Important Bird Areas in the Caribbean Netherlands

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Cover photo: Red-billed Tropicbird, Great Bay Sint Eustatius December 2012 (Steve Geelhoed)

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Samenvatting

Het Important Bird Area (IBA) programma is een wereldwijd initiatief van BirdLife International met als doel een netwerk van sleutelgebieden aan te wijzen en te beschermen die cruciaal zijn voor de bescherming van vogelsoorten.

In Caribisch Nederland zijn negen IBAs aangewezen: een op Saba, twee op Sint Eustatius (Statia) en zes op Bonaire. Tot op heden waren de begrenzing en de ecologische waarden van deze gebieden matig gedocumenteerd en bood de beschikbare informatie onvoldoende fundering voor wettelijke bescherming. In dit rapport wordt beschikbare informatie, aangevuld met nieuwe data, gebundeld en wordt de begrenzing van de IBAs aan de hand van ecologische en planologische criteria preciezer bepaald, opdat de informatie voldoende is voor een wettelijke inkadering en bescherming door de lokale overheid. In dit rapport wordt een beschrijving gegeven van de afzonderlijke IBAs, waarbij de volgende vragen worden beantwoord:

1) wat zijn de waarden binnen de betreffende IBA?
2) is er sprake van kerngebieden binnen de IBAs en waar bevinden deze zich?
3) hoe verhouden de IBAs zich tot ruimtelijke ontwikkelingskaders?
4) welke factoren vormen een bedreiging voor de ruimtelijke en ecologische integriteit van de IBAs?
5) welke maatregelen kunnen worden aanbevolen om het voortbestaan en de integriteit van de IBAs te bewaken?

Op Saba wordt één IBA onderscheiden: Saba Coastline (AN 006). De grootte van deze IBA is 2145 ha. Het gebied ontbeert elke vorm van wettelijke bescherming. Het gebied dankt zijn waarde grotendeels aan broedende zeevogels, met name Roodsnavelkeerkringvogel en Audubon's Pijlstormvogel. Naast een wettelijke aanwijzing als beschermd gebied, zijn aanvullende maatregelen nodig om de natuurwaarden van de IBA te behouden. Om het aantal predatoren, met name katten en ratten, te beperken is zowel actief beheer van de predatoren als beheer van de afvaldump noodzakelijk. Op Saba worden geen andere aanvullende IBAs onderscheiden.

Op Sint Eustatius worden twee IBAs onderscheiden: Boven (NA 007) en The Quill (AN 008). Deze IBAs zijn vrijwel integraal aangewezen als beschermd park. In dit rapport wordt voorgesteld om Boven uit te breiden tot 1106 ha, zodat het Signal Hill met zijn concentratie broedende Roodsnavelkeerkringvogels omvat. Predatie van zeevogels door katten en ratten is beperkter van omvang dan op Saba. De ecologische waarde van de 472 ha grote Quill IBA is grotendeels gebaseerd op het voorkomen van residente broedende landvogels als Grote Kwartelduif, kolibries en zangvogels. Geiten en mogelijk kippen vormen de belangrijkste bedreigingen. Naast de voorgestelde uitbreiding van Boven IBA worden op Sint Eustatius geen andere aanvullende IBAs onderscheiden.

Op Bonaire worden zes IBAs onderscheiden: Washington-Slagbaai National Park (AN 009), Dos Pos (AN 010), Washikemba-Fontein-Onima (AN 011), Klein Bonaire (AN 012), Lac Bay (AN 013) en Pekelmeer Saltworks (AN 014). De meeste gebieden zijn in het Nature Policy Plan Bonaire aangewezen als "natuur" of "open landschap" en hebben daarmee een wettelijke beschermde status.

De 7529 ha grote Slagbaai IBA herbergt een diversiteit aan habitats variërend van kustlagunes tot begroeide heuvels. Belangrijke ecologische waarde in het gebied is de aanwezigheid van geschikt habitat voor Geelvleugelamazone, broedende sterns en foeragerende Rode Flamingo's. Het grootste deel van de IBA is wettelijk beschermd als eilandpark of als RAMSAR-gebied en wordt actief beheerd. Belangrijke bedreigingen zijn overbegrazing door verwilderde geiten en varkens. Voor de Geelvleugelamazone vormt stroperij een groot probleem. Verkeer leidt tot verstoring van broedende sterns.

De 293 ha grote Dos Pos IBA is relatief klein en is grotendeels niet wettelijk beschermd. Het is een belangrijk zoetwatergebied en ontleent zijn waarde aan residente soorten waarvan de Geelvleugelamazone de meest bedreigde is.

De 6286 ha grote Washikemba-Fontein-Onima IBA bevat belangrijk habitat voor Geelvleugelamazone, broedende sterns en de Caribische Koet. Grofweg de helft van het gebied is in het Bonaire Natuurbeleidsplan aangewezen als eilandpark of als beschermd landschap.

De 2052 ha grote Klein Bonaire IBA geniet volledig bescherming; enerzijds op lokaal niveau als natuurgebied, anderzijds als internationaal erkend RAMSAR-gebied. Het eiland en omringende riffen zijn onderdeel van het Bonaire National Marine Park. Het gebied ontleent zijn waarde met name aan de functie als broedgebied voor sterns. Na het verwijderen van geiten treedt herstel op van de vegetatie.

De 2117 ha grote Lac Bay IBA aangewezen als eilandpark en als RAMSAR-gebied. De mangroves en zoutvlaktes vormen een lokaal belangrijk broedgebied voor sterns en de Roodhalsreiger (IUCN-status Near-Threatened).

De 6197 ha grote Pekelmeer saltworks IBA beslaat ongeveer een vijfde van het oppervlak van Bonaire. Het grootste deel van het gebied wordt gebruikt voor zoutwinning door Cargill; alleen het Flamingo Sanctuary en het Pekelmeer zijn wettelijk beschermd op lokaal niveau als natuurgebied en als RAMSAR-gebied. De belangrijkste waarden van het gebied zijn de broedkolonie van Rode Flamingo's en van verschillende soorten sterns. Herstelmaatregelen op eilandjes moeten leiden tot uitbreiding van geschikt broedhabitat voor sterns. Predatie van eieren en kuikens van sterns door Lachmeeuwen dient beperkt te worden. Dit probleem zal groter worden wanneer de populatie van Lachmeeuwen op Bonaire blijft groeien.

Op Bonaire zijn verschillende aanvullende gebieden onderscheiden die IBA sleutelsoorten of andere belangrijke vogelsoorten herbergen: 1) watergebieden ten noorden van Dos Pos; 2) watergebieden ten oosten van Kralendijk; 3) roestplaatsen van papegaaien in 'stedelijk' gebied; 4) Seru Largu.

Samenvattend, in de negen IBAs in Caribisch Nederland komen 18 sleutelsoorten voor. De IBAs op Saba en Sint Eustatius herbergen respectievelijk tien en elf soorten. Saba is belangrijk voor twee broedende zeevogels met een hoge beschermingsstatus: Roodsnavelkeerkringvogel en Audubon's Pijlstormvogel. Saba Coastline IBA is de enige IBA in Caribisch Nederland die zich kwalificeert voor de laatste soort. Dit gebied kwalificeert zich eveneens voor zeven andere soorten die alle jaarrond aanwezig zijn en een beperkte verspreiding op wereldschaal hebben. Sint Eustatius is belangrijk voor Roodsnavelkeerkringvogel en acht andere soorten: Grote Kwartelduif, kolibries en zangvogels met een beperkte verspreiding op wereldschaal. De IBAs op Bonaire herbergen tien sleutelsoorten. Een aantal IBAs op Bonaire is van belang voor broedende zeevogels met een hoge beschermingsstatus zoals Koningsstern, Grote Stern, Visdief en Amerikaanse Dwergstern. Bonaire's IBAs zijn bovendien belangrijk voor een aantal soorten met een beperkte verspreiding op wereldschaal, waarvan de Caribische Koet en Geelvleugelamazone de hoogste beschermingsstatus hebben.

Dit rapport vormt deel van het Beleids-Ondersteunend (BO) onderzoeksprogramma van Wageningen Universiteit (BO-11-011.05-016) en werd gefinancierd door het Ministerie van Economische Zaken (EZ) onder projectnummer 4308701005.

Summary

The Important Bird Area (IBA) programme is an initiative of BirdLife International aimed at identifying, monitoring and protecting a network of key sites for the conservation of the world's birds. On the islands, Bonaire, Sint Eustatius (Statia) and Saba, nine IBAs have been designated in recent years. Prior to this study the boundaries of these areas were imprecisely defined and the specific ecological values of these areas were poorly documented and did not provide sufficient footing for further legal protection. In this report we compile available information, add recently collected field data and precisely define boundaries based on ecological and planning criteria so as to furnish the level of documentation sufficient to allow further legal designation and protection by island governments. In this report we specifically:

- document the most important ecological values represented in each IBA
- define exact boundaries based on ecological and planning criteria and pinpoint core areas that can be distinguished for each IBA
- discuss the IBA's spatial context within development and/or land-use plans
- identify potential factors and developments that threaten the long-term spatial and ecological integrity of each IBA
- determine which measures are needed to maintain the spatial and ecological integrity of each IBA.

On Saba one IBA is identified: Saba coastline IBA (AN 006). The 2,145 ha IBA of Saba lacks any form of legal designation as a protected area. Its value is especially based on breeding seabirds, most importantly the Red-billed Tropicbird and the Audubon's Shearwater. In addition to legal designation, measures needed to protect the values of this IBA include eradication or control of predators such as cats and rats, and management of the garbage dump to limit the number of these predators. On Saba no gaps in IBA coverage are identified.

On Sint Eustatius two IBAs are identified: Boven (AN 007) and The Quill (AN 008). In contrast to Saba, the two IBAs of St. Eustatius enjoy almost full legal designation as protected park areas. Based on our findings we propose an extension of the 1,106 ha Boven IBA to include Signal Hill for its concentration of nesting Red-billed Tropicbirds. The problems caused by cats and rats are much less acute on Statia than on Saba. The value of the 472 ha Quill IBA is largely based on the resident breeding landbirds it supports. Key threats include goats and possibly feral chickens.

On Bonaire six IBAs are identified: Washington-Slagbaai National Park (AN 009), Dos Pos (AN 010), Washikemba-Fontein-Onima (AN 011), Klein Bonaire (AN 012), Lac Bay (AN 013), and Pekelmeer Saltworks (AN 014). The IBAs are designated as "nature" or "open landscape" in the Nature Policy Plan Bonaire spatial plan, thus enjoying protection.

