures are compounded by climate change, including rising sea temperatures, marine heatwaves, coral bleaching, ocean acidification and increasing storm intensity. The loss of key herbivorous fishes through overfishing can further reduce reef resilience by allowing algae to proliferate, making coral communities more vulnerable to disease and environmental disturbance (Jackson et al., 2014).

4.2.2 Seagrass meadows

Seagrasses are flowering plants that photosynthesise and thrive in shallow, sunlit waters. Seagrass meadows are a key coastal habitat in Aruba, covering approximately 11 km² (ACF, 2025a), and are globally recognised for their importance to biodiversity and climate change mitigation. Across the Caribbean, the ecosystem services provided by seagrass are valued at up to US\$ 255 billion annually

(Shayka et al., 2023). These meadows provide important feeding and nursery habitat for a wide range of marine species, including fish species that are important for local fisheries. In the Dutch Caribbean, seagrass habitats are particularly important for turtles, snappers, parrotfish, starfish, surgeon fish, sea bream and queen conch (Debrot et al., 2025). Seagrass ecosystems also support diverse invertebrate communities and contribute to water quality by stabilising sediments and filtering pollutants. In the wider Caribbean, these habitats form part of interconnected coastal systems, linking seagrass meadows with adjacent coral reefs and other habitats (van Tussenbroek et al., 2014).

Seagrass habitats also function as highly effective natural coastal defence systems. Studies from the United States have shown that seagrass can reduce wave energy in shallow bays, with wave heights reduced by up to around 50% compared to unvegetated areas (Reidenbach and Thomas, 2018). Their extensive root systems bind sediments, helping to prevent erosion and stabilise shorelines, while the plants themselves trap suspended particles from the water column and promote sediment accretion. Together, these processes help build and maintain coastal areas, making seagrass meadows valuable nature-based solutions for coastal protection and resilience (Reidenbach & Thomas, 2018).

A study in Lac Bay, Bonaire, found that the native seagrass *T. testudinum* was able to anchor sandy sediments under different wave conditions, but that sediment stabilisation declined and erosion increased as canopy density and coverage decreased (DCNA, 2020). These findings are supported by the Caribbean Coastal Marine Productivity Program (CARICOMP), which conducted a long-term, standardised survey of seagrass beds across the wider Caribbean region (van Tussenbroek et al., 2014). The survey found that seagrass was strikingly resilient even when exposed to hurricanes and major storms, and that recovery was often rapid where disturbance occurred.

Seagrass meadows are important for long-term carbon storage and sequestration because they store substantial amounts of carbon in their underlying sediments. Global estimates indicate an average carbon accumulation rate of 0.83 Mg per hectare per year. The 2018 TEEB report estimated that Aruba's seagrass meadows contained a total carbon stock of approximately 112,752 Mg and assigned an annual economic value of US\$15,900 to carbon sequestration (TEEB Aruba, 2018).

Table 5: Seagrass species recorded in Aruba's marine environment. Source: Climate Impact Atlas, Aruba.

Protected species (Aruba National Decree Protection of native flora and fauna; AB 2017 no. 48)			
Scientific name	English name	IUCN Red List	SPAW
<i>Syringodium filiforme</i>	manatee grass	Least Concern	Annex III
<i>Halodule wrightii</i>	shoal grass	Least Concern	Annex III
<i>Halophila decipiens</i>	Caribbean grass	Least Concern	Annex III
<i>Halophila baillonis</i>	tapegrass	Vulnerable	Annex III
<i>Halophila engelmannii</i>	star grass	Near Threatened	Annex III
<i>Ruppia maritima</i>	widgeon grass	Least Concern	Annex III
Species not protected under national legislation			
Scientific name	English name	IUCN Red List	SPAW
<i>Thalassia testudinum</i> (native)	turtle grass	Least Concern	Annex III
<i>Halophila stipulacea</i> (non-native)	broadleaf seagrass	Least Concern	Not listed

Seven seagrass species are listed in Annex III of the SPAW Protocol, requiring contracting parties to adopt appropriate measures for their protection and recovery. Six of Aruba's seven native seagrass species are additionally protected under the National Decree on the Protection of Native Flora and Fauna (AB 2017 no. 48). Key areas for their conservation include the MPAs at Sero Colorado, Oranjestad and Mangel Halto, as well as Aruba's Ramsar sites.

West Point (NL2527) contains extensive turtle grass (*Thalassia testudinum*) beds and beaches that support green turtles (*Chelonia mydas*), hawksbill turtles (*Eretmochelys imbricata*), loggerhead turtles (*Caretta caretta*) and leatherback turtles (*Dermochelys coriacea*).

A study in Lac Bay, Bonaire, found that the ecological functioning of seagrass meadows is strongly influenced by the intensity of green turtle grazing (Christianen et al., 2022). Higher seagrass biomass was associated with greater nitrogen uptake, higher sedimentary organic carbon content, greater fish biomass, higher macroinvertebrate species richness, and improved sediment stability. Moderate grazing at natural levels improved carbon storage and nutrient cycling, while intensive grazing reduced several ecosystem services, including fisheries support and sediment stability. These findings highlight the close relationship between grazing pressure, seagrass condition and ecosystem functioning, and underline the need for whole-ecosystem management (Christianen et al., 2022).

Threats

Seagrass meadows are vulnerable to multiple threats, including coastal development, anchoring, pollution and ocean warming. In Aruba, the invasive broadleaf seagrass (*Halophila stipulacea*) is displacing native species such as turtle grass (*Thalassia testudinum*). Broadleaf seagrass is able to thrive in degraded environments but does not replicate the full ecological functions of native seagrasses (Winters et al., 2020). It is also rarely grazed by turtles, and its spread is therefore expected to alter ecosystem functioning. Differences in growth form, including shorter canopy height and shallower root systems, may also influence sediment stabilisation and coastal protection compared to native species.

The loss of native seagrass reduces ecosystem resilience and the services these habitats provide (ACF, 2025a). Nutrient pollution, particularly from sewage discharge, is a major pressure on Aruba's seagrass ecosystems. In Curaçao and Bonaire, long-term wastewater inputs and coastal development have degraded turtle grass (*Thalassia testudinum*) meadows (Govers et al., 2014). In Aruba, a 2024 assessment of the Savaneta Nature Reserve found that seagrass cover had declined from 90% in 2021 to 66.3% (van der Wal, 2024). Near sewage inflow points, cover was even lower at 17.3%. Taken together, this evidence indicates that nutrient pollution and coastal development can severely degrade seagrass habitats and are likely affecting other areas of Aruba as well.

4.2.3 Mangroves

Mangrove forests are critical coastal ecosystems that link land, freshwater and the sea (Leal & Spalding, 2024). They are globally recognised for their role in buffering shorelines against storm surges, erosion and flooding, while also improving water quality by filtering nutrients and trapping sediment before it reaches adjacent coral reefs and seagrass beds (Ramsar Secretariat, 2006).

Mangroves are among the world's most biologically productive ecosystems and provide important nursery habitat for commercially valuable fish and invertebrate species, including snappers, groupers

and shrimp (Leal & Spalding, 2024). By supporting these species during critical life stages, mangroves help sustain fisheries, food security and livelihoods, while contributing to income and employment (Hutchison et al., 2014; Leal & Spalding, 2024).

Aruba is home to three true mangrove species: red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*) and black mangrove (*Avicennia germinans*). Buttonwood (*Conocarpus erectus*), although not a true mangrove, is also considered a mangrove in Aruba and Florida. The three true mangrove species and the buttonwood (*Conocarpus erectus*) are protected under the National Decree on the Protection of Native Flora and Fauna (AB 2017 no. 48).

Mangrove forest cover on the island is estimated at 171 ha (UNESCO 2021). Key mangrove areas include Spaans Lagoen and Mangel Halto, which are historically significant and have supported local communities for generations through fisheries and other natural resources (ACF, 2025b). These areas illustrate the close relationship between healthy ecosystems and cultural practices, and their preservation is therefore important not only for biodiversity, but also for safeguarding Aruba's cultural heritage (ACF, 2025b). A recent assessment of mangrove extent in Spaans Lagoen and Isla di Oro suggests that cover has increased slightly in both areas since 2018 (van den Dries, 2025).

Mangrove extent across the Tropical Northwestern Atlantic was estimated at 17,408 km² in 2020 which equates to 11.8% of the total global mangrove area (Troche-Souza et al., 2024). However, mangrove forests within this region have been assessed as vulnerable against the IUCN red list.

The accumulation of organic matter in mangrove soils enables these forests to store large amounts of carbon, making them among the most carbon-rich ecosystems on Earth. Globally, mangroves store an average of 394 tonnes of carbon per hectare and can contain approximately ten times more carbon per hectare than terrestrial forests (Leal & Spalding, 2024). In the Dutch Caribbean, mangrove forests are estimated to contain a total carbon stock of nearly 564,000 tonnes across approximately 1,205 ha of habitat (Tamis & Foekema, 2016). In Aruba, mangrove areas are estimated to accumulate carbon at a long-term rate of 1.39 tonnes per hectare per year, with a total stock of 66,006 tonnes (TEEB Aruba, 2018).

Mangroves in urban areas across the Tropical Northwestern Atlantic have been found to accumulate sediments and nutrients at unexpectedly high rates, which may make them more resilient to sea-level rise by helping them to maintain elevation (Leal & Spalding, 2024). The ecosystem services provided by mangroves are estimated to be worth US\$ 1.6 billion globally each year, particularly through fisheries support, water quality maintenance, coastal protection and ecotourism (Polidoro et al., 2010). Beyond their ecological and economic importance, mangroves also provide cultural and recreational benefits through ecotourism, research and environmental education.

Table 6: Mangrove species recorded in Aruba's marine environment. Source: DNM.

Scientific name	English name	IUCN Red List	SPAW
<i>Rhizophora mangle</i>	red mangrove	Least Concern	Annex III
<i>Laguncularia racemosa</i>	white mangrove	Least Concern	Annex III
<i>Avicennia germinans</i>	black mangrove	Least Concern	Annex III
<i>Conocarpus erectus</i> *	buttonwood / button mangrove	Least Concern	Annex III

*Not a true mangrove species, but is considered a mangrove in Aruba (and Florida).

Threats

Mangrove forests face interconnected threats that can reduce the ecosystem services they provide. Globally, the greatest threats are habitat loss caused by aquaculture, agriculture and coastal development for housing and tourism, together with overexploitation (Debrot et al., 2025). Conversion of mangroves for aquaculture, oil palm and rice cultivation accounted for 43.3% of global mangrove loss between 2000 and 2024 (Leal & Spalding, 2024). Coastal development also restricts mangrove expansion and alters natural hydrology. Together with pollution, these pressures can impair the health and regeneration of mangrove ecosystems.

Mangrove cover in the Caribbean declined by 7.9% between 1996 and 2020, reflecting ongoing pressures across the region (DCNA, 2024b). This rate of loss exceeds the global average and is mainly associated with coastal development, population growth and climate change (Bunting et al., 2022). If this trend continues, mangroves could become regionally extinct within the next few centuries (Rull, 2023).

Addressing these pressures will require stronger enforcement of sustainable development regulations, effective restoration initiatives, and meaningful community engagement to build long-term stewardship. The continued loss of mangroves would not only reduce biodiversity and ecosystem service provision, but also erode the cultural heritage and natural resilience that these habitats provide for the people of Aruba (ACF, 2025b).

5. Existing natural and ecological values: Species

5.1 Summary of nationally protected marine species in Aruba

Article 13 of Aruba's Nature Protection Ordinance (*Natuurbeschermingsverordening*; AB 1995 No. 2, as amended) prohibits the killing, capture, injury or disturbance of protected fauna, as well as the taking of their eggs. These protections are implemented through the Ordinance and national decrees, including the 2017 Decree on the Protection of Indigenous Flora and Fauna. The Ordinance also

provides the domestic legal framework for implementing international agreements such as SPAW and CITES; as advised, the Article 13 prohibition extends to fauna species listed under those agreements.

Table 7: Marine species and habitats groups protected under Aruba's Nature Protection Ordinance (Natuurbeschermingsverordening; AB 1995 No. 2, as amended).

