

# BONAIRE

LAND AREA **288 km<sup>2</sup>** ALTITUDE **0–240 m**  
HUMAN POPULATION **14,000** CAPITAL **Kralendijk**  
IMPORTANT BIRD AREAS **6, totalling 238 km<sup>2</sup>**  
IMPORTANT BIRD AREA PROTECTION **50%**  
BIRD SPECIES **214**  
THREATENED BIRDS **2** RESTRICTED-RANGE BIRDS **3** BIOME-RESTRICTED BIRDS **2**



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Washington-Slagbaai National Park. (PHOTO: ROWAN O. MARTIN)

## INTRODUCTION

Bonaire, which is politically part of the Kingdom of the Netherlands<sup>1</sup>, is one of the three Netherlands Antilles islands (Aruba, Bonaire and Curaçao) that lie off the north-west coast of Venezuela. Bonaire is the easternmost of the three islands (c.50 km east of Curaçao) and the island furthest (c.85 km) from mainland Venezuela. It is 35 km long, 8–15 km wide, and consists of a volcanic core, surrounded by limestone formations. The northern end of the island, within Washington-Slagbaai National Park (IBA AN009), is dominated by hills including Mount Brandaris, the island's highest point. The flat, low-elevation southern end of the island contains the Pekelmeer (IBA AN014), once a series of natural shallow lagoons that have been modified over hundreds of years for salt production. Bonaire has jurisdiction over an offshore island—Klein Bonaire (IBA AN012)—situated c.1 km from the central west coast. Klein Bonaire is a low coral-limestone island fringed with sandy beaches.

<sup>1</sup> At some point in the near future the “Netherlands Antilles” will be dissolved. St Maarten and Curaçao will become separate countries within the Kingdom of the Netherlands (similar to the status currently enjoyed by Aruba). The islands of Bonaire, Saba and St Eustatius will be linked directly to the Netherlands as overseas territories.

Bonaire (as Aruba and Curaçao) is very dry with an average annual rainfall of 450 mm falling mostly in the period October–January. As a result, the island's vegetation is generally xerophytic with many areas dominated by columnar cactus intermixed with low scrub and large expanses of land largely devoid of vegetation, especially along the eastern shoreline which receives slightly less rainfall on average than the western side of the island. Virtually all trees on the island were removed by the early nineteenth century and woody vegetation continued to be cut for charcoal production into the twentieth century. Grazing animals were introduced by 1700 and have significantly altered the vegetation. Free-roaming goats and donkeys have continued to have an impact in many areas even to the present day. In some regions, notably within Washington-Slagbaai National Park, there are patches of thicker and taller (3–4 m) thorn scrub forest supporting some epiphytic growth. Lac Bay (IBA AN013) on the south-eastern side of the island supports Bonaire's only significant mangrove woodland.

Bonaire's human population is significantly less than that of neighbouring Aruba (100,000) and Curaçao (138,000). The island's economy is largely dependent on ecotourism centered on scuba diving within the marine park. Apart from tourism, the salt production industry, a small oil transfer facility,



Free-ranging donkeys are a major threat to Bonaire's vegetation.  
(PHOTO: BERT DENNEMAN)

banking, and fishing provide much of the remaining employment outside of the service and support sectors.

### ■ Conservation

Bonaire has a relatively long history of natural resources protection and legislation. The Bonaire Nature Management Plan 1999–2004 (ratified by the Island Council in 1999) defines protected zones and recommends a number of other portions of the island to be designated with varying levels of conservation protection (see “Important Bird Areas” below). Areas currently protected include: Washington-Slagbaai National Park (IBA AN009) that encompasses 17% of the island's land area; Bonaire National Marine Park that extends from the high-water mark to the 60-m depth contour around the coast of Bonaire and Klein Bonaire, covering an area of c.2,700 ha; and Klein Bonaire (IBA AN012) that was designated a protected area in 2000. These three areas are under the management authority of the local NGO STINAPA Bonaire, with the marine park primarily financed through scuba-diver user fees.