The 7,529 ha Slagbaai IBA covers a diversity of habitats ranging from coastal lagoons to vegetated hillsides. Key values include its habitat value for Yellow-shouldered Amazon, nesting terns and foraging (West-Indian) Flamingos. Most of the area is legally protected either as an island park or with Ramsar status and actively managed. Key threats include overgrazing by feral goats and pigs. Poaching of the Yellow-shouldered Amazon is also a significant problem. Disturbance of tern colonies also occurs due to inappropriate routing of vehicles close to the important nesting island in the Slagbaai lagoon.

The 293 ha Dos Pos IBA is relatively small and largely has no legal protected status. It is an important freshwater site and is both of importance to resident species of which Yellow-shouldered Amazon is the most threatened worldwide.

The 6,286 ha Washikemba-Fontein-Onima IBA includes critical habitat for the Yellow-shouldered Amazon, nesting terns and the Caribbean Coot. About half the area is legally designated as either as "Island Park" or "Protected Landscape" in the Nature Policy Plan Bonaire.

The 2,052 ha Klein Bonaire IBA enjoys full legal protection being designated as a local conservation area and as an internationally recognized Ramsar wetland. The island and surrounding reef are protected within the Bonaire National Marine Park. It is principally of value as a tern nesting island. The woodlands are recovering since complete removal of goats from the island.

The 2,117 ha Lac Bay IBA enjoys legal designation both as an island conservation area and as international Ramsar wetland site. The mangroves and salt flats are of local significance to nesting terns and hold a breeding population of the Reddish Egret (IUCN-status Near-Threatened).

The 6,197 ha Pekelmeer saltworks IBA covers about one fifth of the island of Bonaire. Only the 55 ha "Flamingo Sanctuary" and the Pekelmeer enjoy island legal protected status and Ramsar wetland status, while most of the area is used as saliña by the Cargill company. Key IBA values in this area include the nesting colony of the Caribbean Flamingo, and nesting colonies of various tern species. The construction of isolated islands that will not be subject to industrial traffic along the dikes of the managed ponds should provide suitable nesting habitat for recovery of tern nesting in this area of the island. The Laughing Gull population of Bonaire is expanding largely due to the open landfill. This species predates on tern nests and should be controlled if it continues to expand in numbers.

On Bonaire several areas are identified that host IBA key species or other ecological valuable bird species and currently are not designated as IBA: 1) Ponds north of Dos Pos; 2) Ponds east of Kralendijk; 3) Urban parrot roosts; 4) Seru Largu.

All in all 18 trigger species occur in the nine IBAs in the Caribbean Netherlands. The IBAs on the Leeward islands of Saba and Sint Eustatius host ten and eleven species respectively. Saba is important for the breeding seabirds Audubon's Shearwater and Red-billed Tropicbird, species with a high conservation priority. The Saba Coastline IBA is the only IBA in the Caribbean Netherlands that qualifies for Audubon's Shearwater. Saba's IBA qualifies for another seven species which are all year-round residents with a restricted world's breeding distribution. Sint Eustatius is important for the breeding seabird Red-billed Tropicbird, as well as another eight species: Bridled Quail-dove, hummingbirds and songbirds with a restricted range. The IBAs on the Windward island of Bonaire host ten trigger species. Some of Bonaire's IBAs are important for breeding seabird species with a high conservation priority like Royal, Sandwich, Common and Least Tern. Furthermore Bonaire's IBAs are important for a number of species with a restricted range, of which Caribbean Coot and Yellow-shouldered Amazon have a high conservation priority.

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Terms of reference

After constitutional changes that took place on 10 October 2010, the BES islands became special Dutch overseas municipalities, collectively known as the Caribbean Netherlands. Dutch mainland nature legislation does not apply to nature management in Bonaire, Saba and St. Eustatius. For instance, the EU Habitats Directive and the EU Birds Directive which together form the legal context for the Natura 2000 network of protected areas in European Netherlands do not apply. At the national level in the Caribbean Netherlands the "Wet grondslagen natuurbeheer- en bescherming BES" provides the legal framework for nature management and stipulates the exact division of responsibilities between the various jurisdictional levels in these islands.

The final responsibility for the sustainable management and conservation of the biodiversity on and in the waters of these islands lies with the Dutch Ministry of Economic Affairs (EZ). This ministry implements programs and projects which should fulfill the Dutch Kingdom ambitions with regards to the goals set forth in the Dutch Biodiversity Policy Programme "Beleidsprogramma Biodiversiteit 2008-2011". As a party to the Convention on Biodiversity, The Netherlands also has a strong international commitment to help stem the global decline in biodiversity and to protect threatened and endangered birds species, particularly those species that primarily depend on habitats inside its national boundaries.
In order to protect bird life world wide a network of so-called Important Bird Areas (IBA) has been designated by BirdLife International. These IBAs are considered key sites for the conservation of the world's bird populations. Since the start of the programme more than 11,000 IBAs have been identified all over the world. The islands of the Caribbean Netherlands play a globally important role as habitat for several threatened birds species. On the islands, Bonaire, Sint Eustatius and Saba (*Figure 1*), nine IBAs have been designated in recent years: five on Bonaire, two on Sint Eustatius and one on Saba. Since knowledge on ecological values is scarce the boundaries of these IBAs are rough and descriptions of the site's status, current (and potential) ecological values, threats and developments are poorly documented. Such information, however, is of the utmost importance for an adequate management plan for each IBA, and consequently for the implementation of the proposed management measures. Several of these areas also already enjoy (full or partial) legal protected status as legally designated island conservation or park areas (based on the Bonaire Island Nature Ordinance (AB 2008, No. 23) or as an internationally recognized Ramsar wetland area. However, more detailed information and precise specification of boundaries is essential for further legal designation of these areas as protected IBAs. Hence the Ministry of Economic Affairs commissioned this study.

The aim of this study is providing information for the implementation of the IBAs and appropriate management measures. The report provides a summary of the available information, but the period of collecting information was relatively short. As a consequence, some relevant information may have been missed. Therefore, any new or additional relevant information on the significance of the IBAs is much welcomed by the authors.

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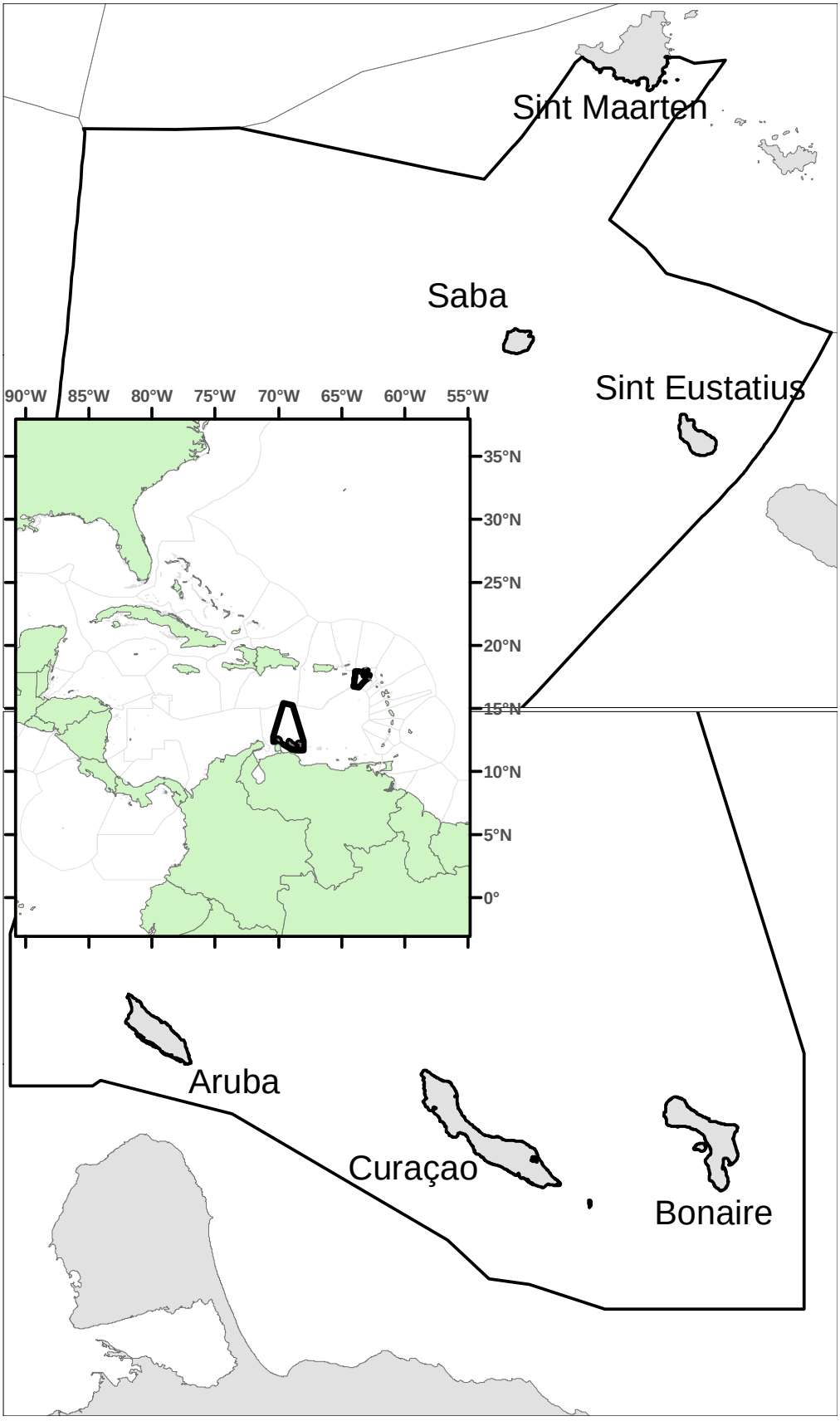

Figure 1. Location of the islands Saba, Sint Eustatius and Bonaire.

1 Introduction

The Important Bird Area (IBA) programme is an initiative of BirdLife International aimed at identifying, monitoring and protecting a network of key sites for the conservation of the world's birds. A site is recognized as an IBA only if it meets certain criteria, based on the occurrence of key bird species or trigger species that are vulnerable to global extinction or whose populations are otherwise irreplaceable. The criteria are internationally agreed, standardized, quantitative and scientifically defensible.

