THE CARIBBEAN BROWN PELICAN OF SINT MAARTEN

MANUAL FOR HABITAT AND POPULATION MANAGEMENT

ENVIRONMENTAL PROTECTION IN THE CARIBBEAN
EPIC
SINT MAARTEN

Filippo Milani

"BROWN PELICAN"

Dashing and splashing, exploring our ponds and shores
Dipping and diving, peeping from the mangroves

You fly and nest, from east to west
Fishing up north like a Grand Case fisherman
Fishing down south like a Simpson Bay fisherman

You don't ever say what all you've seen
You hold your beak, chest high, *semper progrediens*

By Tamara Groeneveldt, poet. © 2023. Sint Maarten
Author of After The Storm (HNP, 2019)

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EXECUTIVE SUMMARY

Environmental Protection in the Caribbean (EPIC) Sint Maarten Foundation launched a pelican project running from November 2022 to April 2023, the Caribbean Brown Pelican being the national bird of Sint Maarten.

The objective of the project "An investigation of the state of Sint Maarten's Brown Pelican population for improved management of the species and its habitat" is to research the status of the Caribbean Brown Pelican on Sint Maarten through monitoring and ecotoxicology analysis and to promote conservation of the pelican through awareness raising and outreach activities.

The main nesting site is Fort Amsterdam, which is a zoned area. Monitoring this location over the years has shown declining numbers, although numbers can fluctuate depending on the stage of the breeding season or annual variation.

Reasons for a decline in numbers can include habitat loss and fragmentation, pollution, disturbance, predators, and diseases.

From our observations, pollution and disturbance should be avoided to improve nesting productivity and breeding habitat of the Caribbean Brown Pelican.

The Manual for habitat and population management of the Caribbean Brown Pelican is a guidebook intended for key stakeholders and resource managers, in order to best manage and protect this species and its habitat.

Recommendations can be found on pages 21-24.

MESSAGE FROM EPIC

The Caribbean Brown Pelican is an important cultural icon for Sint Maarten, as its national symbol, its image can be found on a variety of items and differing locations. It is a symbol for many different things, but most importantly it is an indicator of how we as an island are doing. If the pelican is prospering, so are we.

They indicate our fish abundance, the quality of our waters, the protection of species and their habitats; in general - if we are adequately caring for our nature and environment, as a whole.

Monitoring our pelican population and safeguarding their well-being is therefore crucial to Sint Maarten and the wider Caribbean region. Having a manual in place intends to facilitate this and we as EPIC hope it assists with a better future for our pelican colonies.

FLEUR HERMANIDES
President of the Board, EPIC,
Sint Maarten

Figure 1. Two adult individuals in their breeding plumage at Fort Amsterdam

THE PELICAN PROJECT

The objective of the **"An investigation of the state of Sint Maarten's Brown Pelican population for improved management of the species and its habitat"** project is to research the status of the Caribbean Brown Pelican on Sint Maarten through monitoring and ecotoxicology analysis and to promote conservation of the pelican through awareness raising and outreach activities.

With the observational and nesting data collected between November 2022 and April 2023, the long-term goal of this project is to improve the management of natural resources for the preservation of Sint Maarten's Brown Pelican population and habitats.

This manual provides relevant information about pelican behavior and ecology, and also includes recommendations and guidelines for policy makers and tips for eco-friendly observation.

Members of the Pelican Project Team

The pelican project team was composed of Gaia Piccaluga (Field and Research Intern), Filippo Milani (Field and Research intern and Photographer), Margot Mesnard (Project Coordinator), Natalia Collier (Programme Manager and Scientific Advisor).

This project was funded by the United Nations SPAW/RAC, Prins Bernhard Culture Fund (PBCCG), and the Dutch Representation Office in Sint Maarten (VNP).

FORT AMSTERDAM:
The Main Nesting Colony

Figure 2. Aerial view of Fort Amsterdam

Fort Amsterdam is the main breeding colony site of the Brown Pelican on Sint Maarten.

Fort Amsterdam is privately owned and a zoned historical site, listed on the monument list, which affords it legal protection from development. It is also recognised as an Important Bird Area (IBA) by BirdLife International.