Species group	Protected species and species groups
Marine invertebrates	• All corals (Anthozoa and Hydrocorallina) • Long-spined sea urchin (<i>Diadema antillarum</i>) • Red cushion sea star (<i>Oreaster reticulatus</i>) • Cone snails (<i>Conus curassaviensis</i>, <i>Conus hieroglyphus</i>, <i>Conus wendrosi</i>) • Queen conch (<i>Strombus gigas</i>) • Milk conch (<i>Strombus costatus</i>) • Rooster-tail conch (<i>Strombus gallus</i>) • Fighting conch (<i>Strombus pugilis</i>) • Hawk-wing conch (<i>Strombus raninus</i>) • Caribbean crown conch (<i>Melongena melongena</i>) • Caribbean spiny lobster (<i>Panulirus argus</i>)
Fish and elasmobranchs	• All parrotfish species (family Scaridae) • Nassau grouper (<i>Epinephelus striatus</i>) • Atlantic goliath grouper (<i>Epinephelus itajara</i>) • Atlantic bluefin tuna (<i>Thunnus thynnus</i>) • Whale shark (<i>Rhincodon typus</i>) • Oceanic manta ray (<i>Manta birostris</i>) • Smalltooth sawfish (<i>Pristis pectinata</i>) • Scalloped hammerhead (<i>Sphyrna lewini</i>) • Great hammerhead (<i>Sphyrna mokarran</i>)
Sea turtles	• Loggerhead turtle (<i>Caretta caretta</i>) • Green turtle (<i>Chelonia mydas</i>) • Leatherback turtle (<i>Dermochelys coriacea</i>) • Hawksbill turtle (<i>Eretmochelys imbricata</i>) • Kemp's ridley turtle (<i>Lepidochelys kempii</i>) • Olive ridley turtle (<i>Lepidochelys olivacea</i>)
Cetaceans	• All whales, dolphins and porpoises (Order Cetacea)

Species group	Protected species and species groups
Marine flora	• All native seagrass species • red mangrove (<i>Rhizophora mangle</i>) • white mangrove (<i>Laguncularia racemosa</i>) • black mangrove (<i>Avicennia germinans</i>) • Buttonwood (<i>Conocarpus erectus</i>) • Coralline algae (family Corallinaceae)

5.2 Elasmobranchs

Sharks and rays (elasmobranchs) are important components of marine ecosystems and are often regarded as indicators of ecosystem health due to their role as apex and mesopredators within marine food webs (Debrot et al., 2025). Their ecological functions vary among species and life stages, ranging from regulating prey populations and maintaining food-web structure to influencing the distribution and behaviour of other marine organisms.

Dutch Caribbean waters support a high diversity of elasmobranchs, with 95 species recorded to date, comprising 61 shark species and 34 ray species (Leurs & Winter, 2025). Nearly half of these species are globally threatened, highlighting the high conservation value of the region and reinforcing the importance of regional protection measures and coordinated marine spatial planning, including marine protected area networks (Gallagher et al., 2020; Leurs & Winter, 2025).

Within Aruba's waters, at least 23 elasmobranch species have been recorded based on compiled observations, fisheries data and stranding records (van Beek et al., 2012; Leurs & Winter, 2025). However, the true diversity is likely higher, reflecting both the mobility of many species and limited sampling effort in offshore and deepwater habitats.

Elasmobranchs occur across all marine habitats within Aruba's EEZ, including coral reefs, sandy substrates, seagrass beds, pelagic waters and deep-sea environments (Winter and de Graaf, 2019). Many coastal shark species utilise shallow reef habitats and adjacent nursery areas during early life stages before moving into deeper offshore waters as they mature (Stoffers et al., 2021). Offshore pelagic habitats are particularly important for highly migratory species such as the oceanic whitetip shark (*Carcharhinus longimanus*), shortfin mako (*Isurus oxyrinchus*) and silky shark (*Carcharhinus falciformis*), although their spatial ecology within the Dutch Caribbean remains incompletely understood (Leurs & Winter, 2025).

Evidence from deepwater surveys indicates that offshore and mesophotic environments may support a greater diversity of elasmobranchs than currently documented. Surveys across the Leeward Dutch Caribbean recorded only eight sightings of six species between 80 and 900 m depth, including the bigeye sixgill shark (*Hexanchus nakamurai*), highlighting both the ecological importance of these habitats and existing knowledge gaps (Leurs & Winter, 2025).

Table 8a: Elasmobranch species confirmed from Aruba's waters. Species recorded through direct observation, fisheries data, or stranding records. Source: van Beek et al., 2012; Leurs & Winter, 2025.

Scientific name	Common name	IUCN Red List	CITES	SPAW
<i>Carcharhinus perezii</i>	Caribbean reef shark	Endangered	Not listed	Not listed
<i>Galeocerdo cuvier</i>	Tiger shark	Near Threatened	Not listed	Not listed
<i>Ginglymostoma cirratum</i>	Nurse shark	Vulnerable	Not listed	Annex III
<i>Negaprion brevirostris</i>	Lemon shark	Vulnerable	Not listed	Not listed
<i>Aetobatus narinari</i>	Whitespotted eagle ray	Endangered	Appendix II	Annex III
<i>Dasyatis americana</i>	Southern stingray	Near Threatened	Not listed	Not listed

Table 8b: Elasmobranch species expected to occur in Aruba's EEZ but not yet confirmed in Aruba-specific records, based on: (i) IUCN Red List distribution ranges; (ii) habitat and ecological suitability; and (iii) documented occurrence across the wider Dutch Caribbean region, including the Leeward Islands. Sources: Leurs & Winter (2025); IUCN (2026).

Scientific name	Common name	IUCN Red List	CITES	SPAW
Sharks				
<i>Alopias superciliosus</i>	Bigeye thresher shark	Vulnerable	Appendix II	Not listed
<i>Alopias vulpinus</i>	Thresher shark	Vulnerable	Appendix II	Not listed
<i>Carcharhinus leucas</i>	Bull shark	Near Threatened	Appendix II	Not listed
<i>Carcharhinus limbatus</i>	Blacktip shark	Vulnerable	Appendix II	Not listed
<i>Carcharhinus obscurus</i>	Dusky shark	Vulnerable	Appendix II	Not listed
<i>Isurus oxyrinchus</i>	Shortfin mako	Vulnerable	Appendix II	Not listed
<i>Rhincodon typus</i>	Whale shark	Endangered	Appendix II	Annex III
<i>Sphyrna lewini</i>	Scalloped hammerhead	Endangered	Appendix II	Annex III
<i>Sphyrna mokarran</i>	Great hammerhead	Critically Endangered	Appendix II	Annex III
<i>Sphyrna zygaena</i>	Smooth hammerhead	Vulnerable	Appendix II	Annex III
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	Critically Endangered	Appendix II	Annex III
<i>Carcharhinus falciformis</i>	Silky shark	Vulnerable	Appendix II	Annex III
<i>Cetorhinus maximus</i>	Basking shark	Vulnerable	Appendix II	Annex III
<i>Rhizoprionodon landii</i>	Brazilian sharpnose shark	Vulnerable	Not listed	Not listed
<i>Sphyrna tiburo</i>	Bonnethead shark	Endangered	Appendix II	Not listed

Rays				
<i>Mobula birostris</i>	Oceanic manta ray	Endangered	Appendix II	Annex III
<i>Mobula tarapacana</i>	Sicklefin devil ray	Endangered	Appendix II	Annex II
<i>Rhina ancylostoma</i>	Bowmouth guitarfish	Vulnerable	Appendix II	Not listed
<i>Pristis pectinata</i>	Smalltooth sawfish	Critically Endangered	Appendix I	Annex III

Several highly migratory shark species are known to move through or utilise the wider region surrounding Aruba. Tagging studies have documented trans-equatorial movements of basking sharks (*Cetorhinus maximus*) between the north-eastern United States and South America, with individuals spending extended periods at mesophotic depths and passing through Caribbean waters (Skomal et al., 2009). Although basking sharks are rarely observed locally, a confirmed sighting off Aruba's north-eastern coast in 2016 represented the first record since a stranding event in 1974 (Geelhoed et al., 2016), reinforcing their occasional but important presence in the region.

Whale sharks (*Rhincodon typus*), classified globally as Endangered, show a strong association with the southern Dutch Caribbean. Debrot et al. (2013) documented 24 sightings across the Dutch Caribbean, with the majority (20 records) occurring in the Leeward islands. This distribution is linked to the productivity of the South American Upwelling System, which enhances nutrient availability and seasonal plankton blooms influenced by riverine inputs and oceanographic circulation patterns (Romero et al., 2000). Whale sharks have been recorded in the region throughout most of the year and are believed to feed on planktonic aggregations including crab megalopae and coral spawn (Debrot et al., 2013). Manta and devil rays similarly exploit plankton-rich waters, although records remain comparatively scarce in Aruba (DCNA, 2022).

The combination of productive offshore waters, deep pelagic systems and strong regional connectivity strongly suggests that Aruba's EEZ supports a diverse and ecologically important elasmobranch assemblage that is not yet fully characterised by available data. These waters are therefore highly significant for both resident and migratory shark and ray species.

Threats

Elasmobranch populations have declined globally, with approximately one-third of all shark and ray species now threatened with extinction (Dulvy et al., 2021). Across the Caribbean, these declines are primarily driven by overfishing and the inherently vulnerable life-history traits of many species, including slow growth, late maturity and low reproductive output.

Fishing mortality remains the most significant pressure. Although targeted shark and ray fisheries are limited within the Dutch Caribbean, many species are exposed to fishing pressure throughout their broader migratory ranges. Highly migratory species, including oceanic whitetip, silky and hammerhead sharks, are frequently captured as bycatch in pelagic longline and purse-seine fisheries, while coastal species are vulnerable to incidental capture in artisanal and recreational fisheries (Leurs & Winter, 2025). Longline fisheries operating in waters adjacent to Aruba's EEZ, particularly in the southern Caribbean, represent a notable source of mortality for a range of elasmobranch species (Borobia et al., 2023).

Coastal habitat degradation further compounds these pressures. The loss and degradation of coral reefs, mangroves and seagrass habitats reduces the availability of nursery areas and feeding grounds used by juvenile sharks and rays, while also weakening ecosystem connectivity across life stages (Debrot et al., 2025). For species dependent on multiple habitats throughout their life cycle, these changes can have significant population-level impacts.

Climate change is expected to intensify existing pressures through rising sea temperatures, altered ocean circulation, shifts in prey distribution and increasing frequency of marine heatwaves and extreme weather events. These changes may influence migration routes, habitat suitability and species distributions, particularly for highly mobile pelagic species.

Although knowledge gaps remain, available evidence clearly indicates that Aruba's offshore waters are important for a variety of shark and ray species, including highly migratory taxa. Additional research would improve understanding of species distributions, habitat use and migration patterns, helping to strengthen and refine future conservation and management actions.

5.3 Cetaceans

Cetaceans (whales, dolphins and porpoises) play a fundamental role in maintaining ocean health by regulating nutrient dynamics, enhancing carbon storage, and supporting marine food webs. They are recognised as sentinels of ocean health (Henriquez, 2025) and are protected globally under several international treaties including CITES¹⁰, CMS¹¹, SPAW¹², CBD¹³ and ICRW¹⁴. All cetaceans are listed as Annex II species under the SPAW Protocol which calls for contracting parties to ensure the total protection and recovery of these species.

Wider Dutch Caribbean data

The Caribbean region contains habitats that are critical for marine mammal feeding, nursery, mating and calving (Borobia et al., 2023). Approximately 30 different species of cetaceans have been observed in the Caribbean Sea and the importance of Aruba's offshore area for cetaceans and other marine mammals should not be underestimated. The region has lost one marine mammal species, the Caribbean monk seal (*Neomonachus tropicalis*), which was a pinniped (Parvorder: Pinnipedia) not a cetacean, and was last seen in 1957 and declared extinct in 2008 (Baker et al., 2008).

Aruba cetacean data

Aruba has 20 confirmed cetacean species comprising six whale species and 14 dolphin species (Table 9; Henriquez, 2025). A further two species lack documented visual confirmation and are therefore marked as suspected. The Atlantic spotted dolphin (*Stenella frontalis*) has the highest number of recorded observations followed by common bottlenose dolphin (*Tursiops truncatus*), rough-toothed dolphin (*Steno bredanensis*), long-snouted spinner dolphin (*Stenella longirostris*), pantropical spotted dolphin (*Stenella attenuata*) (Henriquez, 2025).

¹⁰ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) — www.cites.org

¹¹ Convention on the Conservation of Migratory Species of Wild Animals (CMS) — CMS www.cms.int

¹² Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region (SPAW) — SPAW-RAC www.car-spaw-rac.org

¹³ Convention on Biological Diversity (CBD) — Convention on Biological Diversity www.cbd.int

¹⁴ International Convention for the Regulation of Whaling (ICRW) — International Whaling Commission www.iwc.int

Table 9: Cetaceans observed in Aruba's waters. * An asterisk indicates a suspected species.