Global IBA criteria for species are (see appendix I for details):

- A1. Globally threatened species: The site is known or thought to hold regularly significant numbers of a globally threatened species, or other species of global conservation concern.
- A2. Restricted-range species: The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).
- A3. Biome-restricted species: The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.
- A4. Congregations: A site may qualify on any one or more of the four criteria listed below:

i). Site known or thought to hold, on a regular basis, ≥1% of a biogeographic population of a congregatory waterbird species.
ii). Site known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species.
iii). Site known or thought to hold, on a regular basis, ≥20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species.
iv). Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

- B4. Regionally significant congregations.

The taxonomy of species is in a constant flux, especially with the on-going development and use of genetic analysis techniques. With these techniques (former) subspecies can be recognized as full species. Collecting data on population size or ecology is usually lagging behind, as do assessments of conservation status like the IUCN classification.

The aim of this report is providing information for the implementation of the IBAs and appropriate management measures. For each IBA the following questions are addressed:

- what are the most important ecological values in the IBA?
- are there core areas within the IBA? If so, where?
- how is the IBA's relation to spatial developments?
- which factors and developments form a threat to the spatial and ecological integrity of the IBA?
- which measures are necessary to maintain the spatial and ecological integrity of the IBA?

Apart from a description of the ecological and conservation values of the IBAs, conflicts between those values and actual or planned land-use are identified. Based on this information more precise borders for the areas are proposed, and current or future challenges to the spatial and ecological integrity of these areas are identified, and measures to counteract these are proposed. The results will conclude with a synthesis for long-term conservation of the nine Important Bird Areas of the Caribbean Netherlands.

2 Description of IBAs in the Caribbean Netherlands

A description of the IBAs is based on a desk study of available information, information from local experts and additional field work. Basic information on the sites is derived from BirdLife International (2008 & 2012 a-i). The IBAs on Saba and Sint Eustatius (Statia) were visited in April and December 2012. Furthermore, STENAPA has conducted point transect counts in different habitats on Statia in summer and winter since 2009.
On Bonaire up to eleven transects and point counts were conducted in each IBA in July-September 2012. Fewer counts were conducted in IBAs that had recently been surveyed through other work (AN013 Lac and AN012 Klein Bonaire) or were small in size (AN012 and AN010 Dos Pos). Transects and counts were selected to highlight natural values of the IBA, however this was not always possible due to the seasonal value of certain areas or challenges with sampling (e.g. access). Transect sampling involved recording all birds observed within a distance of 25m of the observer, while walking at a constant steady pace for 10 minutes. Trail start and end locations were recorded using GPS. Transects were spaced to minimize the possibility of double counting.
For each IBA a description is provided which contains the following sections: 1) Location, boundaries & size; 2) Protection status; 3) Description; 4) Current monitoring and research; 5) Bird species; 6) Threats; 7) Measures; 8) Knowledge gaps.
Threats are classified according to the World Wildlife Fund's Rapid Assessment and Prioritization of Protected Area Management Methodology (Ervin, 2003). The extent, impact and permanence of potential threats are quantified and multiplied by each other providing a score. Details of this method can be found in Appendix II. Since the classification of the threats are done by different experts for each island the threat scores can only be compared between IBAs on one island and cannot be used to compare IBAs on different islands.
In addition to these IBA specific questions, one topic is addressed as well. The question if there are any gaps in IBA coverage, in particular in relation to locally important species. A first inventory for each island identifying gaps outside the current IBAs is made. This focusses on areas which are not covered using the IBA approach, such as locally declining species, indicator species and habitats that **could** be suitable for important species.

2.1 Saba

Along with Sint Maarten and Sint Eustatius, Saba is referred to as the Windward Islands of the Dutch Caribbean. Saba lies ca 45 km southwest of Sint Maarten, and ca 25 km northwest of Sint Eustatius. Saba is an extinct volcanic peak, rising steeply to 887 m at the top of Mount Scenery. The coastline is dominated by cliffs. The islets of Diamond Rock and Green Island are located closely off-shore on the north side of the island. Coral reefs surround most of the island. Saba's climate is generally dry, with an average of 1,000 mm of rain falling predominantly between August and November. There are no wetlands on the island. Vegetation in the interior of the island comprises scrub and grassland which transitions to secondary rainforest and tree-fern brakes at middle elevations, and elfin forest at the top of Mount Scenery. One IBA is identified on the island (*Figure 2*): Saba coastline IBA (AN 006).

2.1.1 IBA Saba coastline (AN 006)

2.1.1.1 Location, boundaries & size

The IBA includes all areas around the perimeter of Saba from the waterline to 400 meters inland, and all the sea areas up to 1 km from the coast, including Green Island and Diamond rock. The total area of this IBA is ca 2,145 the area, of which 413 ha is land.
Proposed changes to the boundaries are (*Figure 2*): 1) exclude the inhabited area around Fort Bay; 2) exclude the area around the airport.

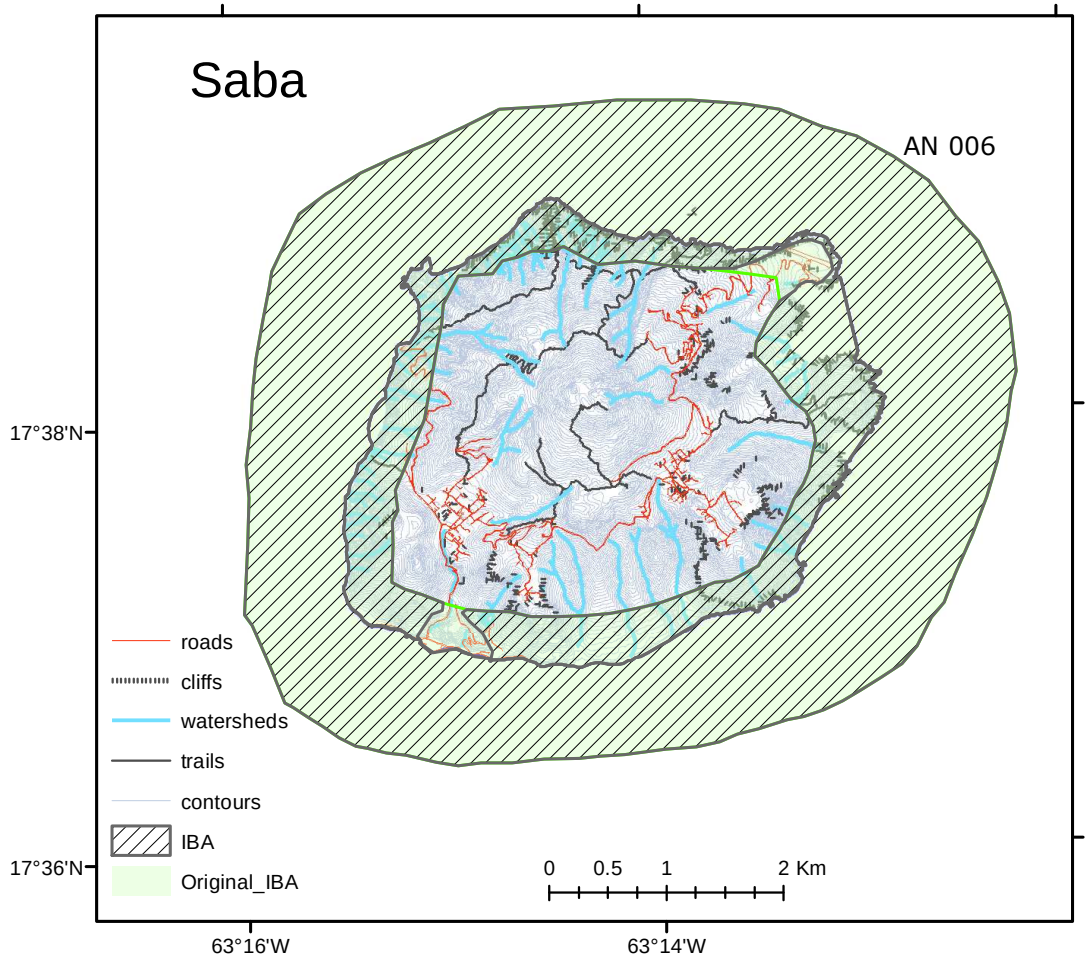

Figure 2. Location and boundaries of the IBA on Saba.

2.1.1.2 Protection status

Currently terrestrial areas on Saba don't have any legal protection. However, since the late 1990s a protected area has been proposed, the so-called Saba National Protected Area, which is to encompass the coastal area around Sulphur Mine "Muriel Thissell Park". It also includes the adjacent canyons which are owned by the Saba Conservation Foundation and extends up the north slope of the island to the elfin forest near the peak of Mount Scenery, well beyond the designated IBA. The majority of Saba's land areas is private property. Eventual legal designation of this park will only protect a small portion of the Saba IBA.

Saba Marine Park covers the area adjacent to the Saba coastline IBA, the sea from the high tide line to the 60 m depth contour. It is legally designated as a protected area and management of the parks is done by Saba Conservation Foundation.

