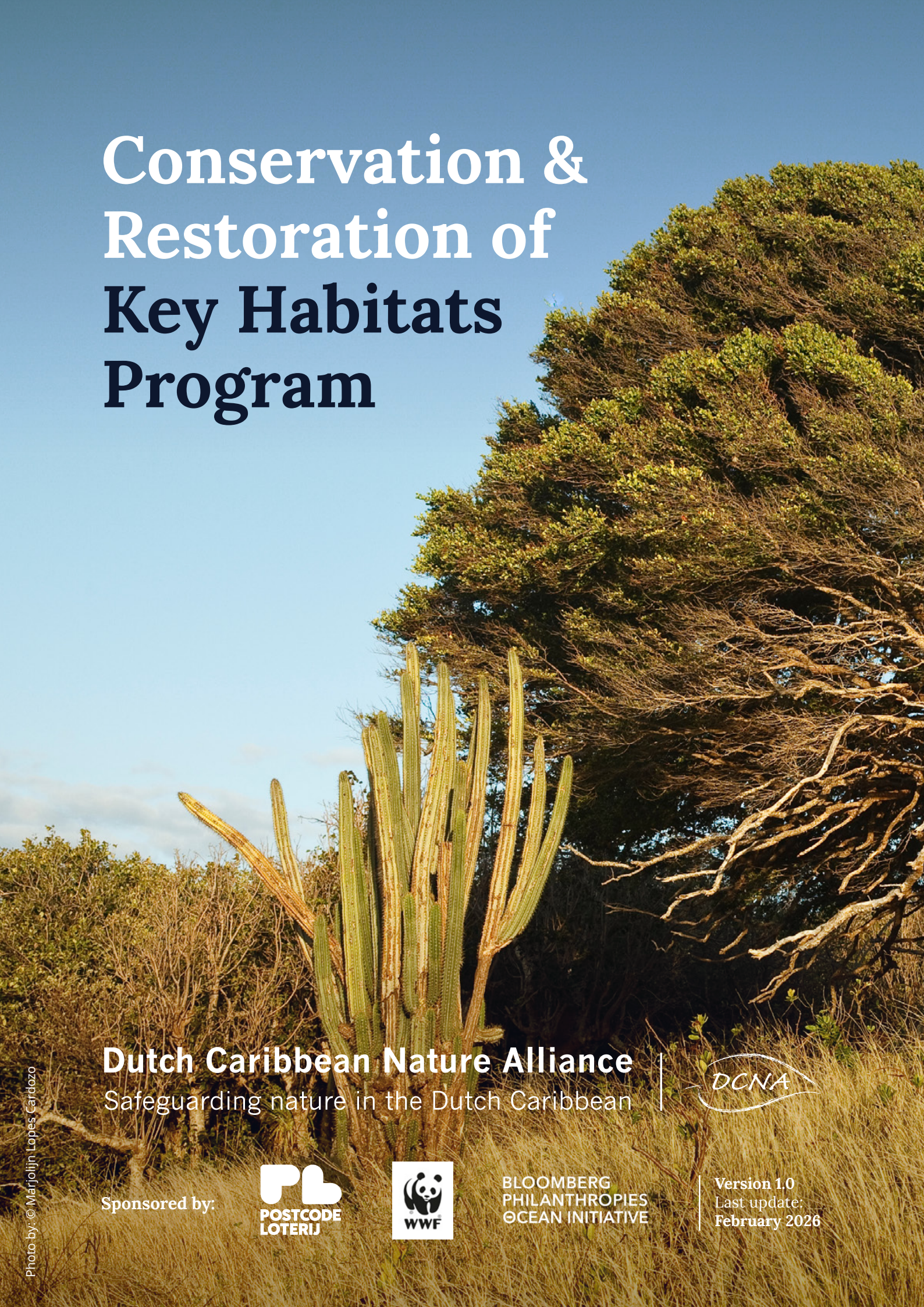
Conservation & Restoration of Key Habitats Program



Dutch Caribbean Nature Alliance

Safeguarding nature in the Dutch Caribbean

DCNA

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Conservation & Restoration of Key Habitats Program - version 1.0

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Executive Summary

The Dutch Caribbean harbors globally **significant biodiversity across its coral reefs, seagrass meadows, mangrove forests, and tropical terrestrial ecosystems,** which together sustain island livelihoods, protect coastlines, and underpin cultural identity and economic vitality. Yet these critical habitats are increasingly threatened by climate change, coastal development, wastewater pollution, invasive alien species and disease, and free-roaming grazers. Without coordinated and sustained intervention, continued degradation will erode the natural defenses of the islands and compromise biodiversity, fisheries, tourism, and community well-being.

Using the Conservation Standards as an adaptive planning framework, the **Dutch Caribbean Nature Alliance (DCNA)** and its partners developed this regional conservation plan to guide collective action across the six islands. The plan identifies five focal Key Habitats: coral reefs, seagrass, mangroves, tropical dry forest and scrub, and tropical wet forests, and evaluates their current condition through standardized assessments of Key Ecological Attributes and indicators. These analyses reveal that coral reefs are currently in poor condition, while the remaining habitats fall outside acceptable ranges of variation and require active management to prevent further decline.

A structured assessment of human pressures was used to prioritize those most likely to influence habitat recovery if addressed. Five pressures were selected for deeper analysis: climate change, development, wastewater release, invasive alien species and disease, and free-roaming grazers. Situation analyses unpacked the socioeconomic and cultural systems driving these pressures and identified leverage points for intervention.

From this foundation, the planning team evaluated a broad suite of potential solutions based on their feasibility and expected impact, organizing the most promising interventions into five overarching strategies:

1. **Reducing free-roaming grazer impacts**
2. **Reducing coastal and terrestrial development impacts**
3. **Reducing wastewater release impacts**
4. **Reducing invasive alien species and disease impacts**
5. **Reducing climate change impacts**

For each strategy, Theories of Change were developed to articulate how priority actions are expected to reduce pressures and improve habitat health, and to surface the assumptions that must hold true for success. These assumptions were translated into SMART objectives that define measurable outcomes and guide implementation and learning.

The plan also establishes a comprehensive Monitoring Framework and Operational Plan that links goals and objectives to specific indicators, methods, monitoring frequency, and institutional responsibilities across the DCNA network.

This conservation plan represents a milestone in strengthening regional collaboration across the Dutch Caribbean. By aligning island-level action with a regional vision, coordinated strategies, and rigorous learning systems, DCNA aims to reverse biodiversity loss, enhance climate resilience, and secure the natural capital upon which island communities depend for generations to come.

Introduction

The Dutch Caribbean is globally recognized as a biodiversity hotspot, home to many endemic plant and animal species and a mosaic of ecosystems that sustain island livelihoods, cultures, and economies. Coral reefs, seagrass meadows, mangrove forests, and terrestrial vegetation are important for underpinning fisheries, tourism, and food security. Yet these critical habitats are deteriorating rapidly due to climate change, coastal development, pollution, invasive species, and unsustainable land and marine use practices, placing the islands' natural and social systems at growing risk.

In response to these escalating pressures, the Dutch Caribbean Nature Alliance (DCNA) has developed this conservation plan to guide a coordinated, long-term effort to protect and restore the Dutch Caribbean's most important ecosystems. The plan focuses on DCNA's Key Habitats Program, a regional initiative designed to move beyond fragmented, project-by-project conservation toward a regional, science-based and adaptive approach implemented across the six Dutch Caribbean islands.

The purpose of this plan is to safeguard nature in the Dutch Caribbean by reversing biodiversity loss across land and sea through the conservation and restoration of key habitats that enhance ecosystem services and build climate resilience. This will be achieved through regional cooperation, evidence-based strategies, and long-term community involvement, positioning the DCNA network as a leading force for conservation in the Caribbean.

This plan provides the strategic framework through which DCNA will identify priorities, coordinate action, mobilize investment, and measure progress over time. It embraces adaptive management principles, recognizing that conservation in a rapidly changing climate requires learning-by-doing, strong monitoring systems, and the flexibility to adjust strategies as new information emerges. By linking island-level action to regional vision, and restoration efforts to education, policy, and sustainable financing, the plan establishes a pathway toward resilient ecosystems and thriving island communities.