Scientific name	English name	IUCN Red List	CITES	SPAW
Odontocetes (Toothed whales)				
<i>Stenella frontalis</i>	Atlantic spotted dolphin	Least Concern	Appendix II	Annex II
<i>Tursiops truncatus</i>	Common bottlenose dolphin	Least Concern	Appendix II	Annex II
<i>Stenella longirostris</i>	Long-snouted spinner dolphin	Least Concern	Appendix II	Annex II
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	Least Concern	Appendix II	Annex II
<i>Stenella attenuata</i>	Pantropical spotted dolphin	Least Concern	Appendix II	Annex II
<i>Delphinus delphis</i>	Common dolphin	Least Concern	Appendix II	Annex II
<i>Stenella coeruleoalba</i>	Striped dolphin	Least Concern	Appendix II	Annex II
<i>Steno bredanensis</i>	Rough-toothed dolphin	Least Concern	Appendix II	Annex II
<i>Stenella clymene</i>	Short-snouted spinner dolphin	Least Concern	Appendix II	Annex II
<i>Pseudorca crassidens</i>	False killer whale	Least Concern	Appendix II	Annex II
<i>Feresa attenuata</i> *	Pygmy killer whale	Least Concern	Appendix II	Annex II
<i>Ziphius cavirostris</i>	Cuvier's beaked whale	Least Concern	Appendix II	Annex II
<i>Orcinus orca</i>	Killer whale	Data deficient	Appendix II	Annex II
<i>Grampus griseus</i>	Risso dolphin	Least Concern	Appendix II	Annex II
<i>Lagenodelphis hosei</i>	Fraser's dolphin	Least Concern	Appendix II	Annex II
<i>Peponocephala electra</i>	Melon-headed whale	Least Concern	Appendix II	Annex II
<i>Mesoplodon europaeus</i>	Gervais' beaked whale	Least Concern	Appendix II	Annex II
<i>Kogia sima</i>	Pygmy sperm whale	Least Concern	Appendix II	Annex II
<i>Physeter macrocephalus</i>	Sperm whale	Vulnerable	Appendix I	Annex II
Balaenoptera (Baleen whales)				
<i>Balaenoptera acutorostrata</i> *	Common minke whale	Least Concern	Appendix II	Annex II
<i>Balaenoptera brydei</i>	Bryde's whale	Least Concern	Appendix II	Annex II
<i>Megaptera novaeangliae</i>	Humpback whale	Least Concern (increasing)	Appendix I	Annex II

Information on the density, distribution and occurrence of cetaceans within the Dutch Caribbean is largely based on opportunistic sightings and strandings data (Scheidat et al., 2015; Borobia et al., 2023; Luksenburg, 2011). Early records date from the 1970s and include reports of very large 'dark' dolphins (possibly beaked whales or blackfish), large brown whales and black whales (Henriquez, 2025). Recent evidence can also be difficult to verify and often comes with few details or data (Luksenburg, 2011). Since 1998 the Aruba Marine Mammal Foundation (AMMF) has collected data on stranding, sheltering, and third-party cetacean encounters. AMMF's dataset has approximately 682 entries (Henriquez, 2025).

In Aruba, three species are known only from single historical sightings: short-finned pilot whale (*Globicephala macrorhynchus*), Cuvier's beaked whale (*Ziphius cavirostris*), and pygmy sperm whale

(*Kogia sima*) (Debrot, 1998). In 2010, photographic evidence confirmed the presence of false killer whale (*Pseudorca crassidens*), Atlantic spotted dolphin (*Stenella frontalis*), and spinner dolphin (*Stenella longirostris*). This represented the first confirmed record of spinner dolphin in Aruba (Luksenburg, 2011).

In 2010–2011, a 20-month study helped address gaps in Aruba’s cetacean data and produced 117 verified sightings of eight species (Luksenburg, 2014). The Atlantic spotted dolphin was recorded most frequently, with 59 sightings, typically at distances of around 5 km from the coast and up to 15 km offshore. Sightings were concentrated along Aruba’s north-west and south-west coasts, and all observed adults were heavily spotted, consistent with coastal populations in Central and South America (Luksenburg, 2014). The second and third most frequently recorded species were the common bottlenose dolphin (*Tursiops truncatus*) and spinner dolphin, with 33 and 12 sightings, respectively (Luksenburg, 2014). Most sightings occurred within 5 km of shore, although this may reflect the study’s monitoring range, with little data from further offshore.

Debrot et al. (2011) analysed 279 cetacean sighting and stranding records across Dutch Caribbean waters and found a higher occurrence of beaked whales and Bryde’s whale (*Balaenoptera brydei*) in the waters surrounding the LDC islands compared to the windward Dutch islands.

Although there are limited data, local knowledge and shared observations suggest that Bryde’s whale exhibits seasonal behaviour within the waters of Aruba, Bonaire and Curaçao (CCS, 2023).

More recently, the Caribbean Cetacean Society (CCS) began the Ti Whale An Nou programme which is focused on cooperation, research, education and conservation for whales and dolphins. The programme represents one of the largest coordinated scientific efforts to improve understanding of cetacean distribution and ecology in the Caribbean. The programme’s ABC island research expedition recorded eight cetacean species in 2023, and seven species in 2024. In 2023, 13 new sperm whale (*Physeter macrocephalus*) individuals were identified in Bonaire and Curaçao. In 2024, a large group of ~70 pantropical spotted dolphin (*Stenella attenuata*), and a group of ~75 spinner dolphins were observed (CCS, 2024). Calves and juveniles were frequently recorded with all species emphasising the importance of nursery habitats (CCS, 2024).

Temporal and spatial distribution

Analysis of available records confirms that cetaceans occur in Aruban waters throughout the year. Observation records increase gradually towards the end of the dry season and peak in September (13.4%), October (12.2%) and November (10.5%) (Henriquez, 2025). Available evidence also suggests that Aruba is a sympatric cetacean area, where offshore pelagic species and coastal shelf-dwelling cetaceans occur in the same waters. This is supported by sightings recorded offshore (depth >200 m), nearshore (depth <200 m), and in shallow sheltered areas (Henriquez, 2025).

Four examples of offshore mixed dolphin species association have been recorded, comprising pairs of: (1) common bottlenose dolphin with pantropical spotted dolphin; (2) common bottlenose with Atlantic spotted; (3) Atlantic spotted with pantropical spotted; and (4) one complex group consisting of common bottlenose, Risso’s and an unidentified spotted dolphin species. Additionally, a coastal observation documented a nearshore mixed-species group involving a false killer whale group mixed with at least one Risso’s dolphin individual along the South Reef on the leeward side of Aruba (Henriquez, 2025). In January 2026, an underwater video submitted to AMMF revealed a mixed group

of bottlenose dolphins and pilot whales 4 km from the coast. Anecdotal accounts from fishermen describe co-occurring feeding groups of sperm whales and Bryde's whales with one to three whale sharks (*Rhincodon typus*) from the same locality.

Threats

Globally, human activities have negatively affected cetacean populations through fishing, vessel strikes, pollution and acoustic disturbance. On Aruba's leeward coast, intense human activity and infrastructure development overlap with important cetacean habitat. Water-based activities, including artisanal and charter deep-sea fishing, sailing tours, pleasure yachts, wave-runners and other water sports, can disturb or injure cetaceans. Key anthropogenic threats documented in Aruban waters include chemical, noise and debris pollution, entanglement in ghost nets and ropes, habitat degradation, seismic surveys, and direct disturbance and harassment (Henriquez, 2025). Additional future risks may arise from proposed open-sea finfish aquaculture projects and oil and gas exploration. However, more data is needed to determine the full extent of these threats and pressures on local cetacean species.

Luksenburg (2014) found that 18.7% of individuals across three cetacean species (Atlantic spotted dolphin, common bottlenose dolphin, and false killer whale) in Aruban waters showed external injuries, with 41.7% linked to human activity. Entanglement was the main cause (53.3%), followed by vessel strikes (13.3%). Debrot et al., (2011) similarly reported high rates of human-caused mortality in the LDC compared to the Windward islands.

AMMF's dataset shows 64 stranding and in-distress incidents across 16 species, including 36 mortalities and one mass stranding (Henriquez, 2025). Four species; Fraser's dolphin (*Lagenodelphis hosei*), Cuvier's beaked whale (*Ziphius cavirostris*), Gervais' beaked whale (*Mesoplodon europaeus*), and melon-headed whale (*Peponocephala electra*) are solely documented from dead stranding incidents (Henriquez, 2025). Over the 25-year period (2000-2025) a total of 15 calf stranding incidents across nine species were recorded, these have been documented around the entire island, with February and November exhibiting the highest frequency of records (Henriquez, 2025) (Figure 14). With the month of May, after a calf stranding in 2026. Fishing activity, particularly entanglement and bycatch, is a major threat to cetaceans in the Dutch Caribbean. At least 16 species have been recorded as bycatch, with longline fisheries considered a key risk (Fon Sing & Rademakers, 2022). However, many countries across the wider Caribbean region lack the resources to monitor and manage the level of cetacean bycatch (Borobia et al., 2023).

Entanglement in fishing gear, including interactions with fish aggregating devices (FADs), has been documented as a cause of mortality in cetaceans in the Caribbean, including sperm whales (Rinaldi & Rinaldi, 2014; Luksenburg, 2014).

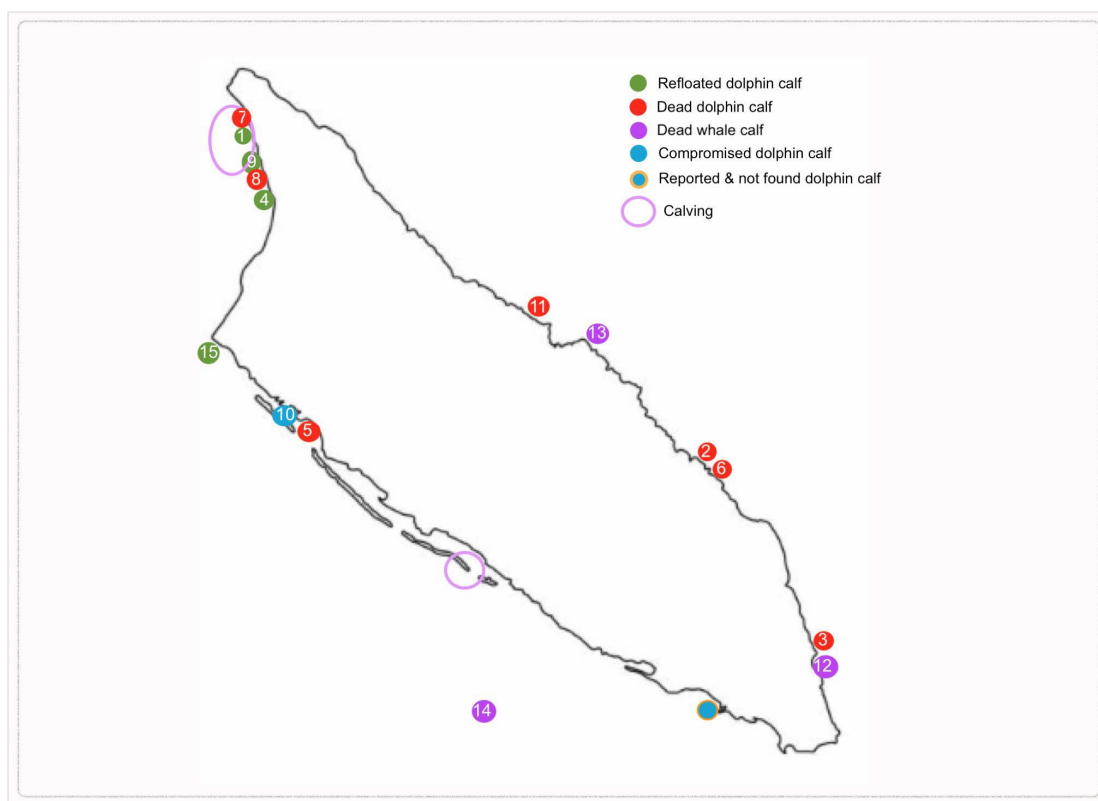


Figure 14: Spatial distribution of calf stranding records. Source: Henriquez, 2025.

The expansion of FAD use, including around Aruba, may increase this risk by extending fishing activity into previously less disturbed areas (Maufroy, 2016). At present, one anchored FAD is located on the windward side of the island, extending local fishing activity into a previously undeveloped stretch of coastline that also falls within the known range of the Bryde's whale.