Conservation action (research, monitoring and education) on Bonaire is currently focused largely on marine issues, and is implemented through STINAPA Bonaire. However, CARMABI Foundation has a long legacy of carrying out and supporting a variety of ecological research (including on birds) throughout the Netherlands Antilles. CARMABI has recently completed a vegetation mapping and analysis project that provides baseline information and recommendations for protecting Bonaire's habitats. The foundation has also undertaken or facilitated a number of surveys of nesting terns and plovers. Other research and outreach and education campaigns implemented by University of Sheffield (UK) have focused on the Yellow-shouldered Amazon *Amazona barbadensis*. National Audubon Society (BirdLife in the USA) has facilitated some ornithological/birdwatching training of staff from Washington-Slagbaai National Park. A long-term monitoring program for bird populations in the park was initiated by STINAPA in 2007.

Biodiversity faces a wide range of threats on Bonaire including disturbance from recreational activities, pollution of (and increasing run-off into) the marine environment and wetlands, and unplanned development. However, the greatest impact on the environment can be attributed to the direct destruction of vegetation by free-ranging goats and donkeys, predation of the native fauna by cats, and the capture (and keeping) of parrots and other birds for pets. These issues will only be addressed through an integrated program aimed at changing local attitudes towards traditional land and biodiversity use, legal enforcement and wardening, invasive species control and eradication, and securing of long-term funding for the management of the island's protected areas.

### ■ Birds

Over 210 species of bird have been recorded from Bonaire. Only 55 of these species are resident (current or former) breeding species, the vast majority being migrants, winterers, and occasional vagrants. Most of the migrants are Neotropical migrants from breeding grounds in North America, although many (50–60 species) are vagrants (recorded on average less than once a year). A smaller number of species are of South American origin, representing either dispersing individuals or austral migrants overshooting their northern South American wintering grounds having originated from breeding grounds further south or west.

Bonaire's resident avifauna is a rather unique, with species of West Indian origin mixed with those originating in South America. This is demonstrated by the presence of two Northern South America biome-restricted birds, namely Bare-eyed Pigeon *Patagioenas corensis* and Yellow-shouldered Amazon *A. barbadensis*, as well as a number of more wide-ranging South American species. *Amazona barbadensis* is also one of three restricted-range species that constitute the Netherlands Antilles secondary Endemic Bird Area (EBA), the other two being West Indian birds, namely Caribbean Elaenia *Elaenia martinica* and Pearly-eyed Thrasher *Margarops fuscatus*. At least 16 subspecies have been described from Aruba, Bonaire and Curaçao; four exclusively from Bonaire. The Bonaire form of Brown-throated Parakeet *Aratinga pertinax xanthogenius* is particularly well-differentiated (based on plumage and vocalisations), and a subspecies of Grasshopper Sparrow *Ammodramus savannarum caribaeus* found only on Bonaire and Curaçao appears vocally distinct from other North American and Caribbean forms. Similarly, vocalisations of White-tailed Nightjar *Caprimulgus cayennensis insularis* from Bonaire and Curaçao are distinct from mainland forms. Further taxonomic research is needed on all of these subspecies.

The threat category and national population sizes of the globally threatened birds are listed in Table 1. The Vulnerable *A. barbadensis* has a disjunct range in northern coastal Venezuela (Falcón, Lara, Anzoátegui and Sucre) and the islands of Margarita and La Blanquilla. The Bonaire birds are clearly important in the context of a global population estimated at 2,500–9,999 individuals. However, over 300 birds were illegally caught for the local pet trade between 1998 and 2002 which has presumably halted any potential population growth on the island. In 2008 several broods were poached from nests on Bonaire, some of which have reportedly

The Vulnerable Yellow-shouldered Amazon.  
(PHOTO: ROWAN O. MARTIN)





**Table 1. Key bird species at Important Bird Areas in Bonaire.**

Key bird species	Criteria	National population	Bonaire IBAs						
			AN009	AN010	AN011	AN012	AN013	AN014	
Caribbean Flamingo <i>Phoenicopterus ruber</i>	■	1,500–7,000	500						5,000
Caribbean Coot <i>Fulica caribaea</i>	NT ■	250			246				
Royal Tern <i>Sterna maxima</i>	■	255							170
Sandwich “Cayenne” Tern <i>Sterna sandvicensis</i>	■	540	360						340
Common Tern <i>Sterna hirundo</i>	■	115	20						60
Least Tern <i>Sterna antillarum</i>	■	2,375	412		452	100			582
Bare-eyed Pigeon <i>Patagioenas corensis</i>	■	500–1,000	✓	✓	✓	✓	✓	✓	
Yellow-shouldered Amazon <i>Amazona barbadensis</i>	VU ■ ■ ■	650	250	267	100			100	
Caribbean Elaenia <i>Elaenia martinica</i>	■	250–500	✓	✓	✓	✓	✓	✓	
Pearly-eyed Thrasher <i>Margarops fuscatus</i>	■		✓	✓	✓				