Through this Key Habitats Program, DCNA seeks to demonstrate how collective action across islands, sectors, and scales can restore degraded landscapes and seascapes while strengthening natural defenses against climate impacts. It is both a blueprint for immediate action and a long-term investment in the ecological integrity, economic vitality, and cultural heritage of the Dutch Caribbean



Photo by: © Christian König

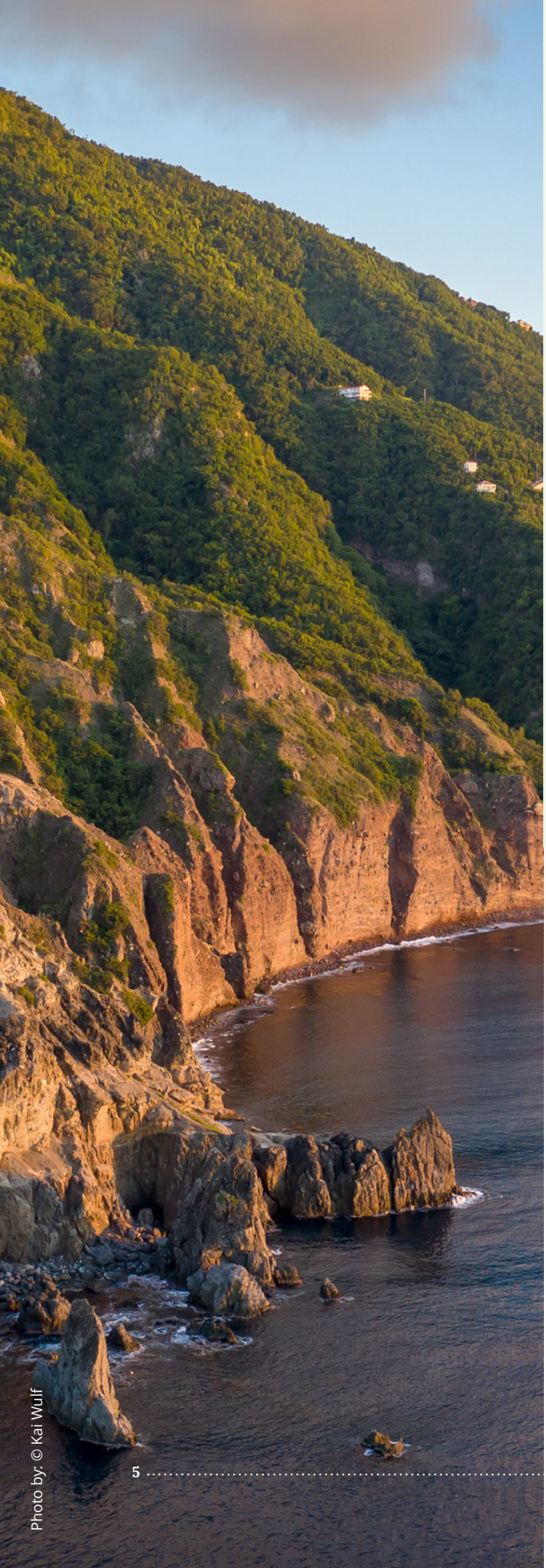


Photo by: © Kai Wulf

Strategic Planning Team

This conservation plan was developed and led by the Dutch Caribbean Nature Alliance (DCNA) as a regional initiative to guide coordinated action across the Dutch Caribbean. DCNA engaged with its key partners (Aruba Conservation Foundation, CARMABI, STINAPA Bonaire, Saba Conservation Foundation, STENAPA and Nature Foundation St. Maarten) while setting the program's conservation goals, targets and actions.

Together, this group brought deep local knowledge, scientific expertise, and regional perspective to the process, ensuring that the plan reflects both on-the-ground realities and long-term conservation ambitions. The planning team worked collaboratively throughout the process to define priorities, assess threats and opportunities, and shape a coordinated strategy for conserving and restoring the region's key habitats. As the program is implemented, the conservation plan will be periodically evaluated, with scope to involve additional stakeholders and refine the approach where learning and emerging needs indicate this is valuable.

Geographic Scope

This conservation plan is designed to guide action across the Dutch Caribbean, encompassing the six islands represented within the DCNA network and the terrestrial and marine ecosystems that sustain them. The geographic scope includes priority landscapes and seascapes where conservation and restoration of key habitats can most effectively strengthen biodiversity, ecosystem services, and climate resilience.

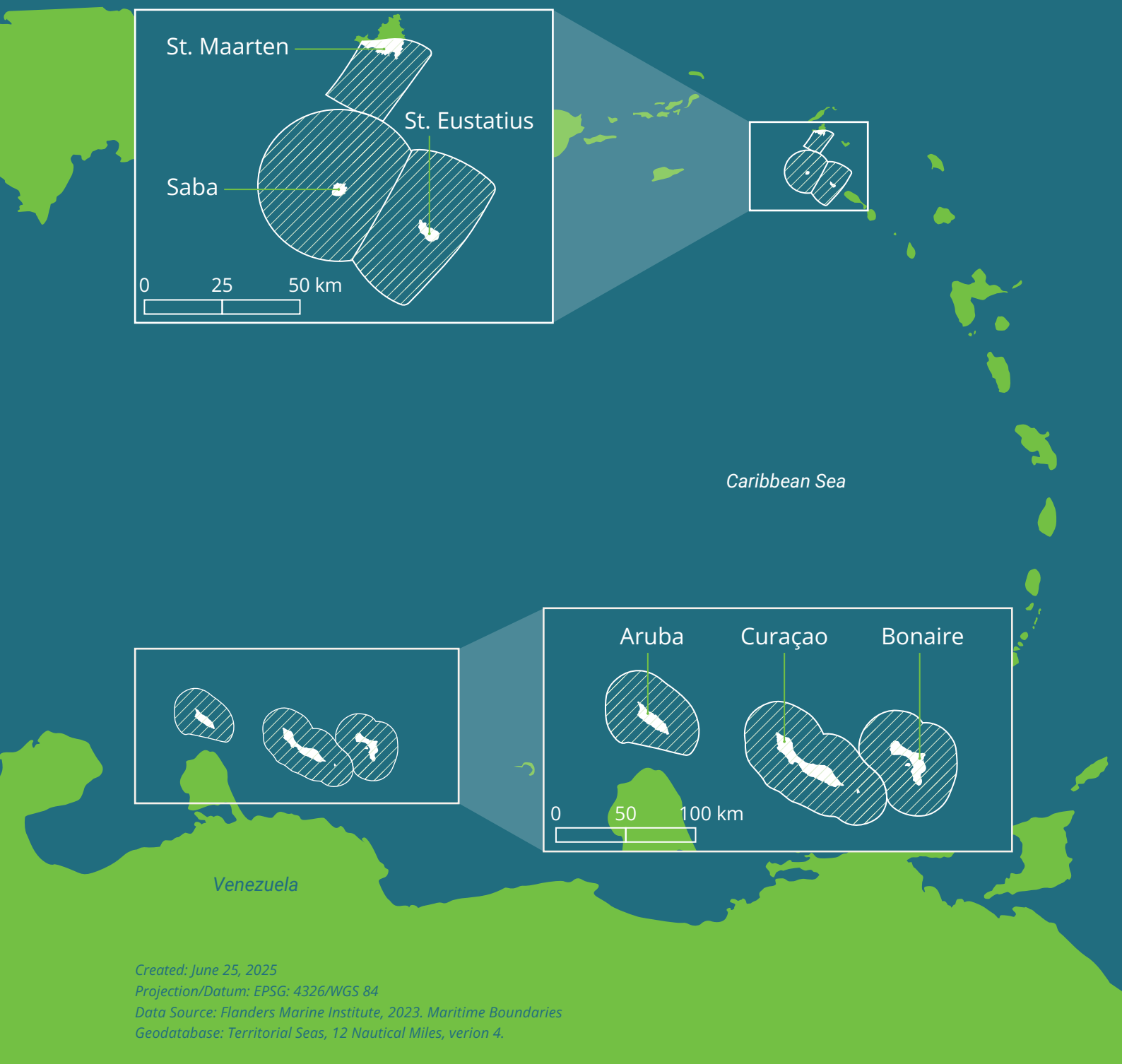
The map presented right illustrates the regional extent of the planning area, providing a spatial frame for understanding shared challenges, opportunities for collaboration, and locations where coordinated conservation action will be prioritized.

Dutch Caribbean Habitat Conservation and Restoration Program Geographic Scope Map

Legend

Geographic Scope:

- Dutch Caribbean Islands
- Territorial Waters (12NM)



Created: June 25, 2025
Projection/Datum: EPSG: 4326/WGS 84
Data Source: Flanders Marine Institute, 2023. Maritime Boundaries Geodatabase: Territorial Seas, 12 Nautical Miles, verion 4.



Photo by: © Kai Wulf

Key Habitats and Key Habitat Health

This plan concentrates on **five priority ecosystems**, referred to as **key habitats**, that together capture the most important terrestrial and marine biodiversity features across the Dutch Caribbean. These habitats were selected because of their ecological significance, their role in climate resilience and human well-being, and their vulnerability to ongoing pressures.