2.1.1.3 Description

The IBA's habitat consists of cliffs, except in Fort Bay where some harbour facilities (a dock, several buildings, a rock quarry), and landfill are present. The cliffs are vegetated by a low vegetation.
Core areas in the IBA include: 1) Sulphur Mine – as breeding site of Audubon's Shearwater and Red-billed Tropicbird; and possibly 2) Green Island - a breeding site for terns

Audubon's Shearwater *Puffinus lherminieri*

Recently the taxonomy of the Little–Audubon's Shearwater complex (*Puffinus assimilis-P. lherminieri*) has been revised, based on DNA analysis (Austin et al, 2004). In the Atlantic Ocean Audubon's Shearwater *P lherminieri* & *P. l.loyemilleri* are recognized as species (or so-called higher level taxon). The former Audubon's Shearwater subspecies from the Indian Ocean and western Pacific Ocean are treated as another species, tentatively named Tropical Shearwater *P. bailloni,* with the population numbering several tens of thousands pairs.
The Atlantic population is small and the species has disappeared from a number of former breeding sites (Bermuda, various islands in the Bahamas, Puerto Rico, Culebra, Mona, Monito, the British Virgin Islands, the Grenadines, and islands in the Western Caribbean). Nesting occurs in the Bahamas, the West Indies and on various islands in the Western Caribbean. Currently survey-based population assessments are not available. Available information suggest that the population contains at maximum 2700 pairs, with 25 pairs on Saba (Bradley & Norton, 2009), whereas the Caribbean population was estimated 5000 pairs in the eighties (Van Halewyn & Norton, 1984). The south western Caribbean subspecies *P. l.loyemilleri* is believed to be close to extinction.
Contrary to the Indian Ocean, where Tropical Shearwater (*P. bailloni* the former Audubon's) breeds in burrows in sand or soil (eg Aride, Seychelles), Audubon's Shearwater *P. lherminieri* in the Bahamas and most of the West Indies nest in rock crevices or even under vegetation (Mackin 2004). Mean density in Long Cay in the Bahamas is 1.97 pair/100 m^2 (95% CI 1.55-2.40). Corrected for missed nests by a correction factor of 1.181 this corresponds with a density of 2.33 pair/100 m^2 (CI 1.83-2.83). This is one of the highest known densities in the world, even compared to the former Audubon's Shearwater -currently Tropical Shearwater- densities on Cousin (Seychelles) and Reunion in the Indian Ocean (Bretagnolle et al, 2000; Burger & Lawrence, 2001). The highest density was found in wooded habitat on Aride in the late 1990's; 11.20 pair/100 m^2 (Bowler et al, 2002)

The conservation status of Audubon's Shearwater for the IBAs is based on the IUCN-classification that used the former taxonomy and consequently the population size of the world's population of both Audubon's and Tropical Shearwater. A reassessment of the conservation status is needed. The Caribbean population size, however, warrants a 'higher' IUCN-conservation status than "Least Concern". A classification as "Near-threatened" is more appropriate (Schreiber, 2000).

2.1.1.4 Current monitoring and research

The following counts and monitoring programmes have recently been conducted in the IBA: 1) During the last decade surveys of Audubon's Shearwater were conducted in February 2001 and 2002 (Collier et al, 2002); 2) monitoring of Red-Billed Tropicbirds has been conducted in two study plots in recent years.

2.1.1.5 Bird species

The IBA is important for nine bird species (*Table 1*): two species are restricted to the breeding season, while seven species are year-round residents. Audubon's Shearwater, and Red-billed Tropicbird qualify as breeding birds. Though no dedicated island-wide censuses have been conducted for these species population size estimates are available for both species.

Audubon's Shearwater is the island's 'national' bird, but information on the distribution and population size is scarce. The estimate of the population size of 1000 individuals is based on the total area of potential habitat, whereas no large-scale dedicated censuses have been conducted. Rainforest Ravine and the Sulphur mine canyons at Hell's Gate on the north coast are the only sites where breeding of Audubon's Shearwater has been confirmed in recent decades (Collier et al, 2002; Lee, 2000).

During the last decade surveys were conducted in February 2001 and 2002 (Collier et al, 2002). Six nocturnal visits (in total < 10 hrs) yielded no observations of vocal behaviour, but one bird was seen flying near Sulphur Mine. Visual inspection of ca 100 potential burrows resulted in one occupied burrow in the Sulphur Mine canyon, where an incubating adult was seen in 2002. Vocal responses of shearwaters to nocturnal call-playback near The Bottom, on the east side of Great Hill, were reported in April (1) and May (3) 2004 (Collier & Brown, 2009). In 2009 and 2010 EPIC conducted surveys on Saba. In February 2009 calling Audubon's Shearwaters were heard on four places; Rainforest Ravine, at the south end of Hell's Gate, Wells Bay and at the garbage dump southeast of Fort Bay. In 2010 no vocal activity was recorded at Rainforest Ravine along the Sandy Cruz trail and at Ladder Bay (Lowrie et al, 2010). While anchored on the southwest side of Saba opposite the cliffs of Great Hill between Ladder Point and Cape Point (17.624 W, 63.26 S) several calling individuals (ca 5) were heard and seen flying overhead in the evening of 27 October 2011 (Geelhoed & Verdaat, 2012). We conclude that this species can be confirmed to be present. The population estimates remain highly uncertain.
Red-billed Tropicbirds breed scattered along all cliffs on the islands perimeter. Walsh-Mc Gehee (2000) estimated the population size to number 750-1000 breeding pairs. Recent research suggests this estimate is too conservative. Based on densities in two study plots and the birds' distribution an estimate of 1200-1500 pairs was obtained in the 2010-2012 breeding seasons (Michiel Boeken & Adrian Del Nevo in litt). Sulphur Mine in the northern part of the island is a key nesting site for this species.

Table 1 Occurrence of IBA trigger species in IBA Saba coastline (source BirdLife International 2012a). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Saba coastline	**AN 006**		**Area: 2,145 (413 land)**
Species	Criterion	Status	Population size (quality)
Audubon's Shearwater *Puffinus lherminieri*[1]	B4ii	B	1,000 IND (medium)
Red-billed Tropicbird *Phaethon aethereus*[2]	A4ii	B	750-1,000 BP (medium)
Bridled Quail-dove *Geotrygon mystacea*	A2	R	Absent
Purple-throated Carib *Eulampis jugularis*	A2	R	Present
Green-throated Carib *Eulampis holosericeus*	A2	R	Present
Antillean Crested Hummingbird *Orthorhyncus cristatus*	A2	R	Present
Caribbean Elaenia *Elaenia martinica*	A2	R	-
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	Present
Lesser Antillean Bullfinch *Loxigilla noctis*	A2	R	Present

[1] Recent reviews of the Caribbean breeding seabirds estimate 25 pairs on Saba (Collier & Brown, 2009). [2] Recent research estimate 1200-1500 pairs on Saba (Boeken & Del Nevo in litt)

Information on abundance and distribution of the seven other resident IBA trigger species is scarce. Of these vegetation dwelling species like Green-throated Carib, Antillean Crested Hummingbird (wide-spread, not restricted to altitude), Pearly-eyed Thrasher (wide-spread, most common species on Saba), and Lesser Antillean Bullfinch (lately there is some debate on the subspecies/race present on Saba and Statia), are found in pockets of habitat along the coastal zone. Purple-throated Carib is found in lower

altitudes than on Statia. Bridled Quail Dove is present at the higher altitudes of Mount Scenery, whereas it is virtually, if not totally, absent in the coastal zone.
In the initial assessment of the IBA Brown Trembler did not qualify as a trigger species. This species, however, is resident on Saba, and does occur in the Saba coastline IBA.

2.1.1.6 Threats

Free roaming goats cause erosion and trample nesting burrows. Introduced predators, such as rats and feral cats, negatively impact the reproduction of the burrow nesting Audubon's Shearwater and Red-billed Tropicbird by predation of eggs and fledglings. The garbage dump on the south side of the island attracts large numbers of predators like cats and rats, resulting in high predation pressure on breeding seabirds in the vicinity of the dump. Under normal circumstances, limited food availability should limit predator densities. However, the landfill provides an unlimited food source sustaining high predator densities year-round, that are able to exert extra high predation pressure during the tropicbird breeding season. Obviously, an oil spill poses a potential threat to seabirds.

Table 2. Threats to the spatial and ecological integrity of IBA Saba coastline. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Goats	4	3	3	36	no	No
Rats/mice	3-4	3-4	2-3	18-48	No	Yes
Cats	3	3-4	2-3	18-36	No	Yes
Habitat degradation[1]	2	3	3	18	no	No
Oil spill[2]	1	4	3	12	no	No

[1] Habitat degradation and erosion are considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion). [2] Oil spill effects depend on timing, place and amount of spilled oil.

2.1.1.7 Measures

Eradication of predators such as cats and rats, using an integrated approach. Management of the garbage dump to limit the number of predators

2.1.1.8 Knowledge gaps

Large-scale censuses for Audubon's Shearwater and to a lesser extent Red-billed Tropicbird are needed to provide baseline data on population size and distribution of both species. Based on the results of these censuses a monitoring programme to assess the population status in the future has to be established.
Furthermore, research on the ecology of Audubon's Shearwater is needed. Key knowledge needs are amongst others the timing of the breeding season, reproduction success and threats. In recent years, research on Red-billed Tropicbird has been conducted by Michiel Boeken and Adrian Del Nevo. The unpublished older data collected by Walsh Mc Gehee contain a wealth of information of potential value. For the other seven resident IBA trigger species information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking. In addition, more information on abundance of breeding terns on Green Island is needed.

2.1.2 Gaps in IBA coverage

On Saba no gaps in IBA coverage are identified.

2.2 Sint Eustatius

Sint Eustatius or Statia is a small, volcanic island, situated ca 13 km northwest of St Kitts and Nevis and ca 25 km southeast of Saba. Sint Eustatius has the shape of a saddle, with a young volcano named the Quill at the southeast end of the island, with Mount Mazinga as its highest point (601 m). In the north-western part of the island remnants of a dormant volcano are present (Roobol & Smith, 2004). The latter area is called the Northern Hills and comprises Signal Hill, Little Mountain and Boven Mountain. Between these two volcanoes there is a low sloping plain, where the majority of the island's population lives. The coast line mainly consists of cliffs or xeric vegetated slopes with a sand beach on the north-east and a rocky beach on the southeast coasts. A more detailed description of the vegetation is provided by Freitas et al (in press). The island has no inland bays or saliñas, nor mangrove stands. Statia also lacks islets off its coast. Coral reef surrounds much of the island. The climate is generally dry with an average of 986 mm of rain falling predominantly between August and November. There is only one freshwater pond on Statia, located at Venus Bay. The vegetation of the interior of the island primarily consists of thorny woodland and grassland, but (secondary) evergreen and elfin forest are found within the volcanic caldera of The Quill. Most of the area of St. Eustatius was formerly used for agriculture, cattle breeding and charcoal-production. At present there is hardly any agriculture. The Kultuurvlakte and the lower slopes of The Quill are still used for grazing, especially for cattle. There are still groups of free-foraging goats ranging about, even on the top of The Quill.

Two IBAs are identified on Sint Eustatius (*Figure 3*): Boven (AN 007) and The Quill (AN 008). Both areas are part of the Quill-Boven National Park which is managed by STENAPA (St. Eustatius National Park). Both IBAs are legally anchored in island legislation and together cover 40% of the island's land area.