All population figures = numbers of individuals.  
 Threatened birds: Vulnerable ■; Near Threatened ■. Restricted-range birds ■. Biome-restricted birds ■. Congregatory birds ■.



Bonaire's endemic subspecies of Brown-throated Parakeet.  
(PHOTO: BERT DENNEMAN)

been seen as pets in homes in Bonaire and neighbouring Curaçao.

Bonaire is of global importance for its waterbird populations including Caribbean Flamingo *Phoenicopterus ruber* whose numbers, over the last 10 years have fluctuated between c.1,500 and 7,000 breeding individuals (though most normally averaging c.5,000). The flamingos fly to mainland Venezuela to feed in lagoons along the coast of the state of Falcón where hundreds are regularly seen but are not known to breed. The movements of the flamingos within the island and to-and-from mainland Venezuela are poorly known and warrant further research. Bonaire supports significant populations of breeding terns (*Sterna* spp.), including the “Cayenne” form of Sandwich Tern *S. sandvicensis eurygnatha*, primarily within Washington-Slagbaai National Park IBA (AN009) and Pekelmeer Saltworks IBA (AN014).

## IMPORTANT BIRD AREAS

Bonaire's six IBAs—the island's international site priorities for bird conservation—cover 23,830 ha (including their marine extensions). They embrace c.55% of the island's land area. Washington-Slagbaai National Park IBA (AN009) and Klein

**Figure 1. Location of Important Bird Areas in Bonaire.**


Bonaire IBA (AN012) are formally protected within the national system. Parts of Washikemba–Fontein–Onima IBA (AN011), Pekelmeer Saltworks IBA (AN014) and Lac Bay IBA (AN013) have been identified as proposed protected areas within the Bonaire Nature Management Plan, but these recommendations have not been acted upon. However, the latter two IBAs are designated Ramsar sites, offering them formal recognition of their importance.

The IBAs have been identified on the basis of 10 key bird species that variously trigger the IBA criteria (see Table 1). The majority of these birds occur in two or more IBAs. However, Royal Tern *Sterna maxima* only nests in Pekelmeer Saltworks IBA (AN014), and the Near Threatened Caribbean Coot *Fulica caribaea* only occurs on the freshwater reservoirs in Washikemba–Fontein–Onima IBA (AN011). Perhaps of greater concern is the fact that c.60% of the Vulnerable Yellow-shouldered Amazon *Amazona barbadensis* population occurs outside of formal protected areas, leaving the species totally exposed to capture for the local pet trade. For example, Dos Pos IBA (AN010) contains some of the most important breeding and roosting sites for the species on Bonaire but receives no protection from future development (although there are no immediate threats to this area), or poaching.



Yellow-shouldered Amazon nesting cliffs at Fontein.  
(PHOTO: ROWAN O. MARTIN)

There is an urgent need to establish secure, protected areas for breeding terns (*Sterna* spp.) on Klein Bonaire IBA (AN012), the islands in Goto Lake (IBA AN009) and in the Pekelmeer Saltworks IBA (AN014) through the eradication of cats and rats where possible (e.g. on Klein Bonaire), signage, fencing, and regular patrols. Such proactive management would likely see a dramatic increase in the breeding tern (and plover *Charadrius* spp.) populations. More attention should also be given to balancing the management of Pekelmeer Saltworks IBA for its ecological values in addition to its economic value. Washington-Slagbaai National Park IBA would benefit from a concerted program of removing goats, donkeys and pigs that are so dramatically impacting the vegetation. The landbird (and vegetation) monitoring program started in 2007 should help to determine the impact these grazing animals have had.