In accordance with the Conservation Standards, each key habitat has been treated as a focal conservation value and assessed for its current ecological condition. For every key habitat, the planning team identified a small number of Key Ecological Attributes (i.e., the fundamental characteristics that define a healthy system) along with associated indicators, indicator ratings, and an overall current status of health. The five key habitats are Coral Reefs, Seagrass, Mangroves, Tropical Dry Forest & Scrub, and Tropical Wet Forest, each of which defined in more detail below:



Photo by: © Henkjan Kievit

Coral Reefs

Coral reefs are among the most biologically diverse ecosystems in the Dutch Caribbean and form the foundation of marine food webs, coastal protection, tourism economies, and cultural identity. Fringing and barrier reefs occur around all six islands, supporting fisheries, buffering wave energy during storms, and attracting global dive tourism.

The health of coral reefs has been assessed using two Key Ecological Attributes: (1) live hard coral cover and (2) hard coral species richness. Together, these metrics provide a measurable and actionable baseline of reef condition that can be used to track change consistently over time. Based on these analyses, the current health of coral reefs in the Dutch Caribbean is categorized as Poor, indicating that recovery is challenging and that ecosystem collapse remains a risk without significant intervention. For the detailed health assessment of coral reefs, see Appendix A.

Seagrass

Seagrass occurs in shallow coastal waters and sheltered bays throughout the Dutch Caribbean and play a critical role in stabilizing sediments, improving water quality, storing carbon, and supporting fisheries by providing nursery habitat for fish, turtles, and invertebrates. These ecosystems are tightly linked to coral reefs and mangroves, forming an interconnected coastal system that contributes to biodiversity conservation and shoreline protection.

The health of seagrass has been assessed using a single Key Ecological Attribute: geographic extent. This indicator provides a spatially explicit and repeatable measure of ecosystem condition that can be used to track change consistently over time and inform conservation and restoration priorities. Based on these analyses, the current health of seagrass meadows in the Dutch Caribbean is categorized as Fair, meaning that conditions fall outside the acceptable range of variation and require human intervention or the situation will likely worsen. For the detailed health assessment of seagrass meadows, see Appendix A.



Photo by: © David Troeger



Photo by: © Hans Smulders

Mangroves

Mangrove forests occur along sheltered coastlines, lagoons, and bays across several of the Dutch Caribbean islands and are among the region's most valuable natural defenses against climate impacts. They reduce coastal erosion, attenuate storm surge, improve water quality, store carbon, and provide essential nursery habitat for fish and invertebrates that support local fisheries and marine biodiversity.

The health of mangroves has been assessed using a single Key Ecological Attribute: geographic extent. This indicator provides a spatially explicit and repeatable measure of ecosystem condition that can be used to track change over time and inform conservation and restoration priorities. Based on these analyses, the current health of mangroves in the Dutch Caribbean is categorized as Fair, meaning that conditions fall outside the acceptable range of variation and require human intervention or the situation will likely worsen. For the detailed health assessment of mangroves, see Appendix A.



Photo by: © Henkjan Kievit

Tropical Wet Forest

Tropical wet forests occur in higher-elevation and moisture-rich areas on select Dutch Caribbean islands and support unique assemblages of plant and animal species, including many endemics. These ecosystems play a disproportionate role in regulating hydrology, stabilizing soils, moderating local climate, and maintaining downstream water quality, despite their relatively limited geographic extent.

The health of tropical wet forests has been assessed using two Key Ecological Attributes: (1) geographic extent and (2) regenerative integrity. Together, these attributes reflect both the spatial distribution of these forests and their ability to sustain natural ecological processes and recover from disturbance, particularly from free-roaming grazers. Based on these analyses, the current health of tropical wet forests in the Dutch Caribbean is categorized as Fair, meaning that conditions fall outside the acceptable range of variation and require human intervention or the situation will likely worsen. For the detailed health assessment of tropical wet forests, see Appendix A.

Tropical Dry Forest and Scrub

Tropical dry forests and scrub dominate large portions of the lowland landscapes of the Dutch Caribbean and support a high diversity of native and endemic plant and animal species adapted to seasonal drought conditions. These ecosystems play an important role in stabilizing soils, regulating surface runoff, maintaining watershed function, and sustaining ecological processes in some of the most human-impacted parts of the islands.

The health of tropical dry forest and scrub has been assessed using two Key Ecological Attributes: (1) geographic extent and (2) regenerative integrity. Together, these attributes capture both the spatial footprint of these ecosystems and their capacity to recover from disturbance related to free-roaming grazers. Based on these analyses, the current health of tropical dry forest and scrub in the Dutch Caribbean is categorized as Fair, meaning that conditions fall outside the acceptable range of variation and require human intervention or the situation will likely worsen. For the detailed health assessment of tropical dry forest and scrub, see Appendix A.

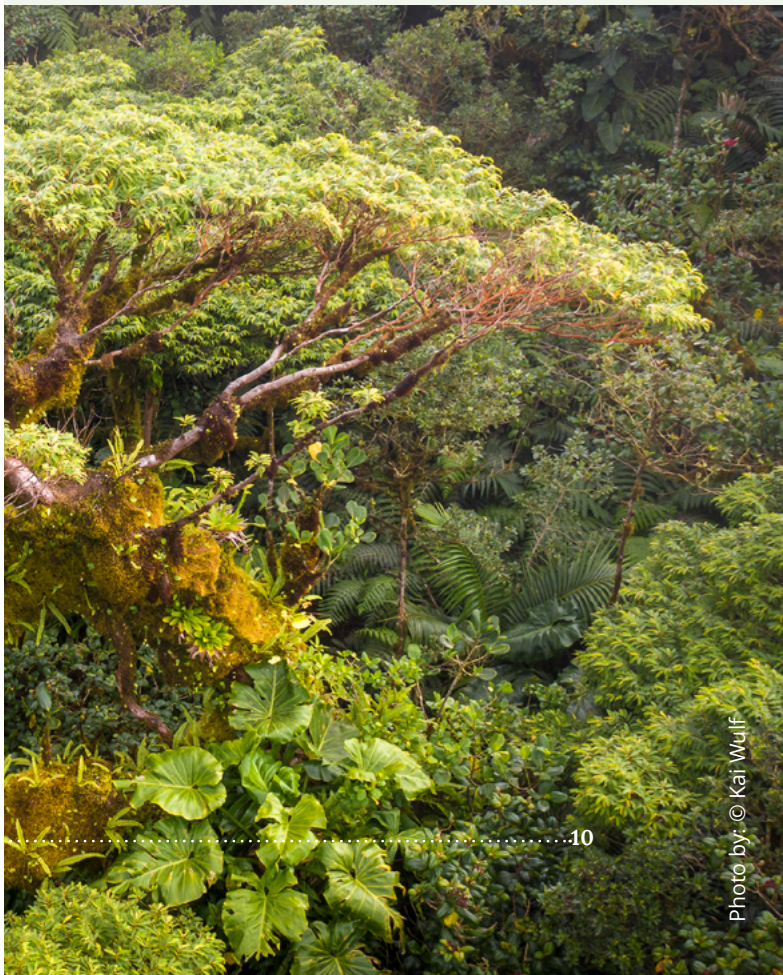


Photo by: © Kai Wulf



Photo by: © Marion Haarsma

Pressures

Pressures are the human activities and processes that damage, degrade, or destroy the key habitats identified in this plan. Understanding the relative importance of these pressures is essential for prioritizing conservation action and designing strategies that can most effectively improve ecosystem health.

The table below presents the results of a structured pressures assessment conducted by the planning team, evaluating each pressure according to its extent, severity, and irreversibility across the five key habitats. Together, these criteria provide a transparent and repeatable basis for ranking pressures and identifying those that pose the greatest risk to long-term conservation outcomes, thereby guiding where management and restoration efforts should be focused first.

Pressures \ Targets	Coral Reefs	Seagrass	Mangroves	Tropical Dry Forest & Scrub	Tropical Wet Forest	Summary Rating
Climate Change	Very High	High	Medium	Medium	High	High
Free-roaming Grazers	Medium	Low	Medium	High	Low	Medium
Development	Medium	Low	Very High	High	Low	High
Dumping	Low	Low	Low	Low	Low	Low
Wastewater Release	High	Low	Low	N/A	N/A	Medium
Destructive Fishing Practices	Low	Low	N/A	N/A	N/A	Low
Recreational Disturbance	Low	Low	Low	Low	N/A	Low
Anchoring Disturbance	Low	Low	N/A	N/A	N/A	Low
Invasive Alien Species & Disease	Very High	Very High	N/A	Medium	Low	Very High
Livestock Agriculture	Low	Low	Low	Low	Low	Low
Poaching	Low	Low	N/A	Low	Low	Low
Oil slicks & spills	Low	Low	Low	N/A	N/A	Low
Ocean Plastic	Low	Low	Low	N/A	N/A	Low

Situation Analyses

The Situation Analysis builds on the pressures assessment by examining the underlying social, economic, institutional, and ecological factors that give rise to the most significant pressures facing the Dutch Caribbean's key habitats. Rather than addressing all identified pressures simultaneously, the planning team used the pressure-ranking results as a decision-support tool to focus attention on those pressures which, if effectively reduced, are most likely to generate meaningful improvements in habitat condition across the region.