2.2.1 IBA Boven (AN 007)

2.2.1.1 Location, boundaries & size

The Boven IBA is situated in the Northern Hills in the northwest peninsula. Zeelandia beach lies on the southeast end of the area, whereas the south western border is adjacent to the Nustar oil transfer station in the southern part of Jenkins Bay. From the northern cliffs the IBA extends 1 km seawards. The total area of this IBA is 1,106 ha, of which 408 ha is land. Proposed changes to the boundaries are (*Figure 3*): 1) an extension to include Signal Hill based on the large numbers of Red-billed Tropicbirds nesting in that inland area.

2.2.1.2 Protection status

The Boven Subsector is formally designated as a protected area. The terrestrial part is covered within the Quill–Boven National Park (above 250 m, and the marine part within the St Eustatius Marine Park. Both the terrestrial St. Eustatius National Park and the marine park are managed by STENAPA.

2.2.1.3 Description

The Boven IBA comprises several rocky hills, that are rather low, but have steep slopes. The habitat of these hills is drier than in The Quill, with a vegetation dominated by Acacia thorn scrublands and grassland. Zeelandia beach on the southeast end of the area consists of sandy cliffs. There are no settlements in Boven. No core areas are identified in the IBA.

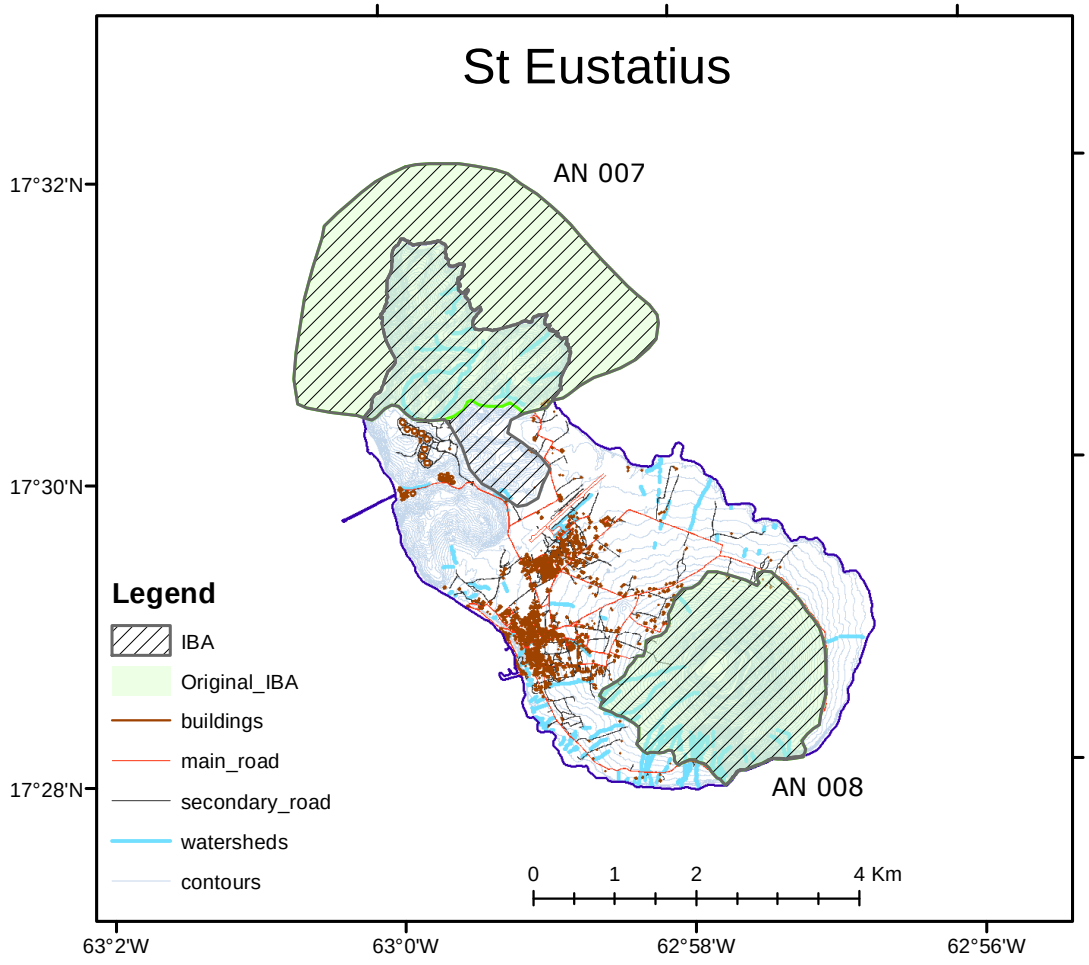

Figure 3. Location and boundaries of the IBAs on Sint Eustatius.

2.2.1.4 Current monitoring and research

The following counts and monitoring programmes are running in the IBA: 1) point transect bird counts by STENAPA since 2009. 2) March 2013 18 Red-billed Tropicbirds were attached with geo-locators by STENAPA and the Clemson University to study their movements.

2.2.1.5 Bird species

The IBA is important for five bird species (*Table 3*): one species is restricted to the breeding season, four species are year-round residents. The Red-billed Tropicbird meets the requirements of A4 ii for a regionally important population within the Caribbean. An estimate of 100-200 breeding birds was made in 2003 based on field surveys which did not cover all of Boven (EPIC, 2003). Tropicbirds nest in the whole area. The hills above the airport form the southern limit of the concentration of Tropicbird nesting. Highest numbers are found outside the boundaries of the IBA, in the Signal Hill area south of the NuStar terminal.

Information on abundance and distribution of the four resident IBA trigger species is scarce. STENAPA point transect counts in both summer and winter, however, have confirmed the presence of Caribbean Elaenia and Lesser Antillean Bullfinch in the IBA. Lesser Antillean Bullfinch is amongst the four most abundant species in the hilly part. These counts show that Antillean Crested Hummingbird is present in the IBA as well, and should be included as a resident species of the Boven IBA. Green-throated Carib is relatively scarce, with one observation on Gilboa Hill during the counts in January 2009.

Table 3. Occurrence of IBA trigger species in IBA Boven (source BirdLife International 2012b and this study). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Boven	**AN 007**		**Area: 1106 (408 land)**
Species	Criterion	Status	Population size (quality)
Red-billed Tropicbird *Phaethon aethereus*	A4ii	B	146 IND (medium)
Green-throated Carib *Eulampis holosericeus*	A2	R	Present
Antillean Crested Hummingbird *Orthorhyncus cristatus*	A2	R	Present
Caribbean Elaenia *Elaenia martinica*	A2	R	Present
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	Present
Lesser Antillean Bullfinch *Loxigilla noctis*	A2	R	Common

2.2.1.6 Threats

Threats to Red-billed Tropicbirds include predation by introduced predators such as rats and cats, trampling of nest burrows by goats, and erosion of the breeding habitat due to overgrazing. Spills from the oil transfer station form a potential threat of oiling.

Table 4. Threats to the spatial and ecological integrity of IBA Boven. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	**Extent**	**Impact**	**Permanence**	**Score**	**Data needed to confirm possibility of threat**	**Data needed on extent/ specifics of threat**
Oil spill[1]	1-3	1-4	2-3	2-36	No	No
Erosion[2]	1	2	1-4	2-8	No	No
Habitat degradation[3]	1	2	4	8	No	No
Cats	4	2	1	8	Yes	Yes
Rats	4	2	1	8	Yes	Yes

1 Oil spill effects depend on timing, place and amount of spilled oil. [2] Erosion permanence depending on location; Zeelandia's breeding grounds of Red-billed Tropicbird is the vulnerable; [3] Habitat degradation and erosion are considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).

2.2.1.7 Measures

Adoption of an oil contamination plan, containing steps to assess and minimise damage caused by an oil spill and to assess the impact by collecting data on the stranded animals (species composition, sex, diet etc) as outlined in for instance the European Handbook on Oil Impact Assessment (www.oiledwildlife.eu).

2.2.1.8 Knowledge gaps

A dedicated survey of breeding Red-billed Tropicbirds is lacking.
For the four resident IBA trigger species information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking.

Red-billed Tropicbird *Phaethon aethereus*

Red-billed Tropicbird is a seabird of tropical waters in the Pacific, Caribbean, Atlantic and northern Indian Ocean. Several subspecies are recognized in different oceans; *P.a. mesonautus* occurs in the Caribbean region, where it breeds on various islands. Breeding occurs mainly in crevices, under boulders and in trees (Lee & Walsh Mc Gehee, 2000). On Zeelandia Bay on Sint Eustatius, however, Red-billed Tropicbirds are found nesting in burrows in the sandy cliffs. One egg is incubated for ca 7 weeks before the chick hatches. The breeding season is prolonged, as birds with eggs or chicks are present year-round. The peak in breeding activity lies in November-July.
Red-billed Tropicbirds spend most of their time at sea. Like other tropicbird species they are the most pelagic feeders of all Pelecaniformes. Diet studies are scarce but all studies show that flying fish and squid are the primary diet components for all tropicbirds (Schreiber & Clapp, 1987). Red-billed Tropicbirds catch their prey by a dive after hovering above the sea surface. Outside the breeding season individuals have an offshore distribution, far from land.
The conservation status of Red-billed Tropicbird is assessed as Least Concern by IUCN. The Caribbean population size, however, warrants a 'higher' IUCN-conservation status. A classification as Vulnerable is more appropriate (Schreiber, 2000).

2.2.2 IBA The Quill (AN 008)

2.2.2.1 Location, boundaries & size

The Quill is the highest point on Sint Eustatius (601 m) and forms the southeast part of the island. The park includes the caldera within the volcanic Mount Mazinga as the Quill is officially named. The total land area of the IBA is 472 ha, and is mapped in *Figure 3* to coincide with the established legal boundaries for the Quill National Park. There are no proposed changes to the boundaries.

2.2.2.2 Protection status

The IBA is part of the Quill-Boven National Park, a designated protected area from 250 meters elevation to the summit and caldera of The Quill. The National Park is managed by STENAPA (St. Eustatius National Park).

2.2.2.3 Description

The Quill is a young volcano. With 601 m it is the highest point on Sint Eustatius. The edge of the volcano is highest on the eastern side and lowest at the western side. The slopes on the inside are extremely steep. The outer slopes are more gradual, with steep ravines cut into them. Human settlements are restricted to levels below 250 meters elevation. Vegetation on higher elevations exist of more moisture dependent species than on the lower altitudes. Inside the caldera of the volcano evergreen seasonal forest is found (Freitas et al, in press). This type closely resembles rainforest. On top

of the caldera small areas of elfin forest existed. On the outer rim of the crater, above 350 meters, dry evergreen forest is found. On lower altitudes more open and less layered forest can be found.
Core areas in the IBA include: 1) the higher altitudes of the caldera; 2) the woodland at the bottom of the crater.