Pelicans make use of this natural coastal area to nest in trees and shrubs, rest on the cliffs, and feed in the ocean and nearby Little Bay freshwater pond and the Great Bay saltpond.

The preferred nesting site is on the rocky cliff of the west side of the main peninsula nearing the recreational water sport area. It is important that this area remains free of further development, pollution and human disturbance.

Pelikan rock is the second nesting colony, last assessed by EPIC in a 2010 survey, located in a Marine Protected Area (MPA). It was not a focal area during this project.

A PROTECTED SPECIES

Figure 3. The sign was placed years ago and is not currently located where the nests are.

Pelicans are legally protected in Sint Maarten. As per national decree, it is forbidden to kill, injure, capture, collect, possess, directly or indirectly disturb the living environment of an animal belonging to a protected animal species, resulting in a physical threat or damage to the fauna or other species.

They are protected under the Specially Protected Areas and Wildlife (SPAW) Protocol Annex II, but are not listed as vulnerable or endangered.

According to the International Union for Conservation of Nature's (IUCN) 2018 classification, pelicans are listed as Least Concerned (LC), with the number of Brown Pelicans increasing worldwide.

However, they have been locally declining over the years on Sint Maarten, which is concerning and likely due to environmental degradation, diseases, pollution and disturbances.

THE PELICAN ID

Caribbean Brown Pelican

Found throughout the Caribbean islands arc, in the Greater Antilles and the Lesser Antilles, ranging from the coast of Venezuela (South) to Florida and the Gulf of Mexico (North and West), in near-shore habitats.

Species	*Pelecanus occidentalis*
Subspecies	*Pelecanus occidentalis occidentalis*
Size	Around 1,1 - 1,3 meters /3.6 - 4.2 feet in height
Wingspan	Up to 2 meters /6.5 feet
Weight	From 3 to 5 kg /6.6 to 11 lbs, females are slightly smaller and lighter than males
Life Expectancy	~ 10 years in the wild
Breeding Season	Year round with one or two peaks
Number of offspring	2 to 4 eggs at a time, with on average one fledge per year
Migration	Non-migratory with movements between Caribbean islands

CHARACTERISTICS

FLYING

The Brown Pelican can fly up to 65 km/h or 40 mph thanks to hollow bones and their flight position. It can travel more than 100 km /62 miles per day to the neighboring islands to follow schools of fish and find feeding grounds.

Figure 4. Pelican flying

Figure 5. Pelican searching for food

DIVING

Once prey is spotted, the Brown Pelican will dive at a 90 degrees angle. Like other seabirds, their feathers are waterproof thanks to the uropygial or oil gland at the base of their spine.

GULAR POUCH

The main particularity of pelicans is the elastic sack of skin attached to their beak, called the gular pouch.

It allows them to scoop up to 11 liters/ 3 gallons of water at a time to feed and cool down.

They also use it to feed their chick by regurgitation.

They have salt glands and ducts connected to their bill to filter and desalinate saltwater and get rid of excess salt in their bodies.

Figure 6. Two adults, one stretching its gular pouch

FEEDING

The Brown Pelican's main diet is fish, such as mullets, sardines, and anchovies. They do not have teeth, but do have a pointy hook at the end of the bill to scrape rocks and occasionally feed on small crustaceans and amphibians such as crabs, shellfish, and frogs.

Figure 7. Two juveniles scraping on rocks for shellfish.

Figure 8. Pelicans preparing to roost for the night.

GREGARIOUS BIRD

They are social animals and like to live in large colonies. They communicate with each other regarding danger and cooperate to hunt in groups. They emit low, brief, hoarse grunts. Nestlings use a shrill, rasping squawk to beg for food.

COLOR CHANGES

The chick is born with dark skin, then grows a white, downy feather coat. At the juvenile stage, its feathers turn grayish-brown. At the adult stage, the head turns white. During breeding season, the back of the adult's neck turns brown.

Figure 9. An adult with a chick in the foreground, estimated to be 1-2 months old.

Figure 10. A breeding pair on nest.

REPRODUCTION

Pelicans are monogamous breeders within a breeding season. The couple builds the nest together and after mating, the female lays one to four eggs, which they brood for 28 to 30 days interchangeably.