Based on this prioritization process, five pressures were selected for deeper analysis: **free-roaming grazers, coastal and terrestrial development, wastewater release, invasive alien species and disease, and climate change.**
For each of these pressures, a structured situation analysis was conducted to map the complex web of socioeconomic drivers, governance conditions, behavioral factors, and feedback loops that allow or encourage the pressures to negatively impact the key habitats. These analyses provide the foundation for identifying leverage points and designing coordinated strategies capable of addressing root causes rather than symptoms.



Photo by: © Christian König

Click HERE to see the different Situation Analyses:



Free-roaming Grazer Impacts



Coastal and Terrestrial Development Impacts



Wastewater Release Impacts



Invasive Alien Species and Disease Impacts



Climate Change Impacts

Vision

The Vision articulates the desired long-term future for the Dutch Caribbean's key habitats and the communities that depend on them. It describes the ultimate ecological condition this plan seeks to achieve, looking beyond individual projects or funding cycles toward an aspirational but realistic endpoint for the strategies outlined in this plan and serves as a guiding reference for decision-making, collaboration, and adaptive management across the DCNA network and its partners.



Photo by: © Diego Marquez

We envision a Dutch Caribbean where nature is safeguarded.

Through collaboration and long-term sustainable financing, the loss of key habitats is halted or reversed, ecosystems are restored and vibrant, and communities live in ***harmony with nature.***

Goals

The goals presented in this plan describe the desired future condition of each key habitat and translate the Vision into clear, measurable conservation outcomes. They are grounded in the Key Ecological Attributes identified through the habitat health assessments and described in detail in Appendix A, ensuring that each goal is directly linked to the ecological characteristics that define a resilient and functioning ecosystem.

In line with the Conservation Standards, these goals are framed as SMART statements: Specific, Measurable, Achievable, Results-oriented, and Time-bound. This ensures that progress can be objectively assessed over the life of the program. Together, they establish transparent benchmarks for success and provide a concrete basis for evaluating whether conservation and restoration actions are delivering meaningful improvements for the Dutch Caribbean's key habitats.

#	Key Habitat	Goal
1	**Coral Reefs**	By 2050, the percentage of reefs with live hard coral coverage will not fall below the current amount of ~8% across the Dutch Caribbean
2	**Coral Reefs**	By 2100, the percentage of reefs with live hard coral coverage will increase from ~8% to 25% or greater across the Dutch Caribbean
3	**Coral Reefs**	By 2050, the average number of hard coral species per island will not fall below 40 across the Dutch Caribbean
4	**Seagrass**	By 2050, the total area of seagrass will increase from 444 ha to 602 ha or greater across the Dutch Caribbean
5	**Mangroves**	By 2050, the total area of mangroves will increase from 380 ha to 407 ha or greater across the Dutch Caribbean
6	**Tropical Dry Forest & Scrub**	By 2050, the total area of tropical dry forest & scrub will not fall below 55,120 ha (no net loss) across the Dutch Caribbean
7	**Tropical Dry Forest & Scrub**	By 2050, the proportion (%) of tropical dry forest & scrub free of free-roaming grazers will increase from 4.48% to 26% or greater across the Dutch Caribbean
8	**Tropical Dry Forest & Scrub**	By 2100, the proportion (%) of tropical dry forest & scrub free of free-roaming grazers will increase from 4.48% to 100% across the Dutch Caribbean
9	**Tropical Wet Forest**	By 2050, the total area of tropical wet forest will not fall below 973 ha (no net loss) across the Dutch Caribbean
10	**Tropical Wet Forest**	By 2050, the proportion (%) of tropical wet forest free of free-roaming grazers will increase from 0.16% to 51% or greater across the Dutch Caribbean
11	**Tropical Wet Forest**	By 2100, the proportion (%) of tropical wet forest free of free-roaming grazers will increase from 0.16% to 100% across the Dutch Caribbean

Strategies and Actions

Based on the full suite of potential solutions identified in the situation analyses, a series of strategies and associated actions were prioritized for implementation to reduce the priority pressures and achieve the habitat-specific goals described above.



Photo by: © Christian König

Each proposed action was systematically evaluated according to two core criteria: (1) its technical, financial, and ethical feasibility to implement, and (2) its likely impact toward achieving the stated goals (i.e., improving the health of the key habitats). These assessments were combined to generate an overall effectiveness rating for each intervention, providing a transparent basis for prioritization.

Based on this process, actions were organized under five overarching strategies that together form an integrated and coordinated approach to conserving and restoring the Dutch Caribbean's priority ecosystems, which are described below:

Strategy 1: Reduce Free-roaming Grazer Impacts

Action #	Intervention	Feasibility	Impact	Effectiveness
1.1	Scale-up fencing installations to allow farmers to keep free-roaming grazers contained	**Medium**	**High**	*Needs More Information*
1.2	Advocate / lobby that governments fund grazer control measures	**Very High**	**Medium**	*Needs More Information*
1.3	Launch a behavior change campaign to improve husbandry practices to reduce free-roaming grazers	**High**	**Medium**	*Needs More Information*
1.4	Scale-up reforestation in areas degraded by grazers	**Medium**	**High**	*Needs More Information*
1.5	Scale-up fencing installations to keep grazers out of ecologically valued areas	**Medium**	**High**	*Needs More Information*
1.6	Scale-up free-roaming grazer removal and eradication	**Medium**	**High**	*Needs More Information*

Strategy 1:
Reduce Free-roaming Grazer Impacts

Free-roaming livestock pose a significant pressure on terrestrial ecosystems across the Dutch Caribbean, contributing to forest degradation, soil erosion, suppressed natural regeneration, and increased sediment runoff into coastal waters. Addressing this pressure is essential for improving the condition of tropical dry and wet forests and for protecting downstream mangroves, seagrass meadows, and coral reefs.

This strategy focuses on a suite of complementary actions aimed at preventing further habitat degradation, restoring impacted areas, and strengthening management systems that reduce grazing pressure over the long term.

Strategy 2:
Reduce Development Impacts

Coastal and terrestrial development is a major driver of habitat loss and degradation across the Dutch Caribbean, affecting mangroves, seagrass beds, coral reefs, and native forests through land conversion, sedimentation, altered hydrology, and shoreline modification. As population growth and tourism infrastructure expand, proactive planning and mitigation measures are essential to balance economic development with long-term ecological resilience.

This strategy focuses on strengthening land-use planning, regulatory frameworks, and incentive mechanisms to minimize development-related impacts while promoting restoration and nature-positive investment.

Strategy 2: Reduce Development Impacts

Action #	Intervention	Feasibility	Impact	Effectiveness
2.1	Partner with tourism agencies to co-fund restoration projects that offset development impacts	**Very High**	**High**	**Effective**
2.2	Lobby and advocate for coastal setback zones to reduce development along the shoreline	**High**	**Medium**	*Needs More Information*
2.3	Provide input to spatial development plans to better incorporate nature	**High**	**Medium**	*Needs More Information*
2.4	Scale-up private land securement to reduce development in ecologically valued areas	**Medium**	**Very High**	*Needs More Information*
2.5	Lobby for habitat offsetting laws to require developers to conserve / restore a net increase in habitat destroyed through development	**High**	**Medium**	*Needs More Information*

Strategy 3:
Reduce Wastewater Release Impacts

Inadequately treated wastewater is a significant pressure on nearshore and coastal ecosystems in the Dutch Caribbean, contributing to nutrient loading, algal blooms, coral disease, and declines in water quality that affect seagrass meadows, mangroves, and coral reefs. Addressing this pressure is critical for improving marine habitat health and safeguarding the ecosystem services that underpin fisheries, tourism, and coastal protection.

This strategy focuses on a single action to improve water quality by deployment of nature-based treatment solution.

Strategy 4:
Reduce Invasive Alien Species & Disease Impacts

Invasive alien species and emerging diseases pose a serious threat to both terrestrial and marine ecosystems in the Dutch Caribbean, disrupting native communities, suppressing regeneration, altering food webs, and accelerating habitat degradation. These pressures can undermine restoration investments and compromise the long-term resilience of key habitats if not addressed systematically and at scale.

This strategy focuses on strengthening prevention, early detection, and rapid response systems while expanding targeted control and restoration efforts in priority areas.