2.2.2.4 Current monitoring and research

The following counts and monitoring programmes are running in the IBA: 1) point transect counts by STENAPA since 2009.

2.2.2.5 Bird species

The IBA is important for eight bird species which all are year-round residents. In the initial assessment of the IBA Scaly-breasted Thrasher did not qualify as trigger species. The point counts, however, show it is present but rare (*Table 5*). The Green-throated Carib, Antillean Crested Hummingbird and Lesser Antillean Bullfinch are common birds on St. Eustatius that also occur in a variety of habitats in the drier parts of the island.

Table 5. Occurrence of IBA trigger species in IBA The Quill (source BirdLife International 2012c and this study). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

The Quill	**AN 008**		**Area: 470**
Species	Criterion	Status	Population size (quality)
Bridled Quail-dove *Geotrygon mystacea*	A2	R	Present
Purple-throated Carib *Eulampis jugularis*	A2	R	Common
Green-throated Carib *Eulampis holosericeus*	A2	R	Common
Antillean Crested Hummingbird *Orthorhyncus cristatus*	A2	R	Common
Caribbean Elaenia *Elaenia martinica*	A2	R	Present
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	Present
Scaly-breasted Thrasher *Margarops fuscus*	A2	R	Present
Brown Trembler *Cinclocerthia ruficauda*	A2	R	Possibly present
Lesser Antillean Bullfinch *Loxigilla noctis*	A2	R	Common

In comparison to IBA Boven The Quill supports populations of trigger species that are dependent on moist vegetations as found in the caldera of The Quill, especially at higher altitudes. These species are Purple-throated Carib, the Bridled-Quail-dove and the Brown Trembler. The latter species occurrence is based on one specimen collected in 1880, and unconfirmed records of its song in The Quill by Voous (e.g. Voous & Koelers, 1967; Rojer, 1997). The last 5 years no records of the species are known. The Bridled Quail Dove is restricted to the forest and woodland around the top and in the crater of The Quill. Records of the Quail Dove are more common than described in the IBA report; it was recorded in every winter transect count by STENAPA. During summer surveys it was recorded less frequently.

In the initial assessment of the IBA Scaly-breasted Thrasher did not qualify as trigger species. The point counts, however, show it is present but rare.

2.2.2.6 Threats

Grazing goats formed a major threat in the past. The frequency of grazing within the park has increased despite an enforcement of an animal registry program. Degradation or the loss of higher vegetations of the Quill has a strong negative effect on the survival of IBA trigger species. For the Bridled Quail Dove main threats are habitat loss caused by hurricanes and development, as well as introduced predators such as cats and rats that prey on the dove's eggs. Feral chicken (*Gallus gallus*) are very abundant in the Quill caldera and along the upper slopes. The species is an aggressive omnivore feeding on seedlings, insects and small reptiles. It may compete for food with the Bridled Quail-dove and may have other impacts on the ecosystem.

Table 6. Threats to the spatial and ecological integrity of IBA The Quill. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Goats	4	2	2-3	16-24	Yes	Yes
Habitat degradation[1]	2	3	2-3	12-18	No	No
Cats	4	2	1	8	Yes	Yes
Rats	4	2	1	8	Yes	Yes
Chicken	4	1-2	1	4-8	Yes	Yes

[1] *Habitat degradation and erosion are considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.2.2.7 Measures

Control of free-roaming goats.

2.2.2.8 Knowledge gaps

Information on the abundance and distribution as well as information on the ecology and potential threats is scarce or lacking for all eight resident IBA trigger species.
In a review of the biological diversity of Statia, Rojer (1997) concluded that information on Brown Trembler and Bridled Quail Dove was lacking. The regular occurrence of Bridled Quail Dove, however, could be confirmed. Next steps should address the threats and confirmation on the occurrence of Brown Trembler. Research on (potential) competition for food between free roaming chicken and the Bridled Quail Dove is pertinent.

2.2.3 Gaps in IBA coverage

On Statia one area is identified that hosts IBA key species: 1) the Signal Hill area south of the Nustar terminal harbours the highest densities of breeding Red-billed Tropicbirds.

2.3 Bonaire

Bonaire is the easternmost of the Leeward islands (Aruba, Bonaire and Curaçao) situated off the northwest coast of Venezuela. The island is situated ca 50 km east of Curaçao, and ca 85 km north of mainland Venezuela. It is 35 km long, 8–15 km wide, and consists of a volcanic core, surrounded by

limestone formations. The northern part of the island is dominated by hills including the island's highest point, Mount Brandaris (243 m), The southern part of the island is flat and less elevated. Offshore, ca 1 km from the west coast lies the low coral-limestone island Klein Bonaire.

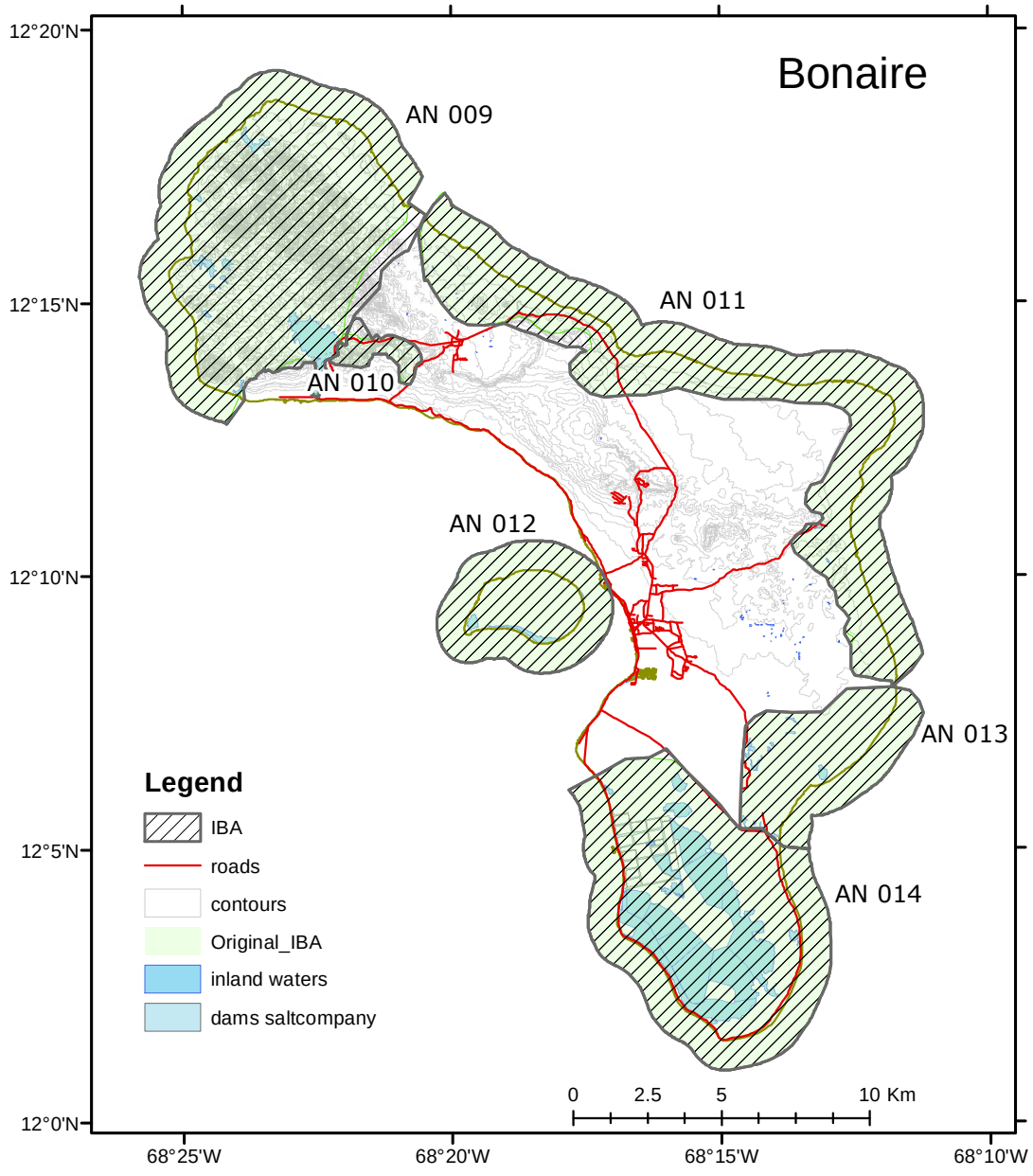

Figure 4. Location and boundaries of the IBAs on Bonaire.

Bonaire has a dry climate with an average annual rainfall of 450 mm. The eastern shoreline receives slightly less rainfall on average than the western side of the island. Most precipitation is in the period October–January. Therefore, the island's vegetation is generally xerophytic. Virtually all trees on the island were removed in the early nineteenth century, and woody vegetation continued to be cut for

charcoal production well into the twentieth century. Grazing by introduced animals has significantly altered the vegetation. As a result, many areas are dominated by columnar cactus intermixed with low scrub and large expanses of land are largely devoid of vegetation. Thicker and taller (3–4 m) thorn scrub forest supporting some epiphytic growth is patchily distributed in some areas, e.g. in Washington-Slagbaai in the northern part of the island. Bonaire's only significant mangrove woodland can be found in Lac Bay, situated in the island's southeast. A vegetation map is provided by Freitas et al (2005).

Six IBAs are identified on Bonaire (*Figure 4*): Washington-Slagbaai National Park (AN 009), Dos Pos (AN 010), Washikemba-Fontein-Onima (AN 011), Klein Bonaire (AN 012), Lac Bay (AN 013), and Pekelmeer Saltworks (AN 014). Some areas are private property. There are several organisations involved in the management of these areas, of which STINAPA Bonaire National Park Foundation manages three areas: Washington-Slagbaai National Park (AN 009), Klein Bonaire (AN 012), and Lac Bay (AN 013). The Nature Policy Plan Bonaire 1999–2004 (ratified by the Island Council in 1999) defines protected zones and recommends a number of other sections of the island to be designated with varying levels of conservation protection.