*Amazona barbadensis* would benefit from increased patrolling of the Washington-Slagbaai National Park IBA in an effort to stop poaching, although this would be difficult and costly. More practical would be a public awareness campaign to raise local pride in combination with enforcement of the laws prohibiting the possession of unregistered birds, thereby reducing local demand for wild-caught birds. Ideally this would reach beyond Bonaire to the neighbouring island of Curaçao as a (currently unknown) proportion of parrots poached on the island are exported to Curaçao. *Amazona barbadensis* on Bonaire is perceived by many as an agricultural pest. A detailed study to determine the extent of agricultural damage caused by the parrot, accompanied by measures to address this conflict with humans is also needed. Further research to determine the factors limiting the parrot population on Bonaire is required to inform management decisions within the IBAs.

State, pressure and response variables at each IBA should be monitored annually to provide an objective status assessment

and highlight management interventions that might be required to maintain these internationally important biodiversity sites.

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### AN009 Washington-Slagbaai National Park

COORDINATES 12°17'N 68°24'W  
 ADMIN REGION Bonaire  
 AREA 6,900 ha  
 ALTITUDE 0–243 m  
 HABITAT Shrubland, salina, coast



Yellow-shouldered Amazon

### National Park/Ramsar Site

THREATENED BIRDS	1
RESTRICTED-RANGE BIRDS	3
BIOME-RESTRICTED BIRDS	2
CONGREGATORY BIRDS	<input checked="" type="checkbox"/>

#### ■ Site description

Washington-Slagbaai National Park IBA encompasses c.25% of Bonaire at the northern end of the island. It is the area of greatest geographic relief, including the island's highest point, Mount Brandaris. The park has a generally well-maintained road network for visitor access, and supports some of the island's most extensive areas of vegetation (xerophytic shrublands with columnar cacti). There are a number of water holes in the park, and salinas/lagoons along the coast. An oil storage facility is located on the south-eastern border. Dos Pos IBA (AN010) is adjacent to Goto Lake, and the Washikemba–Fontein–Onima IBA (AN011) abuts the park's north-eastern corner.

#### ■ Birds

This IBA is a significant nesting, roosting, and foraging area for c.300–400 Vulnerable Yellow-shouldered Amazon *Amazona barbadensis*. The shrublands support all three Netherlands Antilles secondary EBA restricted-range birds, the two Northern South America biome-restricted birds, and a number of endemic subspecies. Globally significant numbers of Common Tern *Sterna hirundo*, and regionally important numbers of Sandwich *S. sandvicensis* and Least *S. antillarum* terns nest. A regionally important concentration of 500 Caribbean Flamingo *Phoenicopterus ruber* occurs.

#### ■ Other biodiversity

The endemic fish *Poecilia vandepolli* occurs in the freshwater streams and ponds. One Bonaire and Curaçao endemic plant, seven endemic lizards, and a number of endemic land-snails are found inside the park.

#### ■ Conservation

This IBA is a state-owned protected area that includes two Ramsar sites—Goto Lake and Boca Slagbaai. The park is managed by STINAPA Bonaire National Park Foundation. Researchers from CARMABI Foundation have conducted ecological studies; those from Sheffield University (UK) are working on the parrot; from University of Amsterdam on raptors; and from Zoological Museum Amsterdam on waterbirds and fish. Once a privately-owned ranch (exporting animals, and producing charcoal and aloe resin), the park still has free-roaming goats and donkeys (and now pigs) which continue to negatively impact the vegetation. Illegal trapping of *A. barbadensis* is a major threat. Feral cats and human disturbance are problems for nesting terns and shorebirds, and oil spills represent a potential threat due to the park's close proximity to a major oil shipping lane and oil storage facility.