Strategy 3: Reduce Wastewater Release Impacts

Action #	Intervention	Feasibility	Impact	Effectiveness
3.1	Install nature-based water filtration systems (e.g., bivalves, sponges, etc.) to improve water filtration	**Medium**	**High**	*Needs More Information*

Strategy 4: Reduce Invasive Alien Species & Disease Impacts

Action #	Intervention	Feasibility	Impact	Effectiveness
4.1	Create a IAS reporting and response program to increase public observation of IAS and facilitate action to remove them	**Very High**	**Medium**	*Needs More Information*
4.2	Support the development, training, and implementation of biosecurity protocols and infrastructure (fencing, quarantine zones, etc.) to reduce IAS introductions	**Medium**	**Very High**	*Needs More Information*
4.3	Create and implement targeted IAS control, removal, and monitoring programs	**Medium**	**High**	*Needs More Information*

Strategy 5:
Reduce Climate Change Impacts

Climate change acts as a pervasive and accelerating pressure on all five key habitats in the Dutch Caribbean, driving coral bleaching, sea-level rise, coastal erosion, altered rainfall patterns, freshwater scarcity, increased storm intensity, and shifts in species composition. These impacts compound existing local stressors and threaten to undermine conservation gains unless proactive adaptation and resilience-building measures are implemented.

This strategy focuses on interventions that enhance ecosystem resilience, buffer islands against climate-driven disturbances, and strengthen institutional capacity to respond to extreme events.



Photo by: © Alwin Hylkema

Strategy 5: Reduce Climate Change Impacts

Action #	Intervention	Feasibility	Impact	Effectiveness
5.1	Install artificial reefs to replace lost reefs	**Very High**	**High**	**Effective**
5.2	Scale-up forest and mangrove restoration to reduce climate change-induced erosion and sedimentation	**Medium**	**High**	Needs More Information
5.3	Re-initiate past practices of building reservoirs to better store and manage freshwater	**Medium**	**High**	Needs More Information
5.4	Implement improved sargassum collection and disposal programs	**Medium**	**High**	Needs More Information
5.5	Advocate that island governments create policy to take responsibility for emergency measures to increase accountability toward addressing climate-change impacts (e.g., sargassum)	**High**	**Medium**	Needs More Information
5.6	Supplement populations of grazers to increase grazing of algae and improve coral reef health	**Medium**	**High**	Needs More Information

Theories of Change and Objectives

For each strategy and respective action selected for implementation, the planning team developed a Theory of Change to articulate how proposed interventions are expected to lead to measurable improvements in key habitat health and reductions in priority pressures. These causal pathway diagrams map the sequence of intermediate outcomes that must hold true for each action to be successful.

By examining and stress-testing these assumptions, the planning team identified those that are most critical to achieving conservation outcomes and framed them as objectives, which are SMART statements describing the desired future conditions that must be realized for actions to be effective. Together, the Theories of Change and associated objectives provide a transparent logic model for the plan, linking on-the-ground interventions to ecological recovery and guiding implementation, monitoring, and adaptive management over time.

Strategy 1: Reduce Free-roaming Grazer Impacts

Objective #	Objective
1.1	By 2030, a minimum of 30 ha will be reforested in areas degraded by grazers
1.2	By 2035, the area of fencing installations that allow farmers to keep free-roaming grazers contained will be a minimum 100 ha
1.3	By 2035, the area of fencing installations to keep grazers out of ecologically valued areas will be a minimum 100 ha
1.4	By 2050, all protected areas in the Dutch Caribbean have free-roaming grazers removed / eradicated
1.5	By 2050, a minimum of $40M of government funding will be invested in grazer control measures as a result of lobbying and advocacy
1.6	By 2035, a minimum of 50 landowners and managers are applying improved grazer husbandry practices as a result of the behavior change campaign

Strategy 2: Reduce Development Impacts

Objective #	Objective
2.1	By 2035, each Dutch Caribbean island has coastal setback zone policies and regulations that are a minimum of 50m from the high-water mark
2.2	By 2035, a minimum of 30% of each island will be set aside as “no development” as a result of providing input into spatial development plans
2.3	By 2035, a minimum of 12,000 ha will be set aside as “no development” as a result of scaling-up private land securement
2.4	By 2035, all 6 Dutch Caribbean islands have offsetting regulations in place to restore habitat destroyed by commercial development
2.5	By 2035, a minimum of $6M will made available to fund restoration projects as a result of partnering with tourism agencies

Strategy 3: Reduce Wastewater Release Impacts

Objective #	Objective
3.1	By 2035, a minimum of 100 m3 of nature-based water filtration systems (e.g., bivalve reefs, sponges, etc.) will be installed

Strategy 4: Reduce Invasive Alien Species & Disease Impacts

Objective #	Objective
4.1	By 2040, there will be no new instances of IAS introductions within the Dutch Caribbean
4.2	By 2040, 100% of verified IAS observations submitted through the reporting tool have been responded to and the species removed.
4.3	By 2040, a minimum of 5,000 ha of key habitats will be free of IAS as a result of targeted IAS control, removal and monitoring programs

Strategy 5: Reduce Climate Change Impacts

Objective #	Objective
5.1	By 2050, all 6 island governments will have developed and implemented climate emergency measures and policies tailored to improving key habitat health
5.2	By 2050, the area of algae covered reef will decrease by 50% relative to the 2025 baseline
5.3	By 2035, a minimum of 200 m^3 of artificial reef will be installed
5.4	By 2035, a minimum of 10,000 m^3 of water storage capacity has been created as a result of creating reservoirs
5.5	By 2035, a minimum of 30% of sargassum landed on shore will be removed and disposed of annually
5.6	By 2035, a minimum of 50 ha of mangrove will be restored to reduce climate-change induced erosion and sedimentation
5.7	By 2035, a minimum of 100 ha of tropical dry forest & scrub will be restored to reduce climate-change induced erosion and sedimentation
5.8	By 2035, a minimum of 30 ha of tropical wet forest will be restored to reduce climate-change induced erosion and sedimentation

Click HERE to see the different Theories of Change:



Free-roaming Grazer Impacts



Coastal and Terrestrial Development Impacts



Wastewater Release Impacts



Invasive Alien Species and Disease Impacts



Climate Change Impacts



Photo by: © Hans Smulders

Monitoring Plan

The Monitoring Plan brings together the goals and objectives presented throughout this conservation plan and translates them into a practical framework for tracking progress, learning from implementation, and supporting adaptive management. For each goal and objective, the plan identifies a focused set of indicators that will be measured consistently over time to assess whether actions are producing the intended outcomes.

For every indicator, this section specifies the monitoring methodology, the frequency of data collection, and the roles and responsibilities for implementation across the DCNA network and partner organizations. Together, these elements ensure that monitoring is feasible, scientifically robust, and aligned with management decision-making needs.

Status Monitoring of Key Habitats

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Goal 1: By 2050, the percentage of reefs with live hard coral coverage will not fall below the current amount of ~8% across the Dutch Caribbean	Percent (%) of reef area with live hard coral coverage	GCRMN sampling methods across a statistically significant number of random sample sites across the 6 island reefs	Every 5 years	DCNA
Goal 2: By 2100, the percentage of reefs with live hard coral coverage will increase from ~8% to 25% or greater across the Dutch Caribbean	Percent (%) of reef area with live hard coral coverage	GCRMN sampling methods within a statistically significant number of random sample sites across the 6 island reefs	Every 5 years	DCNA
Goal 3: By 2050, the average number of hard coral species per island will not fall below 40 across the Dutch Caribbean	Mean number of hard coral species	GCRMN sampling methods within a statistically significant number of random sample sites across the 6 island reefs	Every 5 years	DCNA
Goal 4: By 2050, the total area of seagrass will increase from 444 ha to 602 ha or greater across the Dutch Caribbean	Total hectares of seagrass	GIS analysis to refine current area of seagrass, coupled with a comprehensive survey methodology that is consistent across the 6 islands	Every 5 years	DCNA
Goal 5: By 2050, the total area of mangroves will increase from 380 ha to 407 ha or greater across the Dutch Caribbean	Total hectares of mangrove	GIS analysis to refine current area of mangroves, coupled with a comprehensive GIS methodology that is consistent across the 6 islands	Every 5 years	DCNA
Goal 6: By 2050, the total area of tropical dry forest & scrub will not fall below 55,120 ha (no net loss) across the Dutch Caribbean	Total hectares of tropical dry forest and scrub	GIS analysis to refine current area of tropical dry forest & scrub, coupled with a GIS methodology that is consistent across the 6 islands	Every 5 years	DCNA
Goal 7: By 2050, the proportion (%) of tropical dry forest & scrub free of free-roaming grazers will increase from 4.48% to 26% or greater across the Dutch Caribbean	Proportion (%) of tropical dry forest and scrub free of free-roaming grazers	GIS database of areas within tropical dry forest and scrub that are free of free-roaming grazers, divided by total area of tropical dry forest and scrub	Every 5 years	DCNA
Goal 8: By 2100, the proportion (%) of tropical dry forest & scrub free of free-roaming grazers will increase from 4.48% to 100% across the Dutch Caribbean	Proportion (%) of tropical dry forest and scrub free of free-roaming grazers	GIS database of areas within tropical dry forest and scrub that are free of free-roaming grazers, divided by total area of tropical dry forest and scrub	Every 5 years	DCNA
Goal 9: By 2050, the total area of tropical wet forest will not fall below 973 ha (no net loss) across the Dutch Caribbean	Total hectares of tropical wet forest	GIS analysis to refine current area of tropical wet forest, coupled with a comprehensive GIS methodology across the 6 islands	Every 5 years	DCNA
Goal 10: By 2050, the proportion (%) of tropical wet forest free of free-roaming grazers will increase from 0.16% to 51% or greater across the Dutch Caribbean	Proportion (%) of tropical wet forest free of free-roaming grazers	GIS database of areas within tropical wet forest that are free of free-roaming grazers, divided by total area of tropical wet forest	Every 5 years	DCNA
Goal 11: By 2100, the proportion (%) of tropical wet forest free of free-roaming grazers will increase from 0.16% to 100% across the Dutch Caribbean	Proportion (%) of tropical wet forest free of free-roaming grazers	GIS database of areas within tropical wet forest that are free of free-roaming grazers, divided by total area of tropical wet forest	Every 5 years	DCNA