Aruba lies within one of the world's busiest shipping regions and experiences high levels of marine traffic (Singh et al., 2015). Its coastline includes two commercial ports (Barcadera and Oranjestad), five yachting harbours, several artisanal boat harbours, and near-continuous hotel and residential development. Although the main shipping corridor lies to the north of the windward coast, most vessel activity is concentrated along the leeward coast (Henriquez, 2025). Ship strikes can cause serious injury or death, but there are major data gaps on their occurrence in the Dutch Caribbean (CCS, 2023; Borobia et al., 2023).

Low-frequency sounds generated by shipping, drilling and seismic surveys can travel long distances underwater and affect marine animals both physiologically and behaviourally (Hildebrand, 2009). The extent and nature of these impacts depend on the characteristics of the sound and the species exposed. Heenehan et al. (2019) documented high levels of vessel noise across Caribbean monitoring sites, with evidence of overlap between anthropogenic noise and humpback whale vocalisations. No humpback whale song was recorded at the Aruba monitoring site, where vessel presence was near continuous. Acoustic disturbance and vessel strikes have also been identified as priority threats to marine mammals across the Wider Caribbean Region (Borobia et al., 2023).

5.4 Turtles

Sea turtles are culturally iconic and ecologically important species throughout Caribbean coastal ecosystems (Teelucksingh et al., 2010). Beyond their ecological value, they provide significant social and economic benefits to Caribbean nations, where turtle-related ecotourism supports local livelihoods, contributes to coastal economies, and generates revenue from nature-based tourism (Troëng & Drews, 2004). As charismatic flagship species, sea turtles also play an important role in promoting environmental awareness and strengthening public support for marine conservation and stewardship across the Dutch Caribbean (DCNA, 2025). Consequently, their conservation has long been recognised as a regional priority, reflecting both their ecological significance and their contribution to the natural capital that underpins Caribbean tourism economies.

Sea turtles play a critical role in maintaining the structure and function of coral reef and seagrass ecosystems, where several species forage (van der Wal et al., 2016). As highly migratory animals, they undertake extensive movements across national boundaries and international waters, linking habitats and ecological processes across the wider Caribbean region (van der Wal et al., 2016). Their ecological functions are diverse: sea turtles act as consumers, prey and competitors, hosts for parasites and pathogens, substrates for epibionts, nutrient transporters, and ecosystem engineers that modify and maintain marine habitats (Debrot et al., 2024). For example, the green turtle (*Chelonia mydas*), a keystone species in seagrass ecosystems, can enhance sediment carbon storage, stimulate seagrass productivity, and increase nutrient content through grazing, thereby contributing to ecosystem resilience and blue carbon sequestration (Christianen et al., 2023). Collectively, these ecological roles, combined with their cultural significance and economic value through tourism, make sea turtles a key component of marine biodiversity and ecosystem functioning in Aruba.

Table 10: Species of turtles observed in Aruba's marine environment. Source: Bräutigam & Eckert (2006); van der Wal et al. (2016); Eckert & Eckert (2019).

Scientific name	English name	IUCN Red List	CITES	SPAW
<i>Chelonia mydas</i>	Green turtle	Endangered	Appendix II	Annex II
<i>Caretta caretta</i>	Loggerhead turtle	Vulnerable	Appendix II	Annex II
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Critically Endangered	Appendix II	Annex II
<i>Dermochelys coriacea</i>	Leatherback turtle	Vulnerable	Appendix II	Annex II

Aruba supports nesting populations of four sea turtle species: the green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), and leatherback turtle (*Dermochelys coriacea*) (Brautigam & Eckert, 2006; van der Wal et al., 2016; Eckert & Eckert 2019). The island's sandy beaches provide important nesting habitat, while adjacent coastal waters, including seagrass meadows and reef-associated habitats, support foraging and inter-nesting activities. In addition to resident and nesting individuals, Aruba's waters are likely used by migratory turtles moving between breeding and foraging grounds throughout the Wider Caribbean Region (van der Wal et al., 2016).

Sea turtles are fully protected under Aruba's Nature Protection Ordinance (Natuurbeschermingsverordening; AB 1995 No. 2, as amended), with legal protection extending to eggs and nesting sites since 1980 (Koubrak et al., 2021). Historical records suggest that sea turtles were once abundant throughout the Dutch Caribbean, although much of the early evidence was anecdotal and documentation of nesting activity was limited (Debrot et al., 2005). The earliest documented nesting-related record for Aruba is a leatherback turtle observed coming ashore in 1974 (Debrot et al., 2005). Subsequent observations reported that hawksbill and green turtles of varying sizes occur offshore throughout the year and are thought to likely forage in local waters (Barnes et al., 1993).

Nesting in Aruba occurs primarily between October to December, with hatchling emergence extending from May to November (Turtugaruba, 2025). Sea turtles are highly migratory and may travel thousands of kilometres between breeding and foraging grounds (Hays & Scott, 2013). Available evidence suggests that turtles migrate to Aruba from distant foraging areas to reproduce. During the nesting season, gravid hard-shell turtles are primarily associated with coastal waters and benthic habitats within Aruba's territorial waters, whereas gravid leatherbacks are less constrained by nearshore habitats and may range more than 100 km offshore (van der Wal et al., 2016). Satellite tracking data indicate that leatherbacks nesting in Aruba show a strong preference for waters west of the island, with individuals recorded up to 200 km west and 40 km east of Aruba during the reproductive period (van der Wal et al., 2016).

The broader southern Caribbean also supports important foraging habitats for sea turtles. For example, the approximately 200 ha seagrass meadow in Lac Bay, Bonaire, hosts one of the largest green turtle foraging aggregations in the southern Caribbean (Christianen et al., 2022). Green turtles are long-lived and exhibit strong fidelity to relatively small foraging grounds, often remaining in these areas for more than a decade before reaching sexual maturity. Such long-term use of discrete feeding habitats links local populations to a wider network of Caribbean coastal ecosystems.

Regional telemetry studies further demonstrate the extensive connectivity of sea turtle populations within the Dutch Caribbean. Tracking of post-breeding turtles from Bonaire showed that adults migrated to foraging grounds located 608–1,766 km away for loggerhead turtles and 198–3,135 km away for both green and hawksbill turtles (Becking et al., 2016). Tagged individuals entered the waters of 19 countries, including routes extending towards Nicaragua and Honduras. One proposed migratory corridor passes northwest from Bonaire through waters that include Aruba's EEZ, suggesting that turtles nesting on Aruba's beaches may utilise similar regional migration pathways (Becking et al., 2016) (Figure 16). These findings demonstrate that Aruba's turtle populations form part of a highly connected Caribbean metapopulation, with individuals regularly moving between nesting, foraging, and migratory habitats across multiple jurisdictions.

Although the olive ridley turtle (*Lepidochelys olivacea*) has not been recorded nesting in Aruba, recent observations in Curaçao and Bonaire suggest that the species may occur more regularly in the southern Caribbean than previously recognised (Debrot et al., 2024). Continued monitoring is improving understanding of species distributions, habitat use, and migratory movements throughout the Dutch Caribbean.

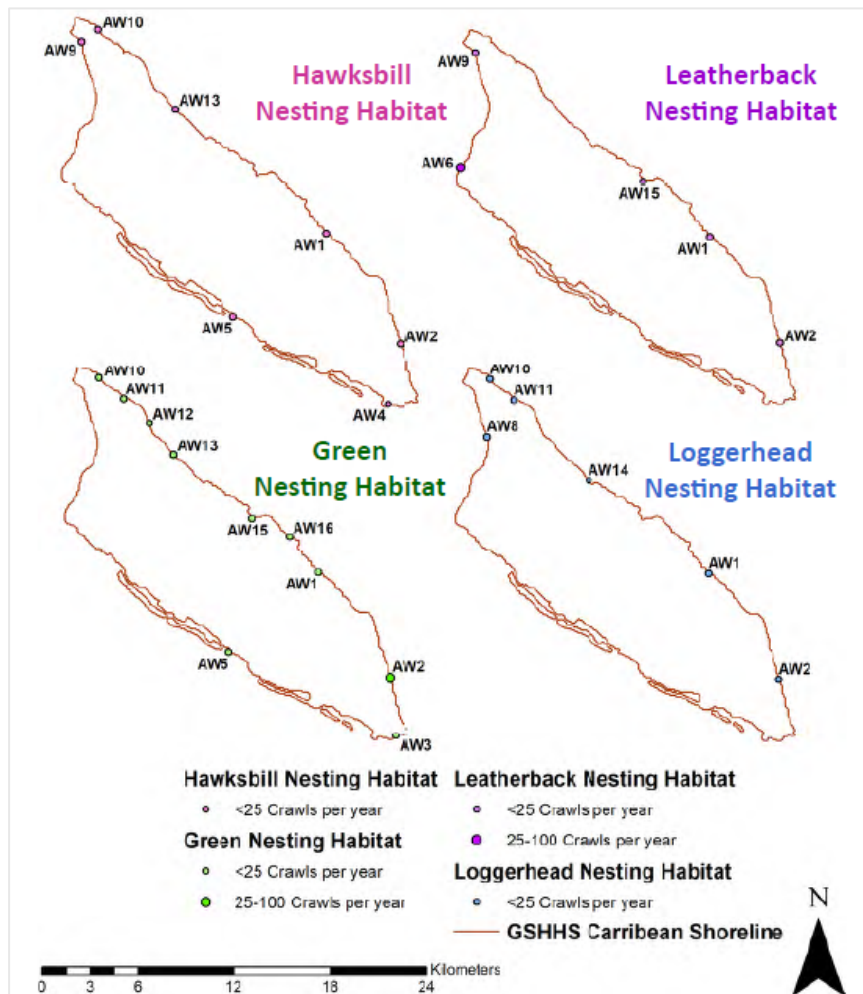


Figure 15: Turtle nesting sites across Aruba. Data derived from the Wider Caribbean regional nesting habitat atlas. Source: Eckert & Eckert, 2019.

Threats

Sea turtles are highly migratory species that depend on a range of distinct habitats throughout their life cycle, including nesting beaches, nearshore developmental and foraging areas, and oceanic migratory routes. As a result, they are exposed to different pressures at different life stages, making populations vulnerable to a wide suite of both local and distant anthropogenic impacts.

Within Aruba, the concentration of tourism, recreation, and coastal development along the shoreline creates important pressures on sea turtle populations. The island's nesting beaches overlap with areas of intensive human use, exposing turtles to disturbance from beach recreation, pedestrian traffic, coastal infrastructure, and nighttime activities. Artificial lighting associated with hotels, roads, residential developments, and beachfront infrastructure can disrupt nesting behaviour and disorient both nesting females and emerging hatchlings, reducing hatchling survival and nesting success (Debrot et al., 2025; Strobl et al., 2016). Coastal light pollution is widely recognised as one of the most pervasive impacts of coastal development on sea turtle populations worldwide, and has well-documented negative effects on nesting success, including reduced nesting activity and increased hatchling mortality.