<b>AN010 Dos Pos</b>		<b>Unprotected</b>
<p><b>COORDINATES</b> 12°14'N 68°21'W  <b>ADMIN REGION</b> Bonaire  <b>AREA</b> 235 ha  <b>ALTITUDE</b> 10–140 m  <b>HABITAT</b> Rocky areas, inland wetland</p>	 <p>Yellow-shouldered Amazon</p>	<p><b>THREATENED BIRDS</b> 1</p> <p><b>RESTRICTED-RANGE BIRDS</b> 3</p> <p><b>BIOME-RESTRICTED BIRDS</b> 2</p> <p><b>CONGREGATORY BIRDS</b> 0</p>

**Site description**

Dos Pos IBA is in northern Bonaire, on the leeward (western) side of the island and immediately east of Goto Lake. It is south-east of Washington-Slagbaai National Park IBA (AN009) and is characterised by numerous small hills and sheltered valleys. Roi Sangu—a 100-m wide canyon with 25-m high cliffs—is within the eastern portion of the IBA. The area also embraces a former fruit plantation (mainly mangoes) and a small, ephemeral pond.

**Birds**

This IBA is significant for its population of the Vulnerable Yellow-shouldered Amazon *Amazona barbadensis*. In winter, c.40% of the island’s parrots roost (in three separate roosts) in the IBA. Roi Sangu is an important nesting area for the species. All three of the Netherlands Antilles secondary EBA restricted-range birds occur at this IBA, as do both the Northern South America biome-restricted bird species. Dos Pos IBA appears to be important for Neotropical migrant passerines, and the small pond supports some waterbirds (including the Near Threatened Caribbean Coot *Fulica caribaea*).

**Other biodiversity**

As one of the few freshwater sites of Bonaire, Dos Pos has received extensive natural history attention, and a recent study documented the butterfly fauna of the site. Several endemic lizards and land-snail species occur.

**Conservation**

Dos Pos is adjacent to the Washington-Slagbaai National Park but is itself unprotected. It is a mix of state and private ownership. Feral donkeys and high densities of goats have had a profound effect on the area’s habitat structure and composition. Their continued presence combined with an apparent increase of feral pigs is preventing natural regeneration of the flora. *Amazona barbadensis* is threatened by habitat loss and degradation, introduced mammalian predators including cats and rats and by poaching for the local pet trade. Although natural lands are being developed at an alarming rate on Bonaire, this area is not likely to be under immediate threat.

<b>AN011 Washikemba–Fontein–Onima</b>		<b>Unprotected</b>
<p><b>COORDINATES</b> 12°14'N 68°17'W  <b>ADMIN REGION</b> Bonaire  <b>AREA</b> 5,960 ha  <b>ALTITUDE</b> 0–45 m  <b>HABITAT</b> Shrubland</p>	 <p>Least Tern</p>	<p><b>THREATENED BIRDS</b> 2</p> <p><b>RESTRICTED-RANGE BIRDS</b> 3</p> <p><b>BIOME-RESTRICTED BIRDS</b> 2</p> <p><b>CONGREGATORY BIRDS</b> ✓</p>

**Site description**

Washikemba–Fontein–Onima IBA is situated along the windward (north and east) coast of Bonaire, between the Washington-Slagbaai National Park IBA (AN009) in the north, and Lac Bay IBA (AN013) in the south-east. It extends inland to the escarpments from Washikemba in the south to Playa Grandi in the north, and includes the natural springs and cliffs of Fontein and the cliffs and intermittent ponds at Washikemba, Onima dam, and inland from Playa Grandi. There is very limited human settlement in this barren area but it does embrace a number of sites of cultural and historic significance with ancient inscriptions of Bonaire’s original (aboriginal) inhabitants. The vegetation is sparse, with cacti, small shrubs, *Euphorbia* species and low-growing salt-tolerant plants.

**Birds**

This IBA is important for the Vulnerable Yellow-shouldered Amazon *Amazona barbadensis* which breeds in the Onima–Fontein cliffs. Over 100 birds form a winter roost at Fontein. More than 240 Near Threatened Caribbean Coot *Fulica caribaea* occur and breed at reservoirs in Onima, Playa Grandi and Washikemba. The coast from Boca Onima to

Washikemba is regionally important for breeding Least Tern *Sterna antillarum*. All three Netherlands Antilles secondary EBA restricted-range birds occur at this IBA, as do the two Northern South America biome-restricted species.

**Other biodiversity**

The fauna of this area includes at least five endemic land-snails, two endemic lizards, and six endemic arthropods.