Effectiveness Monitoring of Strategy 1: Reduce Free-roaming Grazer Impacts

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Obj 1.1: By 2030, a minimum of 30 ha will be reforested in areas degraded by grazers	Total hectares of land reforested in areas previously degraded by grazers	GIS database of areas degraded by grazers and a consistent monitoring protocol for partners to submit shapefiles of areas reforested	Annually	DCNA
Obj 1.2: By 2035, the area of fencing installations that allow farmers to keep free-roaming grazers contained will be a minimum 100 ha	Total hectares of grazing land enclosed with fencing designed to contain free-roaming grazers	GIS database of farmer fencing installations and a consistent monitoring protocol for partners to submit shapefiles of areas with grazers fenced in	Annually	DCNA
Obj 1.3: By 2035, the area of fencing installations to keep grazers out of ecologically valued areas will be a minimum 100 ha	Total hectares of ecologically valued areas excluding free-roaming grazers due to fencing	GIS database of ecologically valued areas with/without fencing and a consistent monitoring protocol for partners to submit shapefiles of areas with grazers fenced out	Annually	DCNA
Obj 1.4: By 2050, all protected areas in the Dutch Caribbean have free-roaming grazers removed / eradicated	Percent (%) of area within protected areas where free-roaming grazers have been removed or eradicated	GIS database of protected areas (PAs) with/without grazers present and a consistent monitoring protocol for partners to submit shapefiles of PAs with grazers removed	Annually	DCNA
Obj 1.5: By 2050, a minimum of $40M of government funding will be invested in grazer control measures as a result of lobbying and advocacy	Total amount of government funding (USD) allocated to grazer control measures	Excel sheet to track the total funding allocated annually to grazer control by each island government	Annually	DCNA
Obj 1.6: By 2035, a minimum of 50 landowners and managers are applying improved grazer husbandry practices as a result of the behavior change campaign	Number of landowners/ managers implementing improved grazer husbandry practices	Periodic social surveys to any/ all participants that are engaged in a behavior change campaign indicating if they have implemented improved grazer husbandry practices as a result of the campaign	Annually	DCNA

Effectiveness Monitoring of Strategy 2: Reduce Development Impacts

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Obj 2.1: By 2035, each Dutch Caribbean island has coastal setback zone policies and regulations that are a minimum of 50m from the high-water mark	Number of Dutch Caribbean islands with coastal setback zone policies /regulations ≥50m from the high-water mark	Excel sheet to track yes/no as to whether each island government has established coastal setback zones ≥50m from the high-water mark	Annually	DCNA
Obj 2.2: By 2035, a minimum of 30% of each island will be set aside as "no development" as a result of providing input into spatial development plans	Percentage of each island designated as "no development" zone in spatial development plans	A GIS database of areas designated as "no development" zones from island-specific spatial development plans. This number can be divided by total island area in an excel workbook.	Annually	DCNA
Obj 2.3: By 2035, a minimum of 12,000 ha will be set aside as "no development" as a result of scaling-up private land securement	Total hectares of private land secured and designated as "no development"	A GIS database of private lands secured for conservation.	Annually	DCNA
Obj 2.4: By 2035, all 6 Dutch Caribbean islands have offsetting regulations in place to restore habitat destroyed by commercial development	Number of Dutch Caribbean islands with active offsetting regulations for habitat restoration	Excel sheet to track yes/no as to whether each island government has established habitat offsetting regulations	Annually	DCNA
Obj 2.5: By 2035, a minimum of $6M will made available to fund restoration projects as a result of partnering with tourism agencies	Total funding (USD) mobilized for restoration projects through tourism agency partnerships	Excel sheet to track the total funding received from tourism agencies to fund restoration projects	Annually	DCNA

Effectiveness Monitoring of Strategy 3: Reduce Wastewater Release Impacts

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Obj 3.1: By 2035, a minimum of 100 m3 of nature-based water filtration systems (e.g., bivalve reefs, sponges, etc.) will be installed	Total volume (m^3) of nature-based water filtration systems installed	Excel sheet to track the total volume of nature-based water filtration system projects installed	Annually	DCNA

Effectiveness Monitoring of Strategy 4: Reduce Invasive Alien Species & Disease Impacts

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Obj 4.1: By 2040, there will be no new instances of IAS introductions within the Dutch Caribbean	Number of new invasive alien species introductions	Excel sheet to track new IAS introductions	Annually	DCNA
Obj 4.2: By 2040, 100% of verified IAS observations submitted through the reporting tool have been responded to and the species removed.	Percentage of verified IAS reports acted upon and resulting in removal of the species	Excel sheet to track verified IAS observation from the reporting tool, whether they have been responded to (or not), and whether the IAS has been removed (or not)	Annually	DCNA
Obj 4.3: By 2040, a minimum of 5,000 ha of key habitats will be free of IAS as a result of targeted IAS control, removal and monitoring programs	Total hectares of key habitats cleared of invasive alien species through targeted programs	GIS database of key habitats with/without IAS present and a consistent monitoring protocol for partners to submit shapefiles of key habitat areas with IAS removed	Annually	DCNA



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Effectiveness Monitoring of Strategy 5: Reduce Climate Change Impacts

Goals / Objectives	Indicator	Method Summary	Time-frame	Who
Obj 5.1: By 2050, all 6 island governments will have developed and implemented climate emergency measures and policies tailored to improving key habitat health	Number of islands with government-implemented climate emergency measures and habitat health policies	Excel sheet to track yes/no as to whether each island government has developed and implemented one or more climate emergency policies to improve key habitat health	Annually	DCNA
Obj 5.2: By 2050, the area of algae covered reef will decrease by 50% relative to the 2025 baseline	Percent (%) change in algae-covered reef area relative to the 2025 baseline	GIS database of reef area covered with algae, coupled with a comprehensive survey methodology that is consistent across the 6 islands (GCRMN sampling methods?)	Every 5 years	DCNA
Obj 5.3: By 2035, a minimum of 200 m3 of artificial reef will be installed	Total volume of artificial reef installed	Excel sheet to track the total volume of artificial reef projects installed	Annually	DCNA
Obj 5.4: By 2035, a minimum of 10,000 m3 of water storage capacity has been created as a result of creating reservoirs	Total volume (m^3) of new water storage capacity created	Excel sheet to track the total volume of water storage capacity from reservoir installation projects	Annually	DCNA
Obj 5.5: By 2035, a minimum of 30% of sargassum landed on shore will be removed and disposed of annually	Percent (%) of sargassum landed on shore that is removed and properly disposed of each year	Excel sheet to track the total annual biomass of sargassum landings and total annual biomass of sargassum removed and disposed	Annually	DCNA
Obj 5.6: By 2035, a minimum of 50 ha of mangrove will be restored to reduce climate-change induced erosion and sedimentation	Total hectares of mangrove restored	A GIS database of areas where mangroves have been restored.	Annually	DCNA
Obj 5.7: By 2035, a minimum of 100 ha of tropical dry forest & scrub will be restored to reduce climate-change induced erosion and sedimentation	Total hectares of tropical dry forest & scrub restored	A GIS database of areas where tropical dry forest & scrub has been restored.	Annually	DCNA
Obj 5.8: By 2035, a minimum of 30 ha of tropical wet forest will be restored to reduce climate-change induced erosion and sedimentation	Total hectares of tropical wet forest restored	A GIS database of areas where tropical wet forest has been restored.	Annually	DCNA

Operational Plan

The following section translates the strategies and actions outlined in this conservation plan into an implementable program of work called the Operational Plan, which organizes each selected action according to three core elements: the entity responsible for coordinating implementation, the anticipated timeframe for delivery, and the budget required to implement (Please note: Budget information is not presented in this document). Together, these components provide a practical roadmap for moving from strategy to on-the-ground results.