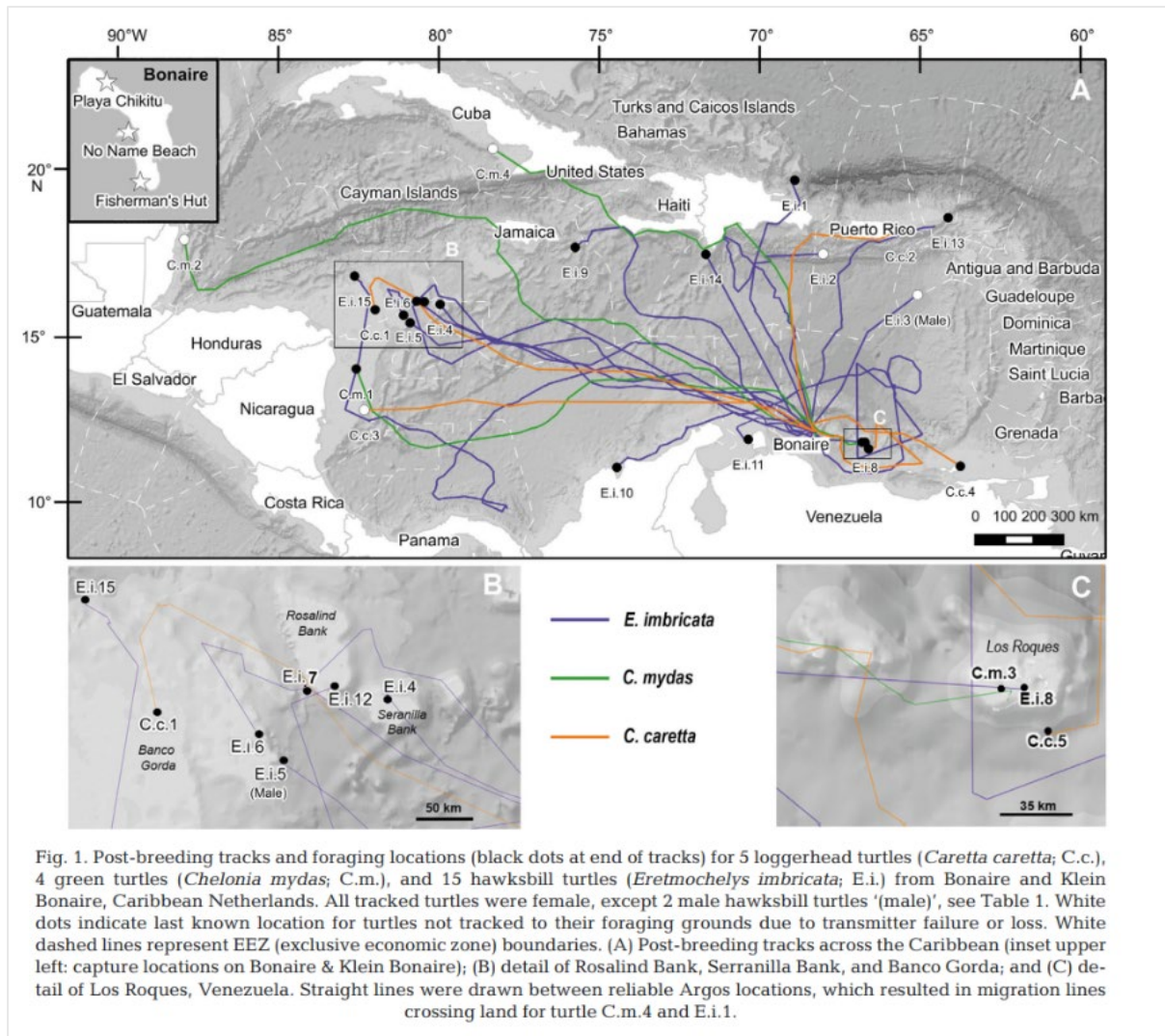


Figure 16: Sea turtle migratory routes across the Caribbean Sea. Source: Becking et al., 2016.

Physical alteration of beaches can further reduce nesting success. Coastal development, shoreline stabilisation structures, beach furniture, recreational infrastructure, and sand extraction may reduce the availability and quality of nesting habitat or impede access to suitable nesting sites. Given Aruba's highly developed coastline and the concentration of tourism infrastructure along many sandy beaches, the potential for interactions between human activities and nesting turtles is particularly high. Similar pressures have been identified as significant threats to sea turtle nesting habitats throughout the Caribbean region.

Nearshore habitats used by sea turtles are also subject to intensive human activity. Aruba's coastal waters support high levels of recreational boating, diving, snorkelling, swimming, fishing, and other marine tourism activities, increasing the potential for disturbance and vessel strikes. Anchoring and other seabed-disturbing activities can damage seagrass meadows and reef habitats that provide important feeding grounds for green and hawksbill turtles. Green turtles may be particularly vulnerable to habitat degradation because of their strong fidelity to foraging grounds, often occupying the same feeding areas for many years prior to reaching maturity (Christianen et al., 2022).

More broadly, declining water quality resulting from coastal development, wastewater discharge, sedimentation, and land-based pollution can reduce the ecological condition of seagrass and coral reef

habitats, affecting food availability and habitat quality. Marine debris and plastic pollution pose additional risks through entanglement and ingestion, while contaminants may have sublethal effects on turtle health, growth, immune function, and reproductive success.

Sea turtles in Aruba also face threats beyond the island's waters due to their highly migratory nature. Individuals move throughout the Wider Caribbean during different stages of their life cycle and are exposed to a range of pressures across multiple jurisdictions. Fisheries interactions remain a significant source of mortality, with turtles frequently captured as bycatch in longlines, gillnets, fish traps, and other fishing gear. In Bonaire, 31% of reported turtle strandings in 2014 were linked to fisheries interactions (Stapleton et al., 2014). Globally, Wallace et al. (2010) estimated a minimum bycatch of 85,000 sea turtles between 1990 and 2008, although actual mortality is likely to be considerably higher. Fisheries bycatch continues to be recognised as one of the most significant threats to sea turtle populations worldwide (Hays et al., 2025).

Migratory turtles may also encounter both legal and illegal turtle fisheries elsewhere in the Caribbean. Nicaragua supports one of the largest remaining legal green turtle fisheries and accounts for an estimated 22% of the global annual turtle harvest (Becking et al., 2016). Across the Caribbean region, 16 countries collectively accounted for approximately 34.6% of the estimated global permitted turtle take in 2014, while illegal harvest continues in several countries, including Venezuela and the Dominican Republic (Humber et al., 2014).

Climate change presents an additional and growing threat. Rising sea levels, increased coastal erosion, changing storm regimes, and elevated sand temperatures may affect nesting beach availability, hatchling survival, and hatchling sex ratios (Fuentes et al., 2024; Patrício et al., 2025). Climate-driven degradation of coral reefs and seagrass ecosystems may also alter the distribution, quality, and resilience of important foraging habitats throughout the Caribbean. Collectively, these pressures affect the nesting, foraging, and migratory habitats that support sea turtles within Aruba's waters and across the wider Caribbean region.

5.5 Reef and commercially important fish

Fish are an important and highly diverse component of Caribbean marine biodiversity and play a central role in maintaining the structure and function of marine ecosystems. They function as predators, prey, and grazers, thereby shaping benthic and pelagic community dynamics (Bellwood et al., 2004). Herbivorous fish, particularly parrotfishes (Scaridae) and surgeonfishes (Acanthuridae), are essential for maintaining coral reef health and resilience, regulating algal growth through grazing. Planktivorous species transfer energy from the water column into reef food webs, while predatory fishes such as snappers (Lutjanidae) and groupers (Serranidae) regulate lower trophic levels and contribute to ecosystem stability. These ecological functions also underpin important ecosystem services, including fisheries production and livelihoods (Debrot et al., 2024; Eicher, 2023).

Caribbean fish assemblages are highly diverse and are strongly shaped by habitat, depth, and oceanographic connectivity. Reef fish depend on coral reefs for shelter and food and are therefore widely used as indicators of reef health. Across the Caribbean, fish assemblages are characteristic of oceanic islands, often showing strong site specificity driven by habitat availability, with composition differing both among islands and from continental reefs (Sandin et al., 2008).

In Aruba, mangroves and seagrass meadows play a vital part in the life cycle of many fish as nursery and feeding grounds (Debrot et al, 2025; 2014; Leal & Spalding, 2024). Offshore waters support large pelagic predators and the dispersal of fish larvae, which can be transported by ocean currents and create connectivity across the region (Debrot et al, 2025). The large pelagic predators are highly migratory, transboundary species with annual migration patterns across the Caribbean.

Mesophotic reefs (30–150 m depth) and deeper slope environments represent important but comparatively understudied habitats in the region. These ecosystems are physically and biologically connected to shallow reefs and may function as ecological refugia under certain conditions (Lesser et al., 2009). Deep-reef fish assemblages vary along depth gradients in response to environmental factors such as light availability and habitat structure, often supporting distinct communities from those found in shallow waters (Pinheiro et al., 2016a). Endemism increases with depth, and new species continue to be described from these environments, reflecting the relatively limited exploration of deep reef systems (Baldwin et al., 2018).

Reef fish

A total of 135 reef fish species were recorded during baseline surveys conducted in 2019 (Vermeij et al., 2019), of which 38 species were observed again during follow-up surveys in 2022 (Eicher, 2023). The most abundant species by biomass were stoplight parrotfish (*Sparisoma viride*) and blue tang (*Acanthurus coeruleus*), together accounting for approximately 18% of total biomass (Vermeij, 2025). Aruba's total reef fish fauna is estimated to comprise approximately 360 species, similar to that reported for Curaçao (Sandin et al., 2008).

The fish community of Aruba's leeward reefs is broadly representative of Southern Caribbean reef systems, although several notable differences have been identified. Herbivores, such as the stoplight parrotfish (*Sparisoma viride*), blue tang (*Acanthurus coeruleus*), and doctorfish (*Acanthurus chirurgus*), together with omnivorous species such as the Bermuda chub (*Kyphosus sectator*) and commercially important snappers such as the yellowtail snapper (*Ocyurus chrysurus*), appear to be relatively more abundant than on reefs around Curaçao and Bonaire. This may reflect the influence of Aruba's lagoonal and nearshore nursery habitats.

In contrast, planktivores (e.g., creole wrasse *Clepticus parrae*) and larger piscivores such as great barracuda (*Sphyræna barracuda*) appear less common (Vermeij et al., 2019). Fish assemblages are dominated by small-bodied individuals, while large predators are rare.

Two main reef fish community types are observed: (1) coral-dominated reefs associated with *Orbicella* spp., *Madracis mirabilis*, and *Agaricia agaricites*, characterised by species such as *Sparisoma viride* and *Lutjanus apodus*; and (2) higher-energy habitats influenced by stronger water movement, characterised by *Acanthurus coeruleus* and *Kyphosus sectator* (Vermeij et al., 2019).

Demersal fish

Demersal fish are species associated with the seabed, including coral reefs, sandy substrates, and deeper shelf and slope habitats. Many species depend on multiple coastal habitats such as reefs, seagrass, and mangroves during different life stages, reflecting strong ecological connectivity across nearshore systems (Gillanders et al., 2003; Nagelkerken, 2009).

Across the Caribbean, demersal assemblages are dominated by groupers (Serranidae), snappers (Lutjanidae), and other reef-associated taxa that are closely linked to benthic structure and often exhibit site fidelity (Heemstra & Randall, 1993; Helfman et al., 2009). These species play an important role in structuring reef food webs and regulating lower trophic levels (Mumby et al., 2006). However, many demersal fishes are vulnerable to fishing pressure due to slow growth, late maturity, and spawning aggregation behaviour, with widespread declines in large-bodied groupers and snappers documented across the region (Sadovy de Mitcheson et al., 2013; Hawkins & Roberts, 2004).

Key demersal species in Aruba include Nassau grouper (*Epinephelus striatus*), red grouper (*Epinephelus morio*), black grouper (*Mycteroperca bonaci*), yellowfin grouper (*Mycteroperca venenosa*), and Atlantic goliath grouper (*Epinephelus itajara*), many of which are classified as threatened or near threatened.

Deeper demersal assemblages associated with mesophotic reefs and upper slope habitats remain less studied but contribute to regional biodiversity and may function as partial refugia for reef-associated species (Lesser et al., 2009; Pinheiro et al., 2016a).

Pelagic fish

Approximately 60 pelagic fish species have been reported in Aruba's waters, including tunas, mackerels, herrings, anchovies, and dolphinfish (Froese & Pauly, 2026). Key species include blackfin tuna (*Thunnus atlanticus*), skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and dolphinfish (*Coryphaena hippurus*).

Pelagic stocks are typically grouped into large coastal pelagics (e.g., wahoo *Acanthocybium solandri*, blackfin tuna *Thunnus atlanticus*, and Spanish mackerels *Scomberomorus* spp.) and highly migratory oceanic species such as yellowfin tuna, skipjack tuna, and swordfish (*Xiphias gladius*) (Mahon and McConney, 2004; FAO, 2022).

These highly mobile stocks routinely move across Exclusive Economic Zones and into international waters, resulting in complex spatial dynamics that complicate stock assessment and management.

Due to their wide-ranging and transboundary movements, offshore and coastal pelagic fish stocks are inherently difficult to monitor and assess accurately. As a result, regional management efforts increasingly focus on improving catch reporting, reducing bycatch, and strengthening data collection systems to support long-term sustainability (Bealey, 2021). Landing data from CARICOM states highlight the continued importance of large coastal pelagic species, particularly dolphinfish, blackfin tuna, and Spanish mackerels. Highly migratory tuna stocks in the Atlantic are managed at the international level by the International Commission for the Conservation of Atlantic Tunas (ICCAT), while similar cooperative governance approaches are being developed for other pelagic fisheries in the region (Mahon and McConney, 2004; FAO, 2022).

Deepwater fish

Deepwater fish assemblages remain poorly studied in Aruba. However, Debrot et al. (2024) recorded 160 deepwater species across the Leeward Dutch islands, including six confirmed from Aruba: Martinique cardinalfish (*Pronotogrammus martinicensis*), black jack (*Caranx lugubris*), red grouper (*Epinephelus morio*), hammerjaw (*Epinnula magistralis*), Guppy's tilefish (*Caulolatilus guppyi*), deepwater brotula (*Physiculus fulvus*), and Madeira moray (*Gymnothorax maderensis*). These species

are associated with deeper reef slopes and offshore habitats that remain among the least studied marine environments in the region.