BREEDING

Both parents take care of the chicks, which can fly at about three months, but continue to need their parents' care for up to eight months, learning how to fly, feed, and survive. This is a protracted breeding season, longer than most Caribbean birds, which requires significant physical resources.

Figure 11. A newborn chick with adult on nest.

A HABITAT TO PROTECT

Habitat loss and disturbance can cause pelicans to abandon nesting areas.

PELICAN HABITAT

Figure 12. Fort Amsterdam peninsula

The main nesting colony is at Fort Amsterdam, a natural space covered in dense vegetation with cliffs and surrounded by water.

Pelicans congregate in areas with minimal disturbance and prefer to roost and nest in the safety of elevated areas, such as trees and shrubs, which also provide shade.

Tree species found at Fort Amsterdam include two acacia species: *Acacia macracantha and Acacia tortuosa.*

Other nesting and feeding areas exist on the island on both the Dutch and French part. Feeding areas include Pelikan Rock off Pointe Blanche, Oyster Pond, Guana Bay, Happy Bay and the Simpson Bay Lagoon.

ECOLOGICAL CORRIDOR

Figure 13. Little Bay Pond (left) and Fort Amsterdam (right)

An ecological corridor is a functional zone of passage between several natural zones for a species dependent on a single environment.

Access to the pond is essential for pelicans; it provides additional feeding grounds and different species of fish than those found in the ocean, as well as crustaceans and amphibians.

Pelicans are seen flying back and forth daily between ponds and the main colony.

Keeping the corridor free of construction and disturbance is essential for pelicans to be able to feed, especially during breeding season, and maintain healthy population numbers.

If the habitat is fragmented, the lack of resources can lead pelicans to abandon the colony.

HABITAT LOSS

The expression “habitat loss” indicates the reduction in the amount of space where a particular species, or a group of species, can survive and reproduce.

Habitat loss due to destruction, fragmentation, or degradation to habitat is one of the primary threats to the survival of wildlife in the world.

Figure 14. An empty nest in acacia trees at Fort Amsterdam

Habitat destruction by removing trees to make new spaces for human development limits pelican nesting sites. Clearing vegetation near nesting sites will deprive pelicans of the shade and safety they need to breed successfully.

Mangroves should be kept intact for the vital role they play as a nursery for forage fish and marine life as well as providing coastal protection during storms.

Overfishing is a threat to pelicans by reducing food sources. Although fishing at Fort Amsterdam is limited to recreational fishing, the impact of commercial fishing and bycatch in surrounding waters warrants study in order to determine its impacts.

POLLUTION

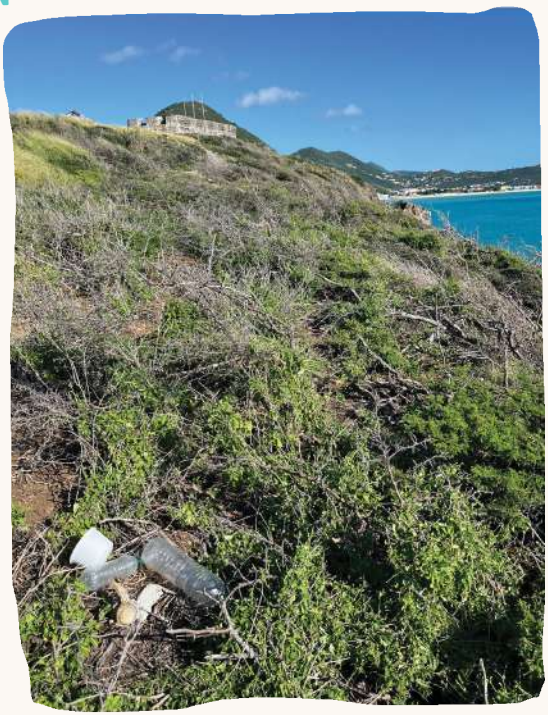


Figure 15. Plastic bottles at Fort Amsterdam

Discarded trash on land and in the water can be accidentally ingested by pelicans who can suffocate or die from the accumulation of plastics in their bodies. Discarded fishing lines can cause injuries to pelicans and entangle them, limiting movement and possibly result in drowning. The species is also known to try to get fish from hooks, resulting in hooks being embedded in the gular pouch. Proper removal of the hooks is essential to reduce injury and mortality.