Strategy #1 - Reduce Free-roaming Grazer Impacts

#	Actions	Implementation Lead	Timeframe
1.1	Scale-up fencing installations to allow farmers to keep free-roaming grazers contained	Local Partners	2026 - 2035
1.2	Advocate / lobby that governments fund grazer control measures	Local Partners	2026 - 2050
1.3	Launch a behavior change campaign to improve husbandry practices to reduce free-roaming grazers	Local Partners	2030 - 2035
1.4	Scale-up reforestation in areas degraded by grazers	Local Partners	2026 - 2030
1.5	Scale-up fencing installations to keep grazers out of ecologically valued areas	Local Partners	2026 - 2035
1.6	Scale-up free-roaming grazer removal and eradication	Local Partners	2030 - 2050

Strategy #2 - Reduce Development Impacts

#	Actions	Implementation Lead	Timeframe
2.1	Partner with tourism agencies to co-fund restoration projects that offset development impacts	DCNA	2026 - 2035
2.2	Lobby and advocate for coastal setback zones to reduce development along the shoreline	Local Partners	2028 - 2035
2.3	Provide input to spatial development plans to better incorporate nature	Local Partners	2028 - 2035
2.4	Scale-up private land securement to reduce development in ecologically valued areas	DCNA	2028 - 2035
2.5	Lobby for habitat offsetting laws to require developers to conserve / restore a net increase in habitat destroyed through development	Local Partners	2028 - 2035



Strategy #3 - Reduce Wastewater Release Impacts

#	Actions	Implementation Lead	Timeframe
3.1	Install nature-based water filtration systems (e.g., bivalves, sponges, etc.) to improve water filtration	Local Partners	2028 - 2035

Strategy #4 - Reduce Invasive Alien Species & Disease Impacts

#	Actions	Implementation Lead	Timeframe
4.1	Create a IAS reporting and response program to increase public observation of IAS and facilitate action to remove them	DCNA	2028 - 2040
4.2	Support the development, training, and implementation of biosecurity protocols and infrastructure (fencing, quarantine zones, etc.) to reduce IAS introductions	DCNA	2026 - 2040
4.3	Create and implement targeted IAS control, removal, and monitoring programs	Local Partners	2028 - 2040

Strategy #5 - Reduce Climate Change Impacts

#	Actions	Implementation Lead	Timeframe
5.1	Install artificial reefs to replace lost reefs	Local Partners	2028 - 2035
5.2	Scale-up forest and mangrove restoration to reduce climate change-induced erosion and sedimentation	Local Partners	2026 - 2035
5.3	Re-initiate past practices of building reservoirs to better store and manage freshwater	Local Partners	2028 - 2035
5.4	Implement improved sargassum collection and disposal programs	Local Partners	2028 - 2035
5.5	Advocate that island governments create policy to take responsibility for emergency measures to increase accountability toward addressing climate-change impacts (e.g., sargassum)	Local Partners	2026 - 2035
5.6	Supplement populations of grazers to increase grazing of algae and improve coral reef health	Local Partners	2028 - 2050

Appendix A: Key Habitat Health Assessments

Coral Reefs

To assess the current condition of coral reefs across the six Dutch Caribbean islands, live hard coral cover was selected as the first Key Attribute. This attribute reflects the extent of living reef framework that underpins habitat complexity, biodiversity, and ecosystem function. The associated indicator (i.e., Percent (%) of reef area with live hard coral coverage) is widely used in Caribbean reef assessments and scientific monitoring programs as a direct measure of reef health.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed based on published regional studies, historical Caribbean baselines, and expert judgment. To estimate current status, the best available recent coral-cover data were compiled for each island from surveys, reports, and expert assessments. Because monitoring programs differ among islands and years, these data sources were harmonized to allow regional comparison. Each island's coral-cover estimate was then **weighted by reef extent** using mapped reef-area data from the Allen Coral Atlas, ensuring that islands with larger reef systems contributed proportionally more to the regional estimate. This approach allowed for an *"apples-to-apples"* comparison across the six Dutch Caribbean islands.

Using this method, the six-island region-wide estimate of live hard coral cover was calculated at **8.13%,** placing the overall condition firmly in the **"Poor"** category. While islands such as Curaçao and Bonaire contribute more heavily to this figure because of their larger reef areas, coral cover is critically low on several islands, including St. Eustatius, Saba, and St. Maarten.

For full methodological detail, including island-specific datasets, assumptions, caveats, weighting calculations, literature sources, and recommendations on how to improve regional data, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Coral Reefs	Live Hard Coral Cover	Percent (%) of reef area with live hard coral coverage	<10%	10 - 24%	25 - 39%	≥40%
	Current Status as of 2020:		8.13%			

To assess the biodiversity and ecological complexity of coral reefs across the six Dutch Caribbean islands, hard coral species richness was selected as the second Key Attribute. This attribute reflects the diversity of reef-building corals that contribute to habitat structure, ecosystem function, and resilience. The associated indicator (i.e., Mean number of hard coral species) was selected as a measure of biological integrity, with higher species richness generally indicating healthier, more resilient reef ecosystems.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed based on published Caribbean species inventories, historical records, and expert judgment. To estimate current status, recent island-specific species lists were compiled from surveys, monitoring programs, and expert assessments, focusing on native hard corals in shallow to mid-depth reef zones. Species not recorded in recent decades and considered locally extirpated were excluded from island totals, while invasive species were not counted toward the indicator. These island-level estimates were then averaged to derive a regional value for the Dutch Caribbean, allowing for comparison across islands with different reef histories and monitoring intensity.

Using this method, the current six-island regional average was estimated at approximately **40 hard coral species,** placing overall species richness in the **"Good"** category. Islands such as Saba and St. Eustatius retain near-historical levels of coral diversity, while Bonaire and Curaçao also support relatively rich assemblages. In contrast, Aruba and particularly St. Maarten exhibit substantially lower species richness, reflecting severe local degradation and contributing to uneven reef condition across the region.

For full methodological detail, including literature sources, assumptions regarding extirpations, uncertainty analyses, and recommendations for strengthening this indicator, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Coral Reefs	Hard Coral Species Richness	Mean number of hard coral species	<30 species	30 - 39 species	40 - 49 species	≥50 species
Current Status as of 2025:					~40 species	

Seagrass

To assess the condition of seagrass ecosystems across the six Dutch Caribbean islands, geographic extent was selected as the sole Key Attribute. This attribute reflects the total area of seagrass meadows, which are critical for sustaining biodiversity, supporting fisheries and coastal protection, and maintaining ecosystem function in shallow marine environments. The associated indicator (i.e., Total Area (ha) of Seagrass) was derived from benthic habitat classifications in the Allen Coral Atlas, which maps reef-associated seagrass in shallow coastal waters.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed through expert judgment and team consensus using Allen Coral Atlas data as the primary regional dataset. To establish a reference for potential historic extent, mapped seagrass area was combined with areas classified as sand substrate, under the assumption that sandy habitats represent locations where seagrass could plausibly occur under favorable conditions. This produced an estimated historic or maximum attainable extent of approximately 805 hectares, which was used to define percentage-based rating categories. While this proxy approach involves uncertainty, it provided a transparent and agreed-upon starting point for regional assessment.

Using this method, current mapped seagrass area across the six islands totals **444 hectares**, equivalent to approximately **55% of the estimated historic extent.** Under the established thresholds, this places the overall condition of seagrass geographic extent in the **"Fair"** category. This indicates that a substantial portion of potential seagrass habitat has been lost or degraded, although more than half of the assumed historic footprint remains occupied.

For full methodological detail, including island-level data tables, threshold rationale, assumptions regarding historic extent, mapping limitations, uncertainty analysis, and recommendations for improving this indicator, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Seagrass	Seagrass Geographic Extent	Total area (ha) of seagrass	0 - 240 ha (0 - 29%)	241 - 601 ha (30 - 74%)	602 - 722 ha (75 - 89%)	723 - 803 ha (90 - 100%)
	Current Status as of 2022:			444 ha		

Mangroves

To assess the condition of mangrove ecosystems across the Dutch Caribbean, geographic extent was selected as the sole Key Attribute. This attribute reflects the total area of mangrove forests, which are essential for coastal protection, nursery habitat for fisheries, carbon storage, and other critical ecosystem services. The associated indicator (i.e. Total Area (ha) of Mangroves) was derived from a global mangrove extent dataset produced by Global Mangrove Watch, covering the four islands where mangroves naturally occur: Aruba, Bonaire, Curaçao, and St. Maarten.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed using expert judgment and team consensus, informed by historic and contemporary Global Mangrove Watch data spanning 1996–2020. To reconcile differences between coarse-resolution annual datasets and higher-resolution mapping available for 2020, a proportional scaling approach was applied to generate a harmonized time series across the full period. The scaled 1996 mangrove extent (estimated at 543 hectares) was adopted as a proxy for the best available historical baseline, acknowledging that true pre-development mangrove extent was likely greater.

Percentage-based thresholds relative to this benchmark were then established to ensure consistency with other habitat indicators and to transparently reflect degrees of habitat loss or recovery.