2.3.1 IBA Washington-Slagbaai National park (AN 009)

2.3.1.1 Location, boundaries & size

The Washington-Slagbaai National Park IBA is situated in the northern part of the island. It encompasses the area from the shore to inland towards the southeast. The eastern border runs from the eastern shore of Gotomeer to the north-northeast. The southern border meanders from the southern shores of Gotomeer to the area north of Saliña Frans. The total land area of this IBA is 5,473 ha, approximately a fourth of Bonaire's surface. The total sea area of this IBA amounts to 2,056 ha. Proposed changes to the boundaries are (*Figure 4*): 1) Southern boundary around Wasao - to include parrot breeding cliffs; 2) Edge of Gotomeer - to improve accuracy and to include missing areas; 3) East boundary - to include missing areas.

2.3.1.2 Protection status

Washington-Slagbaai National Park is a protected area since its establishment in 1969. It is managed by STINAPA Bonaire National Park Foundation. The park hosts two designated Ramsar sites: Goto Lake and Boca Slagbaai. Bonaire National Marine Park extends from the high-water mark to the 60-m depth contour around the coast of Bonaire and Klein Bonaire.
The IBA is primarily designated as "Natuur" in Bonaire's spatial plan (Ruimtelijk Ontwikkelingsplan Bonaire or ROB). Apart from the Ramsar sites several areas have an additional classification: Waarde – Archeologie, Waarde – Kueba (caves), and Waarde Water – Natuur.

2.3.1.3 Description

This IBA exists of mountainous terrain, with the greatest geographic relief of Bonaire including the eroded volcano of Mount Brandaris. Within the IBA a variety of habitats can be found: cactus forests, aloe fields, rock, salt lakes, limestone caves, sand dunes, and limestone terraces. This IBA includes most extensive continuous-area of dry-forest. Within the park's dry-forest there are several waterholes where higher densities of forest birds are found. Seven large salt lakes or saliñas are found in the park of which the Goto Lake (Saliña Goto) and Boca Slagbaai are the most important saliñas. The park was once a large privately-owned agricultural ranch and it still has free-roaming goats, pigs and donkeys such that much of the habitat still bears the signatures of on-going disturbance. The park has a generally well-maintained but narrow and sometimes steep road network for visitor access. There are two inhabited areas; at Playa Frans and south of the village, where the oil storage facility on the industrial area of BOPEC and its buffer zone are situated.

Core areas in the IBA include: 1) Saliña Mathijs – flamingo and wading bird feeding area; 2) North coast – tern breeding area; 3) Malmok – Brown booby roost; 4) Pos Mangle, Saliña Bartol and Boca Bartol – parrot roost and water source for terrestrial birds, feeding area in the saliñas and seabird feeding area; 5) Put Bronswinkel – water source for terrestrial birds; 6) Saliña Funchi – saliña feeding area; 7) Saliña Wayaka - saliña feeding area; 8) Saliña Slagbaai - saliña feeding area, flamingo breeding area; 9) Saliña Frans and cliffs - saliña feeding area, known parrot breeding area; 10) Saliña Tam - saliña feeding area; 11) Saliña Gotomeer - saliña feeding area; 12) Wasao – known parrot breeding area; 13) Juwa area – known parrot breeding area; 14) Natural spring – water source for terrestrial birds; 15) View point – known parrot breeding area.

2.3.1.4 Current monitoring and research

STINAPA has initiated monitoring programs on land birds, waterbirds and Brown Boobies. In 2009 STINAPA also fenced the area of Slagbaai, the southern area of the park, in an effort to start herbivore control. STINAPA's nature education department conducts bird and nature education activities in the park. The following counts and monitoring programmes are on-going in the IBA: 1) monthly Flamingo counts by the Directorate of Spatial Planning and Development; 2) annual parrot counts organized by the Directorate of Spatial Planning and Development, STINAPA, Salba Nos Lora, and since 2012, Echo; 3) nest-monitoring of the Yellow shouldered Amazon Parrot by Echo.

Table 7. Occurrence of IBA trigger species in IBA Washington-Slagbaai National park (source BirdLife International 2012d). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Washington-Slagbaai National park	**AN 009**		**Area: 7,529 (5,473 land)**
Species	Criterion	Status	Population size (quality)
Greater Flamingo *Phoenicopterus ruber*	B4i	R	500 IND (poor)
Sandwich Tern *Sterna sandvicensis*	B4i	R	360 IND (poor)
Common Tern *Sterna hirundo*	A4i	B	20 IND (poor)
Least Tern *Sterna antillarum*	B4i	B	412 IND (poor)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	Present
Yellow-shouldered Amazon *Amazona barbadensis*	A1, A2, A3	R	250 IND (poor)
Caribbean Elaenia *Elaenia martinica*	A2	R	Present
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	20 IND (poor)

2.3.1.5 Bird species

The IBA is important for eight bird species (*Table 7*): two species are restricted to the breeding season, six species are year-round residents. The IBA is important for breeding birds of open, sparsely vegetated landscapes (Greater Flamingo and four tern species), and species of woodlands. The area is among the most important habitat areas for endangered resident raptors such as the Crested Caracara (*Caracara plancus*), and the White-tailed Hawk (*Buteo albicaudatus)* (Nijman et al, 2009).

The coastlines provide breeding areas for globally significant numbers of Common Tern, and regionally important numbers of Sandwich and Least Terns with 1% or more of the regional populations (Wells & Debrot, 2008; Debrot et al, 2009). Outside the breeding season large numbers of terns can be found in this IBA, in September 2012 for instance 750 Least Terns were counted.

The number of Greater Flamingos, which is the national bird of Bonaire, using the coastal habitats in the park for foraging regularly exceeds the regional population threshold of 500 birds. The largest numbers are present at Goto Lake. Small numbers occasionally breed in Saliña Slagbaai. The saliñas provide habitat for a wide range of other resident and migratory wading birds (see Simal et al, 2010).

The park protects an important example of globally threatened dry scrub forest habitat with its avifaunal community including the restricted range Pearly-eyed Thrasher, as well as characteristic species such as Caribbean Elaenia and Bare-eyed Pigeon. The IBA sometimes is known to support at least 1% of the global population of the Yellow-shouldered Amazon, that use the park as nesting, roosting, and foraging area.

2.3.1.6 Threats

Habitat degradation and erosion formed the greatest threats in the past. Nowadays the threats are coming from destructive foraging of free-ranging goats, pigs and donkeys (resulting in the fore mentioned threats), continued poaching of Yellow-shouldered Parrots, and potential depredation from feral cats on nesting terns and plovers, and possibly in some areas from human disturbance of tern nesting colonies. Because a major oil shipping lane passes through the region and the presence of an oil storage facility (BOPEC) on the southeastern border of the park there is a risk for an oil spill, which can contaminate coastal lagoons and estuaries.

Table 8. Threats to the spatial and ecological integrity of IBA Washington-Slagbaai National park. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Habitat degradation[1]	4	3	4	48	No	No
Erosion[1]	4	4	3	48	No	No
Goats	4	4	3	48	No	No
Donkeys	4	4	3	48	No	No
Parrot poaching	3	3	3	27	No	No
Cats	4	3	2	24	No	No
Rats	4	3	2	24	No	No
Pigs	2	4	3	24	No	No
Oil disaster	1	4	3	12	No	No
Dogs	1	2	2	4	Yes	Yes
Human disturbance (Recreational)	1	2	1	2	No	Yes

[1] *Habitat degradation and erosion are considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.3.1.7 Measures

A formal extension of the national park to include the southern areas within the IBA would help to ensure its protection.

Seasonal cat control around tern nesting areas may provide considerable benefit to these birds (the impact on the core area is not reflected in the threat table for the entire IBA). Such measures would probably have implications for the whole cat population in the park. Other bird species may benefit from such a development as well. The removal of herbivores from this IBA is a critically important conservation measure which will have far reaching benefits for bird populations. The Slagbaai area of the park was fenced in 2009 by STINAPA and every effort should be made to eradicate goats and donkeys

from this area. Adoption of an oil spill contingency plan, containing steps to assess and minimise damage caused by an oil spill and to assess the impact by collecting data on the stranded animals (species composition, sex, diet etc) as outlined in for instance the European Handbook on Oil Impact Assessment (www.oiledwildlife.eu).

2.3.1.8 Knowledge gaps

For the resident IBA trigger species Bare-eyed Pigeon, Caribbean Elaenia and Pearly-eyed Thrasher information on the abundance and distribution as well as information on the ecology and potential threats is scarce or lacking. Bird monitoring should be continued and monitoring requirements should be periodically reviewed to ensure efficient allocation of resources. One goal of monitoring should be measuring the effect of management measures on the bird populations, and measuring the abundance of threats to these birds. Cat abundance and their impacts at tern nesting areas should be determined particularly if cat control is actively working. Herbivore abundance should be monitored after control have started and should act as a guide for on-going management.

2.3.2 IBA Dos Pos (AN 010)

2.3.2.1 Location, boundaries & size

The Dos Pos IBA is situated in the northern part of Bonaire, adjacent to the east side of Gotomeer Lake. It lies southeast of the Washington Slagbaai National Park IBA. The total area of this IBA is 293 ha.
Proposed changes to the boundaries are (*Figure 4*): 1) East boundary around Gotomeer – to match AN 009 better; 2) North boundary – extended to include a further parrot roost and water resource but also mapped to exclude low priority area; 3) West boundary – charted to increase accuracy of area.

2.3.2.2 Protection status

This area is presently not under any protection. The area is a mix of private and state ownership. The area is managed by Echo Bonaire. In Bonaire's Spatial Plan the IBA includes nature areas ("Natuur"), however, the western edges have been designated as a Ramsar site. More than half of the area is farmland ("Agrarisch – kunuku"), although most of the area is not actively managed as such.

2.3.2.3 Description

The area is characterised by numerous small hills and sheltered valleys. The vegetation consists of thorn scrub and agricultural land with several plantations (kunuku). The kunuku is managed by Echo and is a release site for illegally captured or injured parrots. The area holds some fresh water ponds.
Core areas in the IBA include: 1) Keteldal - parrots roosts; 2) Pos Chikitu - parrot roost and water resource; 3) Dos Pos kunuku - key feeding area and parrot roost, and important fresh water pond; 4) Roi Sangu – Parrot breeding area

2.3.2.4 Current monitoring and research

Several monitoring programmes are running in this IBA: 1) land bird monitoring by STINAPA; 2) annual parrot count, which is organized by the Directorate of Spatial Planning and Development, STINAPA, Salba Nos Lora, and since 2012, Echo, includes several roosts in this IBA; 3) nest monitoring of the Yellow shouldered Amazon Parrot in Roi Sangu and other areas of the IBA by Echo.