Land and boat-based pollution, including chemicals, pesticides, oil, and microplastics can contaminate the water and impact pelican health.

It enters the food chain by first being ingested by fish in which it bioaccumulates, which in turns harms the pelican when ingesting the fish, which can be fatal; in addition, the declining number of fish in a location due to pollution is a threat to pelicans who depend on fish as the core of their diet.

DISTURBANCES

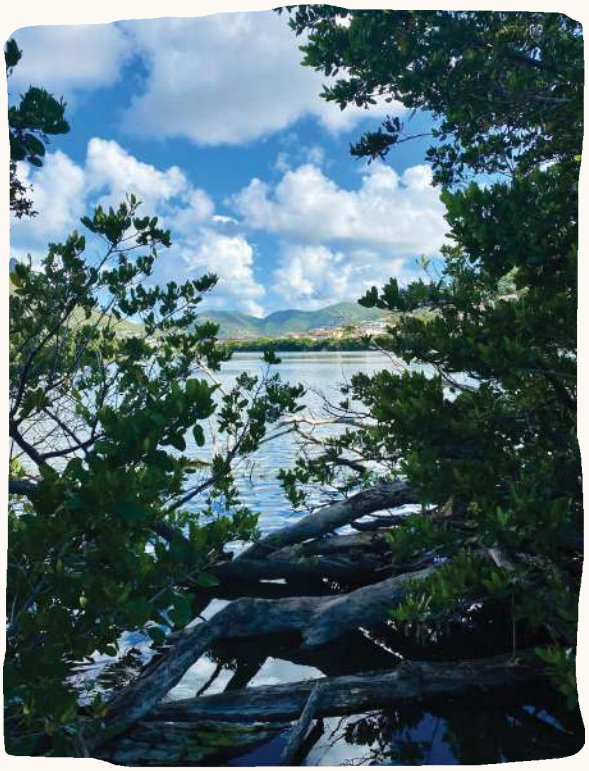


Figure 16. Little Bay pond is a quiet feeding and resting space for pelicans.

Fort Amsterdam is a zoned area, but is part of a hotel property that is open to all to visit. It is an active watersports area, with jet skis, snuba, scuba, snorkeling, and leisure boating activities occurring on a daily basis.

Disturbances, such as loud noises and sudden movements, both on land and water, will cause pelicans to flush from their nest, showing signs of stress based on our observations.

Ponds which are free from disturbance are valuable as feeding and roosting areas.

PREDATORS

Feral cats, dogs, monkeys, mongoose, and rats can prey on both chicks and eggs while iguanas prey on eggs. All these species are not native, meaning they were introduced to the island, often by humans.

Therefore, local wildlife did not evolve protections against these predators, making them vulnerable to predation.

Figure 17. A rat captured at night by camera trap.

During our monitoring, we observed high numbers of iguanas crawling around the nests. Dogs sightings are also a concern as they scare pelicans.

Figure 18. Iguanas in the sun next to the nesting site

To control introduced predator populations, appropriate campaigns should be planned as well as employing environmentally-friendly pest control in a reasonable manner to avoid adverse effects on the pelican habitat with contamination of soil and water.

OTHER SPECIES

Natural habitats such as Fort Amsterdam are home to other species. We observed a variety of seabirds and landbirds during our monitoring who nest and feed in the same areas as the Caribbean Brown Pelican.

Protecting the habitat is important for an array of terrestrial and marine species, in order to maintain biodiversity on Sint Maarten.

Figure 19. American kestrel observed at Fort Amsterdam

Figure 20. Green turtle observed at Fort Amsterdam

PELICAN MONITORING

Pelican monitoring took place between November 2022 to April 2023 by two observers.

Fort Amsterdam was zoned into six areas and monitoring was conducted twice a week.

Figure 21. Field observation sheet

CURRENT NUMBERS

From November 2022 to April 2023, EPIC counted an average of 43 individuals per monitoring session, with five active nests and a total of four surviving chicks.