**Conservation**

This IBA is under a mix of private and state ownership, and none of it is currently protected. However, about half of the area is within regions recommended (in the 1999–2004 Bonaire Nature Management Plan) for status as “Island Park” or “Protected Landscape”. Ecological research, waterbird and freshwater fish surveys have been carried out (variously) by the CARMABI Foundation, Zoological Museum of Amsterdam and Jeff Wells. Threats to the area and its birds include: the continued illegal trapping of wild *A. barbadensis*; destructive foraging of free-ranging goats and donkeys; potential depredation by feral cats on nesting terns and shorebirds; and human disturbance of tern nesting colonies.

## AN012 Klein Bonaire

**COORDINATES** 12°09'N 68°18'W  
**ADMIN REGION** Bonaire  
**AREA** 1,810 ha  
**ALTITUDE** 0–7 m  
**HABITAT** Coastline, shrubland



## Marine Park/Ramsar Site

**THREATENED BIRDS**   
**RESTRICTED-RANGE BIRDS**   
**BIOME-RESTRICTED BIRDS**   
**CONGREGATORY BIRDS**

### Site description

Klein Bonaire IBA is a low, coral-limestone island, situated c.1 km offshore from the central west coast of Bonaire, opposite Bonaire's capital Kralendijk. The island is dominated by low shrubby vegetation that has been severely impacted from a long history of the felling of trees and overgrazing by introduced goats. The island's shoreline includes three salinas (c.36 ha), five freshwater springs or wells, sandy beach areas and coral rubble strands with low shrubby vegetation. The island is uninhabited but has been used in the past for camping by residents, and as a quarantine facility (as evidenced by a ruin of a small building).

### Birds

This IBA is significant for Caribbean Elaenia *Elaenia martinica*—a Netherlands Antilles secondary EBA restricted-range species—and the Bare-eyed Pigeon *Patagioenas corensis*—one of the two Northern South America biome species on the island. The breeding population of 100 Least Terns *Sterna antillarum* is regionally important. The terns and a number of shorebirds (especially plovers) nest along the shoreline and in the salinas. Ruby-topaz Hummingbird *Chrysolampis mosquitus* occurs at relatively high densities.

### Other biodiversity

Klein Bonaire IBA is the most important sea-turtle nesting area in Bonaire, supporting good numbers of the Critically Endangered hawksbill *Eretmochelys imbricata* and the Endangered loggerhead *Caretta caretta* turtles. Bonaire endemics present on the island include three land-snails and one lizard. The island harbours the only major population of the Vulnerable kalabari tree *Zanthoxylum flavum*.

### Conservation

Klein Bonaire is state-owned, and is protected (along with its surrounding reef) within the Bonaire National Marine Park. The island is also a designated Ramsar site. The government has delegated management of the marine park to the non-profit organisation STINAPA Bonaire (that also manages the Washington-Slagbaai National Park IBA, AN009). Goats were eradicated in the 1980s. Further assessment is required to determine if rats and mice still occur, but feral cats were confirmed as present in 2006. Predation of nests and eggs by cats (and possibly rats and mice) is likely the greatest threat to the nesting terns. Disturbance from occasional visitors may also be a problem. Biological inventories and some rare plant reintroduction work have been carried out by the CARMABI Foundation. The most recent bird survey was in 2006.

## AN013 Lac Bay

**COORDINATES** 12°06'N 68°14'W  
**ADMIN REGION** Bonaire  
**AREA** 2,075 ha  
**ALTITUDE** 0–10 m  
**HABITAT** Coastline, sea, mangrove



## Ramsar Site/Marine Park

**THREATENED BIRDS** 1  
**RESTRICTED-RANGE BIRDS** 2  
**BIOME-RESTRICTED BIRDS** 2  
**CONGREGATORY BIRDS**

### Site description

Lac Bay IBA is on the south-east side of Bonaire and comprises a shallow bay (with sea-grass beds) protected from the open ocean by a fringing reef at its mouth. The island's only significant mangrove woodland (c.100 ha) is within the IBA. On the north side of the bay are large expanses of saltflats and small salinas. A small resort and two windsurfing centres are located on the south side and a small harbour for fishing vessels (that fish outside of the bay) and associated buildings (including a restaurant) are on the northern side of the bay mouth. Scattered farms and homes abut the edge of the IBA in its north-west corner.