Table 11: Protected and ecologically or commercially important bony fish (Osteichthyes) species recorded in Aruba's marine waters. Source: Vermeij et al., (2019); Debrot et al., 2024; Sandin et al., (2008).

Scientific name	Common name	Ecological / management significance	IUCN Red List	SPAW
Protected species				
<i>Epinephelus striatus</i>	Nassau grouper	Reef predator; historically important fishery species	Critically Endangered	Annex III
<i>Epinephelus itajara</i>	Atlantic goliath grouper	Large reef predator associated with reefs and mangroves	Vulnerable	Annex III
<i>Scaridae spp. *</i>	Parrotfishes	Key herbivores that maintain reef health by controlling algal growth and facilitating coral recruitment	Various	Annex III
Commercially and ecologically important species				
<i>Epinephelus morio</i>	Red grouper	Commercially important reef predator	Vulnerable	Not listed
<i>Mycteroperca bonaci</i>	Black grouper	Commercially important reef predator	Near Threatened	Not listed
<i>Mycteroperca venenosa</i>	Yellowfin grouper	Commercially important reef predator	Near Threatened	Not listed
<i>Ocyurus chrysurus</i>	Yellowtail snapper	Important commercial fishery species	Least Concern	Not listed
<i>Lutjanus apodus</i>	Schoolmaster snapper	Common reef-associated snapper	Least Concern	Not listed
<i>Thunnus albacares</i>	Yellowfin tuna	Highly migratory pelagic species	Least Concern	Not listed
<i>Thunnus obesus</i>	Bigeye tuna	Highly migratory pelagic species	Vulnerable	Not listed
<i>Katsuwonus pelamis</i>	Skipjack tuna	Important regional fishery species	Least Concern	Not listed
<i>Acanthocybium solandri</i>	Wahoo	Major recreational and commercial target species	Least Concern	Not listed
<i>Xiphias gladius</i>	Swordfish	Highly migratory pelagic predator	Least Concern	Not listed
<i>Makaira nigricans</i>	Blue marlin	Recreationally important billfish	Vulnerable	Not listed
<i>Istiophorus albicans</i>	Atlantic sailfish	Recreational fishery species	Least Concern	Not listed

* Parrotfish species recorded from Aruba and protected under Aruba legislation and SPAW Annex III include: *Nicholsina usta*, *Scarus coeruleus*, *Scarus coelestinus*, *Scarus guacamaia*, *Scarus taeniopterus*, *Scarus vetula*, *Sparisoma atomarium*, *Sparisoma aurofrenatum*, *Sparisoma chrysopterus*, *Sparisoma iseri*, *Sparisoma radians* and *Sparisoma viride*. Additional parrotfish species may occur within Aruba's waters and are collectively protected under the SPAW Annex III listing of *Scaridae spp.*

Threats

Fish populations in Aruba are exposed to a range of interacting pressures that affect reef, demersal, pelagic and deepwater species. Overfishing, habitat degradation, coastal development, invasive species, pollution and climate change all influence the abundance, distribution and resilience of fish populations, while the strong ecological connectivity between coral reefs, seagrass meadows,

mangroves and offshore waters means that impacts in one habitat can have consequences across multiple life stages.

Fishing pressure remains one of the most significant threats to fish populations throughout the Caribbean, where over 60% of coral reefs are considered threatened by overfishing (Burke et al., 2004). Aruba's annual catch includes approximately 390 tonnes of reef-associated fish taken by recreational and artisanal fisheries, with a further estimated 359 tonnes landed by larger vessels, including vessels operating illegally within Aruba's Exclusive Economic Zone (Vermeij et al., 2019). Although overall fish biomass remains relatively high compared with some Caribbean reefs, surveys indicate that large carnivorous species such as sharks, groupers and snappers occur at low abundance, while individuals larger than 25 cm are relatively uncommon in Aruba's coastal waters (Vermeij et al., 2019; Sandin et al., 2008). The preferential removal of larger fish reduces reproductive capacity, alters population structure and can diminish ecosystem function, particularly where large-bodied herbivores and predators are lost.

Demersal species, including groupers and snappers, are especially vulnerable to overexploitation because many species are long-lived, mature late and form predictable spawning aggregations that can be heavily targeted by fisheries (Sadovy de Mitcheson et al., 2013). The Nassau grouper (*Epinephelus striatus*), listed as Critically Endangered, has undergone severe declines throughout the Caribbean due to fishing pressure on spawning aggregations, habitat degradation and low population recovery rates (IUCN, 2018). Similarly, the Atlantic goliath grouper (*Epinephelus itajara*) has experienced substantial regional declines as a result of historical overfishing and habitat loss (Bertoncini et al., 2018). Pelagic species face additional challenges associated with their highly migratory behaviour. Species such as tunas, billfishes, wahoo and dolphinfish move across national boundaries and into international waters, where they are exposed to commercial and recreational fisheries throughout their range (Mahon and McConney, 2004; FAO, 2022). Bycatch in pelagic longline and purse-seine fisheries remains a significant concern, affecting both target species and non-target fauna, including sharks, seabirds and sea turtles (FAO, 2022).

Habitat degradation represents a major threat to fish communities in Aruba. Since the late 1990s, reef fish density has declined across much of the Caribbean alongside widespread coral loss associated with disease outbreaks, marine heatwaves and coral bleaching (Alvarez-Filip et al., 2015). In Aruba, herbivorous fish still account for most reef fish biomass, but this biomass more than halved between 2019 and 2023 (Eicher, 2024). Surveys indicate that the western side of the island supports the lowest reef fish densities, with herbivorous fish abundance approximately four times lower than in other areas (Vermeij et al., 2019). The loss and degradation of coral reefs reduces the availability of shelter, feeding grounds and breeding habitat for many reef-associated species.

Coastal development and declining water quality further exacerbate habitat loss. Mangroves and seagrass meadows provide important nursery habitat, feeding grounds and refuge for numerous reef and demersal fish species, yet these habitats are vulnerable to coastal reclamation, dredging, infrastructure development, anchoring and increased recreational use (Nagelkerken et al., 2000; Dorenbosch et al., 2007; Nagelkerken et al., 2017). Nutrient enrichment and pollution can reduce water quality, promote algal blooms and cyanobacterial proliferation, and in extreme cases contribute to hypoxic or anoxic conditions that are detrimental to fish and their habitats. Disruption of ecological connectivity between reefs, mangroves and seagrass meadows can have significant consequences for

species that depend on multiple habitats during different stages of their life cycle (Nagelkerken et al., 2000; Dorenbosch et al., 2007).

Invasive species present an additional and growing threat. The Indo-Pacific damselfish (*Neopomacentrus cyanomos*) was first recorded in the Greater Caribbean in 2013 and reported from Aruba in 2016, most likely following introduction via offshore infrastructure such as oil platforms. Although its ecological impacts remain poorly understood, increasing populations may compete with native reef fishes. The invasive lionfish (*Pterois volitans* and *P. miles*) continues to pose a significant threat throughout the region through predation on native reef fishes and competition with native predators. While local control programmes have reduced lionfish abundance in shallow waters, recent research indicates that substantial populations occur beyond conventional diving depths, limiting the effectiveness of removal efforts (Andradi-Brown et al., 2017; Gress et al., 2017).

Deepwater fish assemblages remain among the least studied components of Aruba's marine biodiversity. Although direct fishing pressure is currently limited compared with shallow-water habitats, many deepwater species exhibit slow growth, delayed maturity and low reproductive output, making them particularly susceptible to overexploitation and slow to recover from population declines (Norse et al., 2012). Significant knowledge gaps remain regarding the abundance, distribution and population status of deepwater fishes in Aruba's waters, limiting the ability to assess their conservation status and vulnerability accurately (Debrot et al., 2024).

Across all habitat associations, climate change is expected to amplify existing pressures. Rising sea temperatures, ocean acidification, coral bleaching, changes in ocean circulation and increasing storm intensity are likely to alter fish distributions, food-web dynamics and habitat availability throughout the Caribbean (IPCC, 2022). These changes are expected to affect reef, demersal, pelagic and deepwater species alike, with potential consequences for biodiversity, fisheries productivity and the ecosystem services that fish communities provide.

5.6 Invertebrates

Marine invertebrates form a highly diverse component of Aruba's marine biodiversity and occur across a wide range of habitats, including coral reefs, seagrass meadows, mangroves, sandy seabeds, rocky shores and deeper offshore environments. They play essential roles in ecosystem functioning, acting as herbivores, filter feeders, detritivores, predators and prey. Through processes such as grazing, nutrient cycling, sediment reworking and bioerosion, they contribute to ecosystem productivity, habitat structure and the maintenance of ecological balance (Bellwood et al., 2004; Steneck & Bellwood, 2013). Many species also support local fisheries, tourism and cultural practices, and are therefore an important component of Aruba's natural capital.

These roles are closely linked to the broader coastal system, where mangroves, seagrass meadows and coral reefs function as interconnected habitats supporting different life stages of many species. This connectivity is particularly important in Caribbean reef systems, where juvenile and adult stages of both fish and invertebrates often rely on different environments for feeding, shelter and development (Nagelkerken et al., 2002; Dorenbosch et al., 2007; Mumby et al., 2004). As a result, invertebrate populations are shaped not only by local conditions, but also by the condition of adjacent habitats.

Although hundreds of marine invertebrate species occur throughout the wider Dutch Caribbean, a relatively small number are of particular importance in Aruba because of their ecological roles, economic value, and conservation status. These include key herbivorous species that help regulate algal growth on coral reefs, commercially important shellfish and crustaceans that support local fisheries, and species protected under national legislation and international agreements such as the SPAW Protocol and CITES.

Table 12 highlights species of particular ecological, fisheries and conservation importance, including species protected under Aruba's national legislation and species that play key functional roles in maintaining ecosystem health and resilience. Three cone snail species (*Conus curassaviensis*, *Conus hieroglyphus* and *Conasprella wendrosi*) are considered endemic to Aruba and are of particular conservation significance because of their highly restricted distributions.

Table 12: Key marine invertebrate species of conservation, fisheries and ecological importance in Aruba. Sources: Government of Aruba (AB 2017 No. 48); IUCN Red List (accessed 2026); CITES Appendices (2025); SPAW Protocol Annexes (2023); Appeldoorn & Baker (2013); Butler et al. (2024); DCNA (2020).

Scientific name	Common name	Primary habitat association	Ecological / conservation importance	IUCN Red List	CITES	SPAW
Protected species (Aruba Nature Protection Ordinance (AB 1995 no. 2))						
<i>Diadema antillarum</i>	Long-spined black sea urchin	Coral reefs, rocky reefs	Keystone herbivore that suppresses macroalgae and promotes coral recruitment and reef recovery	Not Evaluated	Not listed	Not listed
<i>Oreaster reticulatus</i>	Red cushion sea star	Seagrass meadows, sandy bottoms	Large benthic invertebrate contributing to sediment turnover and ecosystem functioning	Not Evaluated	Not listed	Not listed
<i>Lobatus gigas</i>	Queen conch	Seagrass meadows, sandy habitats	Ecologically, culturally and commercially important herbivorous gastropod with widespread regional declines due to overexploitation	Near Threatened	Appendix II	Annex III
<i>Aliger costatus</i>	Milk conch	Seagrass meadows, sandy habitats	Herbivorous gastropod associated with shallow coastal ecosystems	Not Evaluated	Not listed	Not listed
<i>Aliger gallus</i>	Rooster-tail conch	Sandy bottoms, seagrass habitats	Herbivorous gastropod associated with shallow sandy habitats	Not Evaluated	Not listed	Not listed
<i>Strombus pugilis</i>	Fighting conch	Sandy bottoms, seagrass habitats	Common grazing gastropod contributing to benthic ecosystem processes	Not Evaluated	Not listed	Not listed