REPRODUCTIVE SUCCESS

Monitoring population data and reproductive success can give insight on population growth.

During the study, we have observed one fledgling and four chicks. Chick survival is not yet determined as fledging was not complete by project end.

Table 1. Reproductive success November 2022 - March 2023

Month	Individuals	Breeding pairs	Active nests	Eggs	Chicks	Fledglings
Nov. 22	31	1	1	0	1	0
Dec. 22	38	0	1	0	1	1
Jan. 23	32	0	0	0	0	0
Feb. 23	34	2	2	5	0	0
Mar. 23	54	2	2	2	3	0
Apr. 23	61	3	3	0	4	0

Individuals - average of total counted pelicans per month, including juveniles and chicks

Breeding pairs - the number of adult pelicans showing signs of breeding activity

Active nests - number nests with evidence of breeding activity

Eggs - total number of incubated eggs

Chicks - number of chicks

Fledglings - number of chicks that left the nest after acquiring feathers necessary for flight

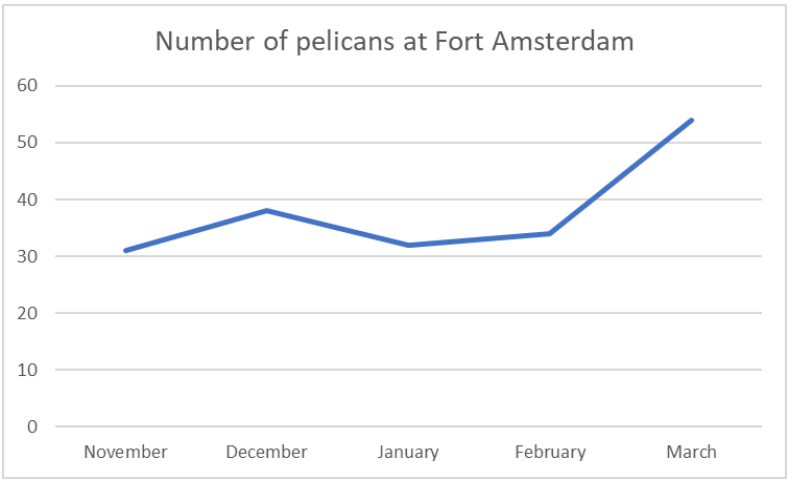
SEASONAL TRENDS

Analysing trends can help to understand the timing of breeding and annual peaks in activity.

Historical records indicate the breeding season at Fort Amsterdam typically starts in November. However, a fledgling was observed in a nest when observations started in November, suggesting an early start for the 2022 breeding season.

Causes of this seasonal pattern change are not determined, but reportedly observed on other islands in the Caribbean such as Guadeloupe during this same particular 2022 season.

Table 2. Monthly Brown Pelican population trend during 2022-2023



LONG-TERM TRENDS

In order to assess the status of the colony, it is helpful to look at the long-term annual trends.

Monthly monitoring by EPIC of the Fort Amsterdam and Pelikan Rock nesting colonies took place from 2000 to 2010. The highest number of nests recorded was 80 in 2001, 60 of which were at Fort Amsterdam, while the lowest count was 9 in 2009. EPIC's last in-depth survey in 2010 counted an average of 14 pelicans per month at Fort Amsterdam using the same protocol as the one used for this study.

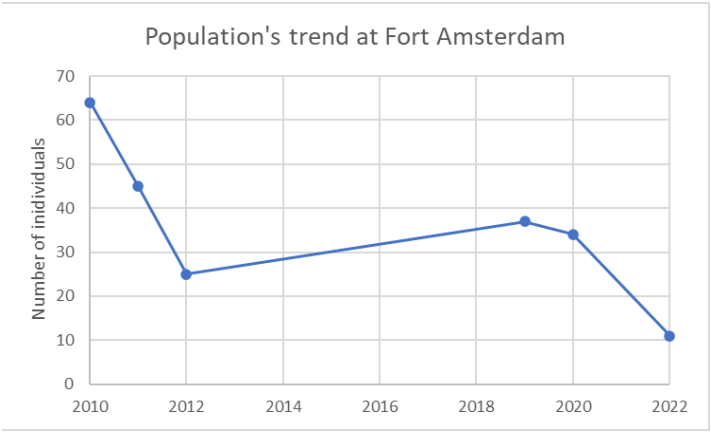
The Nature Foundation has been conducting monthly monitoring for 13 years at various locations, including at one specific area at Fort Amsterdam.