### Birds

This IBA is significant as a (sporadic) roost site for c.100 Vulnerable Yellow-shouldered Amazon *Amazona barbadensis*. Also, two (of the 3) Netherlands Antilles secondary EBA restricted-range birds occur at this IBA, as do both of Bonaire's Northern South America biome-restricted species. Numbers of Caribbean Flamingo *Phoenicopterus ruber* occasionally exceed 200, and the IBA supports good numbers of breeding and wintering shorebirds, breeding herons, breeding Least Terns *Sterna antillarum*, and a roost (historically over 100) of Magnificent Frigatebird *Fregata magnificens*.

### Other biodiversity

Lac Bay lagoon is important as nursery habitat for reef fishes and queen conch *Strombus gigas*, and contains sea-grass beds used by globally threatened sea-turtles.

### Conservation

Lac Bay IBA is state owned. The marine environment is protected (activities in the area, and use of natural resources are regulated) within the Bonaire National Marine Park. Lac Bay is also a Ramsar site and has been proposed for national park designation. A multi-year management and education program for Lac Bay was undertaken by STINAPA and the Marine Park (with funding from WWF Netherlands). The bay has become popular for a variety of recreational water-sports (jet-skis and kite-surfing are banned) which may cause disturbance of foraging flamingos and other birds. There are also naturalist-guided kayak trips among the mangroves. However, the greatest potential threats are probably from pollution and increased nutrient loading, and also sedimentation from adjacent development-related land clearing. The roost sites for *A. barbadensis* should be mapped and protected from clearance/cutting.

## AN014 Pekelmeer Saltworks

COORDINATES 12°03'N 68°18'W

ADMIN REGION Bonaire

AREA 6,850 ha

ALTITUDE 0–10 m

HABITAT Coastline, shrubland, saline lagoons



Caribbean Flamingo



## Flamingo Breeding Reserve/Ramsar Site

THREATENED BIRDS RESTRICTED-RANGE BIRDS BIOME-RESTRICTED BIRDS CONGREGATORY BIRDS 

### Site description

Pekelmeer Saltworks IBA is the flat, low-elevation southern end of the island. It was once a series of natural shallow lagoons, but these have been modified over hundreds of years for salt production. Since the 1950s the area has been further modified for large-scale industrial salt production, with water levels tightly controlled within a series of condenser lagoons for maximum salt production. Most of the area (over 90%) is under active management for salt production. Low bushes (mostly buttonwood *Conocarpus erecta*) grow along the shores of some of the lagoons but the area is largely open. Lac Bay IBA (AN013) lies on the south-east coast, just to the north of Pekelmeer.

### Birds

This IBA is globally significant for Caribbean Flamingos *Phoenicopterus ruber*—numbers fluctuate between 1,500 and 7,000 (most often c.5,000) individuals, with a maximum of 1,300 pairs nesting in 1996. The IBA is also an important nesting area for terns, including: 60 Common Terns *Sterna hirundo* breed (globally important); 340 Sandwich Tern *S. sandvicensis* (regionally important); 170+ Royal Tern *Sterna maxima* (regionally important); and 582 Least Tern *Sterna antillarum* (regionally important). Hundreds (and sometimes thousands) of migratory and wintering shorebirds

use the site, as do numerous herons. The Northern South America biome-restricted Bare-eyed Pigeon *Patagioenas corensis* occurs.

### Other biodiversity

No threatened or endemic species have been recorded although there are numerous studies documenting various aspects of the area's biodiversity, such as arthropods, lizards, land-snails and euryhaline fishes.

### Conservation

Much or most of the IBA is government owned but is leased to the commercial salt works company. However, a 55-ha area (including an island) has been set-aside since 1969 as a Flamingo Breeding Reserve, which is where most of the birds nest. Pekelmeer (and the flamingo reserve) are designated as a Ramsar site. A section along the south-west side has been proposed as a "Strict Reserve" and the remainder (excluding the crystalliser basins on the western side) as an "Island Park" in the 1999–2004 Bonaire Nature Management Plan. The CARMABI Foundation has carried out research within the IBA. The bird populations within the IBA co-exist with the industrial activities of the salt production area. While there may be some disturbance to the birds, the character and extent of any disturbance has not been assessed.