Using this approach, mangrove extent across the region in 2025 is estimated at approximately **380 hectares**, based on trend extrapolation from the harmonized dataset and supported by recent island-level studies indicating continued declines in key locations such as Lac Bay, Bonaire. This value corresponds to roughly **70% of the 1996 baseline** and places the overall condition of mangrove geographic extent in the **"Fair"** category, signaling substantial loss relative to historical levels and ongoing degradation pressures.

For full methodological detail, including scaling procedures, baseline derivation, island-specific trends, uncertainty analysis, and recommendations for improving mangrove monitoring, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Seagrass	Mangrove Geographic Extent	Total area (ha) of Mangroves	<163 ha (<30% of historic value)	163 - 406 Ha (30 - 74% of historic value)	407 - 543 ha (75 - 100% of historic value)	>543 ha (>100% of historic value)
Current Status as of 2022:				380 ha (70%)		

Tropical Dry Forest and Scrub

To assess the condition of tropical dry forest and scrub across the six Dutch Caribbean islands, geographic extent was selected as the first Key Attribute. This habitat type represents the dominant terrestrial ecosystem in the region and is critical for supporting endemic biodiversity; its loss has direct consequences for numerous rare plant and animal species. The associated indicator (i.e., Total Area (ha) of Tropical Dry Forest & Scrub) was derived from island-specific vegetation maps combined with satellite land-cover data, which provides standardized, high-resolution classifications across all islands.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed through expert judgment and team consensus using spatial analysis of current land cover and an estimated historical baseline. Historic extent was approximated by combining present-day forest and shrubland areas with land classes representing anthropogenic conversion, while excluding wet-forest zones on Saba and St. Eustatius using detailed island vegetation maps. This approach yielded an estimated historical tropical dry forest and scrub extent of 85,059 hectares, against which percentage-based thresholds were established.

The current extent of tropical dry forest and scrub across the six islands is estimated at 55,120 hectares, representing **approximately 65% of the historic baseline.** This places the regional condition in the **"Fair"** category, indicating substantial reduction in this ecosystem (nearly 30,000 hectares lost) primarily from development and agricultural conversion.

For full methodological detail, including historic-extent reconstruction, island-level calculations, spatial assumptions, uncertainty analysis, and recommendations for improving future assessments, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Tropical Dry Forest & Scrub	Tropical Dry Forest & Scrub Geographic Extent	Total area (ha) of Tropical Dry Forest & Scrub	≤25,517 ha (≤29%)	25,518 - 63,793 ha (30 - 74%)	63,794 - 76,552 ha (75 - 89%)	≥76,553 ha (≥90%)
	Current Status as of 2025:			55,120 ha (65%)		

To evaluate the regenerative capacity of tropical dry forest and scrub ecosystems across the six Dutch Caribbean islands, regenerative integrity was selected as the second Key Attribute. This attribute reflects the ecosystem's ability to naturally recover and sustain itself, which is severely constrained by introduced free-roaming grazers such as goats, sheep, pigs/boar, donkeys, and cattle. Chronic browsing pressure suppresses tree recruitment, alters vegetation structure, and drives cascading impacts on wildlife, ultimately threatening the long-term persistence of dry-forest communities. The associated indicator (i.e., Proportion (%) of Tropical Dry Forest & Scrub Free of Free-Roaming Grazers) measures the share of existing dry-forest habitat where these animals have been fully removed or excluded, allowing regeneration to proceed without grazing disturbance.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed through expert judgment and team consensus in the absence of established ecological benchmarks. To ensure transparency and consistency, the indicator range was divided into four equal quartiles representing increasing proportions of ungrazed habitat across the region. This approach provides a practical starting framework that can be refined as more empirical data become available.

Current status was estimated by compiling spatial information from island-based experts, including park managers and conservation practitioners, who identified fenced exclosures, goat-free reserves, and areas where sustained removal programs have eliminated free-roaming herds. These grazer-free zones were mapped and overlaid with the dry-forest distribution derived under Key Attribute 4.1: Geographic Extent, allowing calculation of the proportion of habitat currently free from grazing pressure. Only areas with near-complete exclusion of grazers were counted to maintain a conservative and clearly defined standard.

Using this method, approximately **2,468 hectares (4.48%)** of tropical dry forest and scrub across the six islands are currently free of free-roaming grazers, placing the regional condition firmly in the **"Poor"** category. This result underscores that widespread grazing pressure remains one of the most severe constraints on terrestrial ecosystem recovery in the Dutch Caribbean.

For full methodological detail, including island-level data sources, mapping assumptions, uncertainty analysis, and recommendations for establishing a regional grazer-free spatial database, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program**.

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Tropical Dry Forest & Scrub	Regenerative Integrity	Proportion (%) of Tropical Dry Forest & Scrub free of free-roaming grazers	0 - 25%	26 - 50%	51 - 75%	76 - 100%
Current Status as of 2025:			4.48%			

Tropical Wet Forest

To evaluate the condition of tropical wet forests across the Dutch Caribbean, geographic extent was selected as the first Key Attribute. Tropical wet forest occurs only on Saba and St. Eustatius and supports a distinctive assemblage of rare and endemic species, making its persistence particularly important for regional biodiversity conservation. The associated indicator (i.e., Total Area (ha) of Tropical Wet Forest) measures the combined extent of wet-forest habitat across these two islands using island-specific vegetation maps integrated with satellite land-cover data.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed through expert judgment and team consensus, informed by spatial analyses and refined using local vegetation classifications to separate wet from dry forest types. Historic wet-forest extent was estimated by delineating wet-forest zones on each island and summing all land-cover classes within those zones that plausibly represented former forest, including areas now converted to agriculture or settlements. This produced a regional historic reference value of 1,052 hectares, which was then used to define percentage-based condition categories consistent with other habitat indicators in the plan.

Current status was calculated by summing Tree Cover and Shrubland classes within the mapped wet-forest zones for Saba and St. Eustatius. Using the 2021 land-cover layer, the present regional extent of tropical wet forest is estimated at **973 hectares**, representing approximately **92% of the historic reference area.** This places the ecosystem firmly in the **"Very Good"** condition category, indicating that most tropical wet forest habitat on these two islands remains intact relative to the best available historical benchmark.

For full methodological detail, including spatial delineation methods, island-level results, uncertainty analysis, and recommended refinements, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Tropical Wet Forest	Tropical Wet Forest Geographic Extent	Total area (ha) of Tropical Wet Forest	≤315 ha (≤29%)	316 - 788 ha (30 - 74%)	789 - 946 ha (75 - 89%)	≥947 ha (≥90)
	Current Status as of 2025:					973 ha (92%)

To assess the regenerative condition of tropical wet forests on Saba and St. Eustatius, regenerative integrity was selected as the second Key Attribute. This attribute reflects the ecosystem's capacity to naturally recover and sustain itself, which is severely constrained by introduced free-roaming grazers such as goats, sheep, pigs/boar, donkeys, and cattle. Chronic browsing suppresses forest regeneration, threatens long-term plant community persistence, and creates cascading impacts for wildlife. The associated indicator (i.e., Proportion (%) of Tropical Wet Forest Free of Free-roaming Grazers) measures the share of wet-forest habitat where these animals have been completely removed or excluded, expressed as a percentage of total current wet-forest area.

Indicator rating thresholds *(Poor, Fair, Good, Very Good)* were developed through expert judgment and team consensus and structured as equal quartiles across the full indicator range. This transparent approach was adopted in the absence of published ecological benchmarks and allows future refinement as better empirical data become available.

Current status was derived through expert consultations with island managers and researchers who identified known grazer-free areas, such as fenced exclosures or zones where eradication programs have removed free-roaming herds. These areas were spatially mapped and overlaid on the wet-forest extent calculated under Key Attribute 5.1. Only areas confirmed to be essentially free of grazers were included, ensuring a conservative and clearly defined standard. Using this method, just **2 hectares** of the region's **973 hectares** of tropical wet forest were identified as grazer-free in 2025 (**0.16%** of total wet-forest area), placing the regional condition firmly in the **"Poor"** category.

For full methodological detail, including island-level data, mapping assumptions, uncertainty analysis, and recommended refinements, please refer to **Priority Habitat Health: Technical Methodology for Evaluating the Health of Key Habitats for the DCNA Conservation and Restoration of Key Habitats Program.**

			Indicator Ratings			
Target	**Key Attribute (KA)**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Tropical Wet Forest	Regenerative Integrity	Proportion (%) of Tropical Wet Forest free of free-roaming grazers	0 - 25%	26 - 50%	51 - 75%	76 - 100%
Current Status as of 2025:			0.16%			



DCNA

DCNA envisions this program as a major step forward in safeguarding nature. Through collaboration and long-term sustainable financing, we aim to halt or reverse the loss of key habitats, restore ecosystems, and promote communities living in balance with nature.

communication@dcnanature.org

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