Data shows that the population trend is declining over the years in this location and it is a long-term trend.

Hurricane Irma hit the island in September 2017. From 2019, a number of sick and dying birds were reported with possible botulism contamination.

A pelican unable to fly was reported to the Nature Foundation in April 2023 but the cause of the grounding was not determined.

Table 3. Annual Brown Pelican population trend
Source: The Nature Foundation St. Maarten



BEST PRACTICES FOR POLICY MAKERS & RESOURCE MANAGERS

Figure 22. Two pelicans statues at the entrance of the Government building, Philipsburg

The goal is to better manage the Caribbean Brown Pelican and its habitat, resulting in stable or increasing breeding populations for Sint Maarten. Based on our observations during the pelican project, we can recommend the following points:

ENVIRONMENTAL

• Protect natural habitats, coastal areas, ponds, lagoons and mangroves from development through policies, legislation and enforcement.

• Ban/limit cutting vegetation and mangroves in general, especially at Fort Amsterdam and near ponds.

• Ban/limit the release of pollutants, such as chemicals, oils and wastewater into ponds and coastal areas.

• Conduct a predator (feral dogs, cats, rats, iguanas) population control study and execute an action plan.
• Monitor for avian diseases such as botulism and bird flu (influenza H5N1 and variants).
• Facilitate research on wildlife by having designated protocols and facilitating export permits issuance to ship samples to laboratories outside of Sint Maarten.
• Properly manage waste island-wide so it does not contaminate natural areas such as Fort Amsterdam.
• Enforce respect of international conventions and agreements to which Sint Maarten is a signatory.
• Cooperate on research with neighboring islands and the wider region.

Figure 23. A pelican resting in the trees.

TOURISM

• Establish and enforce a no-approach marine zone within 10 meters/ 33 feet of the FortAmsterdam peninsula, including placement of relevant signage.
• Establish and enforce a reduce speed policy for watercrafts within 50 meters/ 165 feet of Fort Amsterdam.
• Establish and enforce a no-commercial or motorized recreational activities at 50 meters/ 165 feet distance from nesting sites during breeding season.
• Enforce a no-music policy for tour operators snorkeling and diving in the western zone of Fort Amsterdam.
• Encourage the development of sustainable ecotourism practices and birdwatching, respecting best practices for observation.

Figure 24. Tourists swimming close to a juvenile pelican.

ECONOMY

• Encourage the development of low impact tourism activities in the Fort Amsterdam area, such as bird watching by trained professionals, kayaking and snorkeling in small groups.
• Create a fund to protect pelicans and the Fort Amsterdam site.

Figure 25. A kayak near Fort Amsterdam

CULTURE

Figure 26. A recreational fisherman at Fort Amsterdam

- Increase public awareness of the cultural and ecological significance of the Caribbean Brown Pelican, and its protected status.
- Incentivize fisherfolk to properly dispose of fishing lines and hooks.
- Ban fireworks near protected species areas.

EDUCATION

- Educate the general public to encourage better protection of the whole Fort Amsterdam area.
- Stimulate environmental education becoming part of the regular educational curriculum.
- Conduct awareness campaigns about the Caribbean Brown Pelican through various educational tools and media.

Figure 27. Free school presentation to primary school children

BEST PRACTICES FOR OBSERVATION

To protect and be able to continuously enjoy the beauty of the Brown Pelican, it is important to observe them without flushing them from the nest and/or causing them stress.

Figure 28. EPIC's team observing pelicans.

✓ Keep on trails and travel in small groups.
✓ Keep quiet and at a distance both on land and in water to avoid flushing from the nest. The harsh sun can kill young chicks and the embryo in the egg if left uncovered by the parent.
✓ Keep the area clean, dispose of trash properly.
✓ Leave the area as you found it.
✓Use binoculars and stay at a reasonable distance when bird-watching.
✓Wear neutral dark colors, use good closed shoes, and sun protection.