<i>Aliger raninus</i>	Hawk-wing conch	Sandy bottoms, reef-adjacent habitats	Herbivorous gastropod associated with coastal sandy habitats	Not Evaluated	Not listed	Not listed
<i>Melongena melongena</i>	Caribbean crown conch	Sandy and muddy coastal habitats	Predatory and scavenging gastropod contributing to benthic food-web dynamics	Not Evaluated	Not listed	Not listed
<i>Panulirus argus</i>	Caribbean spiny lobster	Coral reefs, seagrass meadows, mangroves	Ecologically important predator and one of the Caribbean's most valuable fisheries species	Data Deficient	Not listed	Not listed
<i>Conus curassaviensis</i>	Curaçao cone snail	Rocky reefs and hard-bottom habitats	Endemic cone snail of conservation importance due to its restricted distribution	Not Evaluated	Not listed	Not listed
<i>Conus hieroglyphus</i>	Hieroglyphic cone snail	Rocky reefs and hard-bottom habitats	Endemic cone snail of conservation importance due to its restricted distribution	Not Evaluated	Not listed	Not listed
<i>Conasprella wendrosi</i>	Wendros cone snail	Rocky reefs and hard-bottom habitats	Endemic cone snail with a highly restricted known distribution in Aruba	Not Evaluated	Not listed	Not listed
Ecologically important species (not currently protected)						
<i>Maguimithrax spinosissimus</i>	Caribbean king crab	Coral reefs	Major macroalgal grazer contributing to reef resilience and coral recovery	Not Evaluated	Not listed	Not listed
<i>Isostichopus badiotus</i>	Three-rowed sea cucumber	Sandy bottoms, seagrass meadows	Important for sediment turnover, nutrient cycling and benthic ecosystem functioning	Least Concern	Not listed	Not listed
<i>Tripneustes ventricosus</i>	White sea urchin (West Indian sea egg)	Seagrass meadows, coral reefs	Herbivorous grazer of macroalgae and seagrass contributing to ecosystem productivity	Not Evaluated	Not listed	Not listed

Ecologically important and protected species

Among the most ecologically significant reef-associated invertebrates is the long-spined sea urchin (*Diadema antillarum*), widely regarded as a keystone herbivore in Caribbean coral reef ecosystems. This species plays a central role in controlling macroalgal growth and maintaining open substrate for coral recruitment. Reefs with healthy populations of *Diadema* typically show lower algal cover and improved conditions for coral settlement and recovery (Butler et al., 2024; Edmunds & Carpenter, 2001). Other herbivorous sea urchins, including the white sea urchin (*Tripneustes ventricosus*), also

contribute to algal and seagrass grazing, although their abundance and ecological influence vary depending on habitat conditions.

The Caribbean king crab (*Maguimithrax spinosissimus*) is an important benthic omnivore that contributes to the consumption of macroalgae and algal turf, including forms that are less frequently grazed by other reef organisms. While not a primary herbivore, it can locally influence algal biomass and contribute to conditions that support coral recruitment and reef recovery processes (Butler et al., 2024).

Molluscs are also an important component of Aruba's coastal ecosystems. The queen conch (*Lobatus gigas*) is one of the Caribbean's most recognisable and culturally significant marine invertebrates. Historically, it was heavily harvested across the region, resulting in widespread population declines. In Aruba, the fishery was closed in 1987 as an early conservation measure. However, populations remain patchily distributed and are often dominated by juveniles, indicating slow recovery and possible ongoing illegal harvesting (Appeldoorn & Baker, 2013; DCNA, 2020). Weak enforcement has limited the effectiveness of the ban, leaving the species vulnerable (DCNA, 2020). The queen conch is currently listed as Near Threatened on the IUCN Red List, included in Appendix II of CITES, and listed under Annex III of the SPAW Protocol.

Other important species include the Caribbean spiny lobster (*Panulirus argus*), which occupies mangroves, seagrass beds and coral reefs during different life stages and supports one of the most valuable fisheries in the region, and sea cucumbers such as the three-rowed sea cucumber (*Isostichopus badionotus*), which contribute to sediment bioturbation and nutrient recycling within benthic habitats.

A particularly notable group in Aruba are the cone snails (*Conus curassaviensis*, *Conus hieroglyphus*, *Conasprella wendrosi*), which are considered endemic to Aruba under national classification. These species are restricted in distribution and represent a distinctive component of the island's marine biodiversity, occurring mainly on shallow reef and hard-bottom habitats.

Threats

Marine invertebrates face a range of pressures from both human activities and environmental change. Overharvesting has historically affected several commercially valuable species, particularly queen conch, spiny lobster and sea cucumber populations throughout the Caribbean (Appeldoorn et al., 2021; NOAA Fisheries, 2026). In Aruba, the limited size of some exploited populations and the slow recovery of protected species indicate that extraction pressure remains an ongoing concern (Vermeij et al., 2019).

Habitat degradation driven by coastal development, dredging, pollution and declining water quality reduces the availability and quality of habitats used by invertebrates for feeding, reproduction and shelter. Seagrass meadows, mangroves and coral reefs are especially important habitats for many species. The expansion of invasive seagrass species has also been linked to changes in sediment dynamics that can affect grazing conditions for queen conch (DCNA, 2020).

Disease has had particularly severe impacts on Caribbean reef ecosystems. A region-wide mortality event in 1983 caused a dramatic collapse in populations of *Diadema antillarum*, resulting in major shifts in coral reef structure and function. Although partial recovery occurred in some areas, Caribbean

populations have remained low since the original 1980s mass mortality event (Lessios, 2016). A second mass mortality event beginning in 2022 has led to widespread declines across the region, with mortality approaching 99% at affected sites (AGRRA, 2023; Butler et al., 2024).

Climate change is expected to intensify many of these pressures. Rising sea temperatures increase the frequency and severity of coral bleaching, indirectly reducing habitat availability for reef-associated invertebrates. Ocean acidification may also impair shell and skeleton formation in calcifying organisms, including molluscs, echinoderms and corals, while increasing physiological stress and susceptibility to disease (Doney et al., 2009). Together, these interacting pressures pose significant challenges to the long-term resilience of Aruba's marine invertebrate communities.

5.7 Seabirds

Seabirds are an important component of marine ecosystems, linking marine and terrestrial environments through nutrient transfer, food-web connectivity, and long-distance movement across the wider Caribbean and Atlantic. They are widely recognised as indicators of marine ecosystem health, as changes in seabird abundance, breeding success, and distribution often reflect broader changes in marine food webs and oceanographic conditions (Dias et al., 2019; Signa, 2021). Across the Caribbean, many seabird populations have experienced long-term declines driven by habitat loss, invasive species, fisheries interactions, human disturbance, and climate change (Croxall et al., 2012; BirdsCaribbean, 2022).

Within this regional context, Aruba supports a relatively small but regionally important assemblage of breeding and migratory seabirds. The island's offshore reef islands provide nesting habitat for several tern and noddy species, while its coastal and offshore waters are used for foraging and seasonal movements (Prins et al., 2009; BirdLife International, 2008). Although offshore data remain limited, available observations indicate that Aruba forms part of a broader southern Caribbean migratory and foraging network used by both coastal and pelagic species (Meesters et al., 2010; Luksenburg & Sangster, 2013).

Coastal and breeding seabirds

Breeding seabird populations in Aruba are concentrated in nearshore reef-island habitats and form the core of the island's seabird community. Breeding species include Cayenne tern (*Thalasseus acuflavidus*), royal tern (*Thalasseus maximus*), roseate tern (*Sterna dougallii*), least tern (*Sternula antillarum*), sooty tern (*Onychoprion fuscatus*), brown noddy (*Anous stolidus*), and black noddy (*Anous minutus*), together with smaller populations of common tern (*Sterna hirundo*) and laughing gull (*Larus atricilla*) (BirdLife International, 2008).

These populations are highly localised and depend almost entirely on a small number of low-lying offshore reef islands for nesting, making them particularly vulnerable to disturbance and environmental change.

More commonly recorded species in coastal and nearshore waters include brown booby (*Sula leucogaster*), red-footed booby (*Sula sula*), magnificent frigatebird (*Fregata magnificens*), and brown pelican (*Pelecanus occidentalis*), which forage opportunistically in association with fish aggregations and productive nearshore waters.

Important Bird and Biodiversity Areas (IBAs)

Two sites in Aruba are recognised as Important Bird and Biodiversity Areas (IBAs): the San Nicolas Bay Reef Islands and the Oranjestad Reef Islands (BirdLife International, 2008; BirdLife International, 2024). Together, these reef-island systems provide the principal nesting habitat for Aruba's seabirds and support the majority of breeding activity on the island.

The San Nicolas Bay Reef Islands support the largest breeding colonies, particularly of Cayenne terns, alongside roseate terns, least terns, common terns, sooty terns, and noddies (BirdLife International, 2008). The Oranjestad Reef Islands provide an important secondary nesting area and support a substantial proportion of Aruba's breeding tern population. Documented movement of birds between the two island groups indicates ecological connectivity between colonies and highlights the importance of both sites in maintaining breeding populations.

Offshore and migratory seabirds

The offshore waters surrounding Aruba form part of a wider pelagic system within the Venezuelan Basin and are used intermittently by migratory and wide-ranging seabird species. Offshore records remain limited and are largely derived from marine mammal surveys and other opportunistic at-sea observations (Meesters et al., 2010; Luksenburg & Sangster, 2013).

Species recorded offshore include the endangered black-capped petrel (*Pterodroma hasitata*), together with occasional observations of Cory's shearwater (*Calonectris borealis*), red-billed tropicbird (*Phaethon aethereus*), and south polar skua (*Stercorarius maccormicki*) (Luksenburg & Sangster, 2013). These records indicate that Aruba lies along broader pelagic movement routes across the southern Caribbean rather than supporting a substantial resident offshore assemblage. More recent observations from cetacean surveys under the Ti Whale An Nou programme recorded 12 seabird species in 2023 and 18 species in 2024, further demonstrating the use of Aruba's waters by a range of coastal and migratory species.

Threats

Seabirds in Aruba face a range of pressures that primarily affect coastal breeding habitats and nearshore foraging systems, with offshore threats of more limited relevance due to the relatively infrequent occurrence of pelagic species in local waters. Globally, seabirds are among the most threatened groups of birds, with widespread declines driven by invasive species, fisheries interactions, habitat loss, human disturbance, and climate change (Croxall et al., 2012; Dias et al., 2019).

In Aruba, the most significant pressures are disturbance at breeding colonies, habitat modification, and the limited availability of suitable nesting habitat. Human access, recreational use, and coastal development can disrupt nesting behaviour and reduce breeding success, particularly for ground-nesting terns and noddies (BirdsCaribbean, 2022). Because breeding activity is concentrated within a small number of reef islands, even localised disturbance can have disproportionate impacts.

Changes in prey availability represent an important indirect pressure. Many seabirds depend on small pelagic fish and other forage species in coastal waters, meaning that declines in fish abundance—driven by fishing pressure, habitat degradation, or changing oceanographic conditions—may reduce breeding success and reproductive output (Croxall et al., 2012; FAO, 2022).

Invasive species and predation may further affect reproductive success if introduced predators become established on nesting islands or adjacent coastal habitats. Ground-nesting seabirds are particularly vulnerable to predation by rats, cats, and other invasive mammals, which are widely recognised as major drivers of seabird declines on islands (Dias et al., 2019; BirdsCaribbean, 2022).

Although direct fisheries interactions are likely to be limited locally, bycatch remains a significant threat across the wider Caribbean and Atlantic, particularly for pelagic species (Croxall et al., 2012; FAO, 2022). Broader ecosystem effects of fishing may also alter food-web structure and prey availability.

Climate change represents an increasing long-term threat. Sea-level rise may reduce the availability of nesting habitat on Aruba's low-lying reef islands, while increased storm frequency and intensity can result in nest loss and reduced breeding success. Changes in sea surface temperature and marine productivity may also alter prey distribution, with implications for seabird populations across the region (IPCC, 2022; Dias et al., 2019).

Overall, seabird vulnerability in Aruba is driven primarily by the concentration of breeding activity within a small number of coastal sites, combined with the sensitivity of these colonies to disturbance, habitat change, and broader environmental pressures.

Table 13: Seabirds recorded in Aruba's marine and coastal environment. Sources: BirdLife International (2008, 2024), Prins et al. (2009), Meesters et al. (2010), Luksenburg & Sangster (2013) and BirdsCaribbean (2022). Conservation status follows the IUCN Red List (accessed 2026), CITES Appendices (2025) and SPAW Protocol Annexes (2023).

Scientific name	English name	Status in Aruba	Habitat association	IUCN Red List	CITES	SPAW
<i>Thalasseus acufavidus</i>	Cayenne tern	Breeding resident	Coastal reef islands / nearshore marine	Least Concern	Not listed	Not listed
<i>Thalasseus maximus</i>	Royal tern	Breeding resident	Coastal reef islands / nearshore marine	Least Concern	Not listed	Not listed
<i>Sterna dougallii</i>	Roseate tern	Breeding resident	Coastal reef islands / nearshore marine	Least Concern	Not listed	Annex II
<i>Sternula antillarum</i>	Least tern	Breeding resident	Coastal reef islands / nearshore marine	Least Concern	Not listed	Annex II
<i>Onychoprion fuscatus</i>	Sooty tern	Breeding resident	Coastal reef islands / offshore marine	Least Concern	Not listed	Not listed
<i>Anous stolidus</i>	Brown noddy	Breeding resident	Coastal reef islands / offshore marine	Least Concern	Not listed	Not listed

<i>Anous minutus</i>	Black noddy	Breeding resident	Coastal reef islands / offshore marine	Least Concern	Not listed	Not listed
<i>Sterna hirundo</i>	Common tern	Occasional breeder / seasonal migrant	Coastal marine / reef islands	Least Concern	Not listed	Not listed
<i>Larus atricilla</i>	Laughing gull	Local breeder / resident	Coastal marine / reef islands	Least Concern	Not listed	Not listed
<i>Sula leucogaster</i>	Brown booby	Regular visitor	Coastal and offshore marine	Least Concern	Not listed	Not listed
<i>Sula sula</i>	Red-footed booby	Regular visitor	Coastal and offshore marine	Least Concern	Not listed	Not listed
<i>Sula dactylatra</i>	Masked booby	Regular visitor	Offshore marine	Least Concern	Not listed	Not listed
<i>Fregata magnificens</i>	Magnificent frigatebird	Regular resident	Coastal and offshore marine	Least Concern	Not listed	Not listed
<i>Pelecanus occidentalis</i>	Brown pelican	Resident	Coastal marine and lagoons	Least Concern	Not listed	Annex II
<i>Pandion haliaetus</i>	Osprey	Seasonal migrant	Coastal marine and lagoons	Least Concern	Appendix II	Not listed
<i>Gelochelidon nilotica</i>	Gull-billed tern	Rare visitor	Coastal marine and lagoons	Least Concern	Not listed	Not listed
<i>Pterodroma hasitata</i>	Black-capped petrel	Rare offshore visitor	Offshore pelagic waters	Endangered	Not listed	Annex II
<i>Calonectris borealis</i>	Cory's shearwater	Rare offshore visitor	Offshore pelagic waters	Least Concern	Not listed	Not listed
<i>Phaethon aethereus</i>	Red-billed tropicbird	Rare offshore visitor	Offshore pelagic waters	Least Concern	Not listed	Not listed
<i>Stercorarius maccormicki</i>	South polar skua	Vagrant	Offshore pelagic waters	Least Concern	Not listed	Not listed

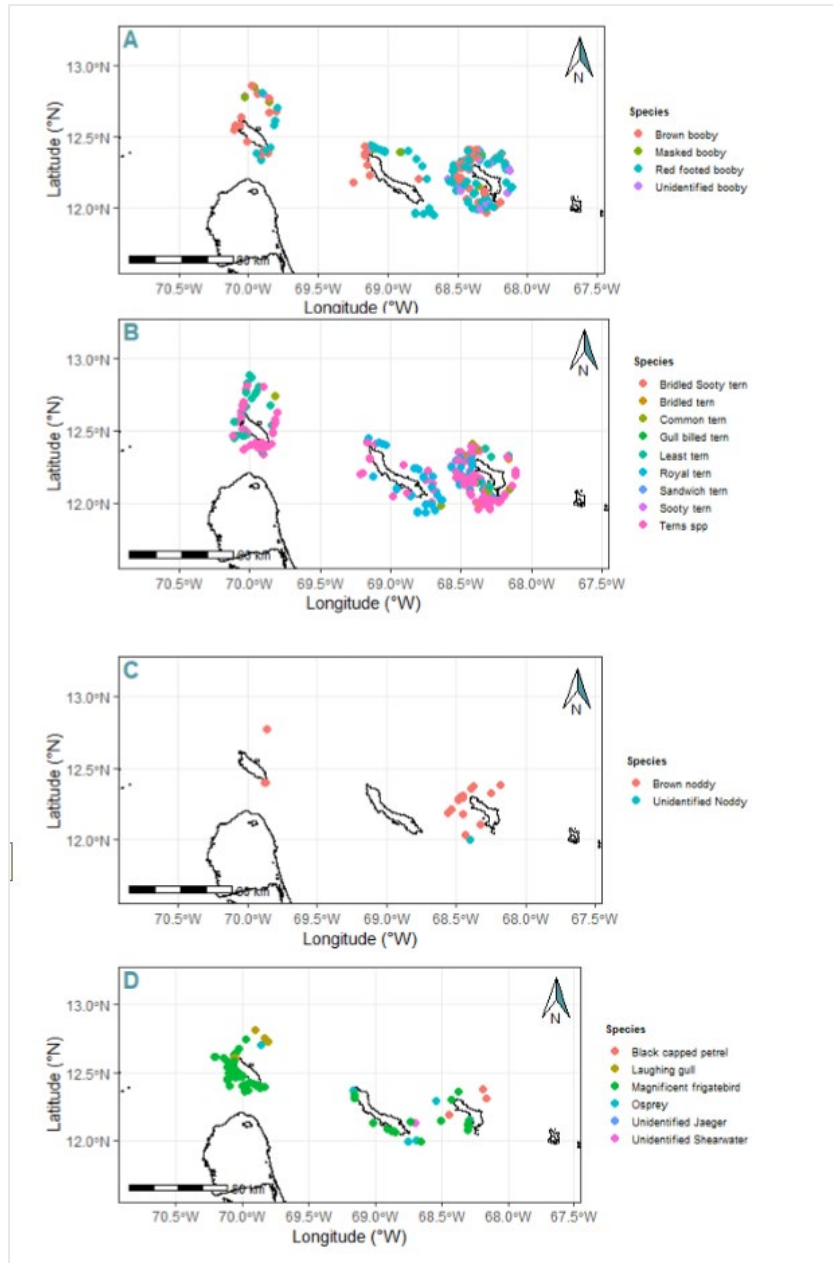


Figure 17: Maps of CCS sightings of seabird families recorded during expedition 7 of 2024 across the ABC islands with: A) booby sightings; B) tern sightings; C) noddy sightings; and D) other sightings. Source: CCS (2024).

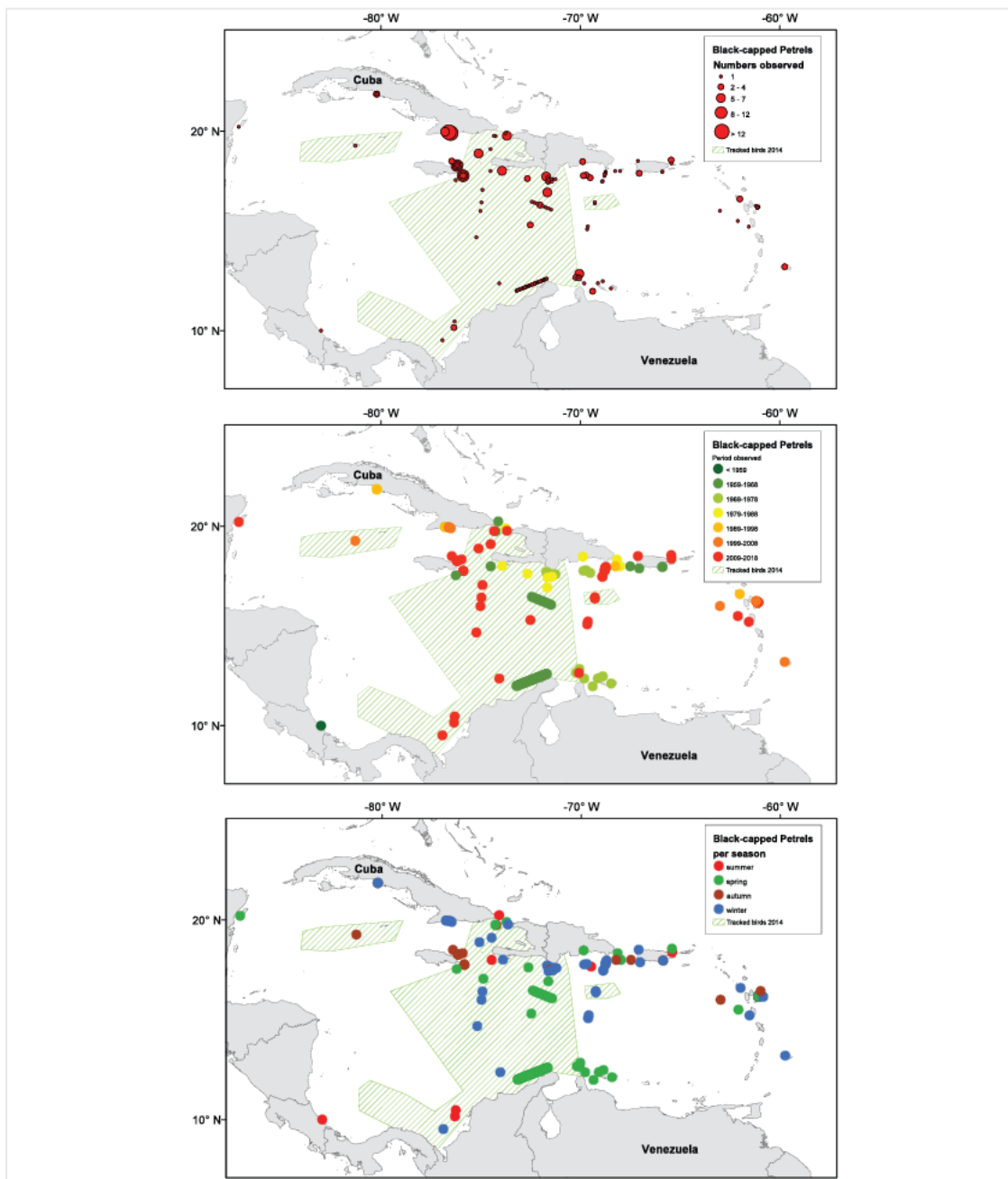


Figure 18: Plots of all records found of Black-capped Petrels in the Caribbean Sea by numbers per sighting, by decade (middle map) and by season (bottom map) Source: Leopold et al. (2019).

6. Conclusion

Aruba's marine environment supports a diverse range of habitats and species that provide substantial ecological, economic, and cultural value. These ecosystems underpin key functions including primary productivity, fisheries support, coastal protection, and nutrient cycling, while also sustaining a tourism-based economy that relies heavily on the quality and integrity of coastal and marine environments. In a regional context, Aruba forms part of a broader southern Caribbean seascape,

contributing to ecological connectivity and supporting migratory and wide-ranging species across jurisdictional boundaries.

The evidence presented in this report indicates that Aruba's marine ecosystems are under increasing pressure. Key habitats, including coral reefs, seagrass beds, and mangroves, show documented declines in condition, while important species groups—particularly large-bodied predators and reef-associated species—have declined or remain insufficiently understood in offshore areas. These patterns are consistent with wider regional trends and reflect cumulative pressures including coastal development, tourism, fishing, climate change, and land-based pollution.

At present, marine protection in Aruba is limited in spatial extent and primarily focused in nearshore areas, with offshore ecosystems largely unprotected. As a result, much of Aruba's marine environment remains exposed to ongoing and emerging pressures. At the same time, Aruba has made national and international commitments under the Global Biodiversity Framework, including the target to conserve 30% of marine areas by 2030 (30x30), highlighting the importance of protecting biodiversity and maintaining ecosystem function.

Taken together, the findings of this report highlight the ecological significance of Aruba's marine biodiversity, its role within the wider Caribbean, and its importance in supporting ecosystem function, resilience, and socio-economic systems. The patterns observed across habitats and species groups—particularly declines in condition, increasing pressure, and limited spatial coverage of protection—are consistent with a broad body of scientific evidence demonstrating the importance of conserving and effectively managing marine ecosystems. In this context, the protection of marine biodiversity is considered critical for maintaining ecosystem integrity, supporting regional connectivity, and sustaining the ecological processes on which both biodiversity and human well-being depend.

The ecological importance of Aruba extends across the entirety of its EEZ. While nearshore habitats contain many of the island's most intensively used and biodiverse ecosystems, offshore waters comprise the vast majority of the marine area and support important pelagic, deepwater and migratory species, including sharks and rays, cetaceans and sea turtles. These waters are connected to the wider Caribbean through feeding grounds, migration routes, oceanographic processes and larval dispersal, creating strong linkages between coastal and offshore ecosystems. As a result, the long-term health and resilience of Aruba's marine environment depend on managing the EEZ as a single, interconnected system, rather than as a collection of separate habitats or protected areas.

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