✕Do not remove anything from its natural habitat (i.e. plants, animals, shells, etc.)
✕Avoid flying drones and photographing with flash.
✕Do not approach nests and resting pelicans. This can cause them to flush and circle the area until it appears safe to land.
✕ Do not feed wildlife such as iguanas and do not leave food which can attract predators.
✕ Do not feed the fish as it can be unhealthy to pelicans and modify their feeding habits.

HISTORY, CULTURE, ART & EDUCATION

Figure 29. Pelican statues at Juliana International Airport roundabout

The Brown Pelican can be found throughout the island, both on the Dutch and French side. As the national bird of Sint Maarten, it is of cultural significance and part of the natural heritage, featured on the flag since 1985.

Pelicans are emblematic of how humans share coastal ecosystems with wildlife. Traditionally, in the Caribbean, the pelican assists fisherfolk by being a good indicator for schools of fish. They also compete for fish and may try to remove fish from a fish hook, which is hazardous and may result in injury to the gular pouch.

Legends about the pelican are included in Christian theology with the self-sacrificing myth of a pelican tearing its chest open with its beak to feed its offspring. This myth still prevails in the popular belief that pelicans symbolize family, hard work and sacrifice.

It is also the symbol of many universities in the world, including the regional Caribbean University of the West Indies.

Culturally, the Brown Pelican is a symbol of the island, giving its name to many foods and beverages, local establishments, sports teams and brands.

Figure 30. Street Art by Madtwoz Family Association in Maho (left)
Figure 31. Art by Tes Verheij Art Craft Cafe (right)

Artistic depictions of pelicans are seen throughout the island in various forms, such as statues, fine art, street art, t-shirts and souvenirs.

Many concerned citizens and visitors we spoke with shared that, from experience, there used to be many more pelicans in recent decades, flying in flocks along the coastline and in the lagoon. Many individuals expressed concern regarding the decline of pelican numbers and would support measures to protect and restore the population.

EPIC has conducted free pelican presentations throughout the project period, reaching close to 700 primary school children and 100 adults in awareness-raising events. Participants demonstrated their improved understanding of the importance of protecting the Caribbean Brown Pelican on Sint Maarten.

Continued education efforts are essential in changing attitudes towards conservation measures which protect wildlife such as the pelican.

Through changing behaviors, enacting the measures outlined in this manual, and ongoing monitoring of the population, Sint Maarten can work towards ensuring that the Caribbean Brown Pelican will thrive for generations to come.

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The CAR-SPAW-RAC Annex II (2023). Downloaded at http://www.car-spaw-rac.org

The IUCN Red List of Threatened Species (2018). Downloaded at http://iucn.org

The Nature Foundation of Sint Maarten, Brown Pelican monitoring data 2010-2022

RESOURCES

EPIC Sint Maarten: Brown Pelican Monitoring at www.epicislands.org

The Nature Foundation Sint Maarten: Brown Pelican monitoring at www.naturefoundationsxm.org

Birds Caribbean: Research papers at www.birdscaribbean.org

Les Fruits de Mer Saint Martin: Birds activities at www.lesfruitsdemer.com

PELICAN RESCUE

The Nature Foundation is responsible for the management of protected, endangered, and threatened species on Dutch Sint Maarten.

If you find a distressed, sick or dead bird, please do not touch it.
Call immediately: The Nature Foundation: +1 (721) 544-4267

If a pelican cannot fly due to a broken wing or has an injury on its gular pouch, it will not be able to feed itself and can die.

Pelicans can carry bacteria and diseases (botulism, avian flu, etc.).
They need to be handled and properly cared for by trained professional experts.

Remember that pelicans are not aggressive but they are wild animals.
Do not try to approach them and always leave space for them to have an escape route.

If you can, stay close by the bird and check its movements until experts arrive at the location.

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NOTES

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NOTES

Filippo Milani

ENVIRONMENTAL PROTECTION IN THE CARIBBEAN

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Protect our national bird, the Caribbean Brown Pelican

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