2.3.2.5 Bird species

The IBA is important for four bird species which are all year-round residents (*Table 9*). The Dos Pos IBA is a key area for the Yellow-shouldered Amazon Parrot. Parrots nest in the cliffs of Roi Sangu, and the mango fruit plantation of Dos Pos Kunuku is an important food resource (Williams, 2009). Roi Sangu is

an important breeding site for the Bonaire Barn Owl (*Tyto alba;* Prins et al, 2003). Several hundred parrots have been recorded at the seasonally important roost sites in the western areas of the IBA. In January 2007 these roosts harboured ca 40% of the island's parrot population. In the initial assessment of the IBA the "Near Threatened" Caribbean Coot did not qualify as a trigger species, but it can be found in the IBA's small pond on the Dos Pos kunuku. Dos Pos is also a site where many migrating passerines are seen (Ligon, 2012).

Table 9. Occurrence of IBA trigger species in IBA Dos Pos (source BirdLife International 2012e). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Dos Pos	**AN 010**		**Area: 293**
Species	Criterion	Status	Population size (quality)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	Present
Yellow-shouldered Amazon *Amazona barbadensis*	A1, A2, A3	R	267 IND (medium)
Caribbean Elaenia *Elaenia martinica*	A2	R	-
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	Present

2.3.2.6 Threats

In the past habitat degradation and erosion has occurred in the park. At present feral donkeys and high densities of goats have a considerable effect on habitat structure and composition. Their continued presence and the apparent increase of feral pigs prevent natural regeneration of the flora. The Yellow-shouldered Parrot is threatened by habitat loss and degradation, introduced mammalian predators including cats and rats and poaching for the local pet trade.

Table 10. Threats to the spatial and ecological integrity of IBA Dos Pos. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	**Extent**	**Impact**	**Permanence**	**Score**	**Data needed to confirm possibility of threat**	**Data needed on extent/ specifics of threat**
Habitat degradation[1]	4	3	4	48	No	No
Erosion[1]	4	4	3	48	No	No
Goats	4	4	3	48	No	No
Donkeys	4	4	3	48	No	No
Pigs	3	4	3	36	No	No
Parrot poaching	3	3	3	27	No	No
Cats	4	3	2	24	No	No
Rats	4	3	2	24	No	No
Habitat loss	1	4	3	12	No	No

[1] *Habitat degradation and erosion are considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.3.2.7 Measures

Herbivore control (including pigs in the Dos Pos kunuku area) is a key action that would benefit the IBA. Fenced areas could provide protection for forest areas and the freshwater pond at Dos Pos. Three parrot roost sites occur on private land and efforts should be made to ensure their protection.
Formal protection, beyond the five-yearly reviewed Spatial Plan, should be given to the area of Roi Sangu.
Echo's parrot release work at Dos Pos, which facilitates confiscations of illegally captured parrots, should be continued/supported, along with a further enforcement of the parrot's protected status. Such measures contribute to tackling parrot poaching which is a medium priority threat in three IBAs.

2.3.2.8 Knowledge gaps

For the resident IBA trigger species Bare-eyed Pigeon, Caribbean Elaenia and Pearly-eyed Thrasher information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking. Bird monitoring should be continued and monitoring requirements should be periodically reviewed to ensure efficient allocation of resources.

2.3.3 IBA Washikemba-Fontein-Onima (AN 011)

2.3.3.1 Location, boundaries & size

The Washikemba-Fontein-Onima IBA is situated in the northern side of Bonaire. The IBA extends along the coast inland towards escarpments from Washikemba in the south to Playa Grandi in the north. It includes the natural springs and cliffs of Fontein and the cliffs and intermittent ponds at Washikemba, Onima dam, and inland from Playa Grandi. The total area of this IBA is 6,286 ha, of which 3,484 is land.
Proposed changes to the boundaries are (*Figure 4*): 1) West boundary – large area of kunuku to be excluded as not critical to IBA; 2) Fontein area – area increased to improve accuracy of the boundaries along the cliffs; 3) Porto Spaño area – area reduced to eliminate unimportant kunuku land; 4) Western boundary at south end extended to include Roi Lamunchi

2.3.3.2 Protection status

The area is a mix of private and state ownership. None is currently in protected areas but approximately half of the area is within regions recommended for status as "Island Park" or "Protected Landscape" in the Nature Policy Plan Bonaire 1999-2004. The Fontein area and Onima are designated as nature area ("Natuur"). To the northwest there is farmland ("Agrarisch – kunuku") with a strip of areas designated as "Bedrijf –Windenergie": where the windmills are located. Throughout the coastal areas there is open landscape ("Open landschap"). Within the open landscape there are areas designated as "Waarde, Archeologie and Waarde Kueba (caves)". Areas having this designation are also found around Onima, the cliffs at Fontein and near Washikemba.

2.3.3.3 Description

This relatively large IBA includes a diverse range of habitats. There is very limited human settlement in this area. Vegetation consists mainly of thorny shrubland. There are three large water reservoirs in the area: Onima Reservoir, Playa Grandi Reservoir, and Washikemba Reservoir.
Core areas in the IBA include: 1) Northern ponds – important habitat for waterbirds; 2) Onima cliffs and pond – Know parrot breeding area, and a large fresh water pond; 3) Fontein – key water resource, parrot breeding, feeding and roost area; 4) Lagun and Washikemba – wading bird feeding habitat and Least Tern nesting area; 5) Roi Lamunchi - seasonally important lake. The key value of this IBA has been documented among others for the endangered Caribbean Coot (Prins et al, 2005; Prins & Nijman 2005;

Nijman et al, 2008; Nijman, 2010), the Bonaire Barn Owl (Prins et al. 2003) and the Least Tern (Debrot et al, 2009).

2.3.3.4 Current monitoring and research

Several programmes that are conducted on Bonaire include this IBA. The following counts and monitoring programmes are running in the IBA: 1) land bird monitoring by STINAPA; 2) annual parrot count, which is organized by the Directorate of Spatial Planning and Development, STINAPA, Salba Nos Lora, and since 2012, Echo, includes several roosts in this IBA; 3) nest monitoring of the Yellow shouldered Amazon Parrot in Fontein, along the Bolivia cliffs and in other areas of the IBA by Echo.

2.3.3.5 Bird species

The IBA is important for six bird species (*Table 11*): one species is restricted to the breeding season, one species is wintering, four species are year-round residents. The area likely meets 1% global threshold for Least Tern and Yellow-shouldered Amazon and occasionally for Caribbean Coot. Apart from the trigger species the IBA is a breeding site for the Bonaire Barn Owl (Prins et al, 2003).
Surveys of Least Terns in 2002 documented 452 birds (>10% of regional population) within this IBA along the eastern coast from near Boca Onima south to near Washikemba (Debrot et al, 2009). In this coastline area many wading birds are also found.
This IBA is the only area that exceeds the threshold for the "Near-Threathened" Caribbean Coot. This species has been documented as an intermittent breeder largely at three big water reservoirs Onima Reservoir, Playi Grandi Reservoir, and Washikemba Reservoir. Records from the period 1974-2001 indicate that Onima Reservoir has had as many as 200 birds with confirmed breeding, Playa Grandi Reservoir as many as 26 birds with confirmed breeding, and Washikemba Reservoir as many as 20 birds with confirmed breeding (e.g Prins et al, 2005; Prins & Nijman 2005; Nijman et al, 2008; Nijman, 2010).

Yellow-shouldered Amazons are also known to nest on the cliffs that extend from Onima to Fontein. The area of Fontein includes a fresh water spring. The tallest trees on the island and cliffs are key areas for parrots and also accommodate high densities of other forest birds. Parrots have long frequented Fontein for its permanent fresh water, its (introduced) fruit trees and also used it as a roosting site. Winter roost counts yielded over 100 birds (Williams & Martin, personal comments).
Information on abundance and distribution of the two resident IBA trigger species (Pearly-eyed Thrasher and Caribbean Elaenia) is scarce. The IBA is a breeding area for Pearly-eyed Thrasher and a suite of thorn scrub passerines though.

Table 11. Occurrence of IBA trigger species in IBA Washikemba-Fontein-Onima (source BirdLife International 2012f). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Washikemba-Fontein-Onima	**NA 011**		**Area: 6,286**
Species	Criterion	Status	Population size (quality)
Caribbean Coot *Fulica caribaea*	A1	R	246 IND (poor)
Least Tern *Sterna antillarum*	B4i	B	452 IND (poor)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	Present
Yellow-shouldered Amazon *Amazona barbadensis*	A1, A2, A3	W	100 IND (poor)
Caribbean Elaenia *Elaenia martinica*	A2	R	present
Pearly-eyed Thrasher *Margarops fuscatus*	A2	R	20 IND (poor)

2.3.3.6 Threats

Habitat degradation and destructive foraging of free-ranging goats and donkeys constitute the most severe threats to the IBA's spatial and ecological integrity. For Yellow-shouldered Amazons continued illegal trapping of individuals forms an high additional threat. Ground-nesting birds like terns and plovers face potential depredation from feral cats and rats, and possibly in some areas human disturbance, especially by sight-seers.

Table 12. Threats to the spatial and ecological integrity of IBA Washikemba-Fontein-Onima. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Goats	4	4	3	48	No	No
Donkeys	4	4	3	48	No	No
Cats	4	4	3	48	No	No
Habitat degradation[1]	4	3	4	48	No	No
Resource extraction (rocks for sand)	4	3	4	36	No	No
Parrot poaching	3	3	3	27	No	No
Habitat loss	2	4	3	24	No	No
Rats	4	3	2	24	No	No
Inappropriate development of Fontein	1	3	3	9	No	No
Human disturbance (Recreational)	2	3	1	6	No	Yes

[1] *Habitat degradation is considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.3.3.7 Measures

Herbivore control (including pigs at Fontein) is a key action that would benefit the IBA. Seasonal cat control around areas of high tern nesting density would provide considerable benefit to these birds (the impact on core area four is not reflected in the threat table for the entire IBA). This measure would probably have implications for the area's cat population benefiting other birds.

2.3.3.8 Knowledge gaps

Current knowledge on distribution of breeding terns is lacking. Surveys are needed to identify core areas for tern breeding along the extensive coast line of this IBA. Further investigation into the likelihood and impact of further rock extraction may benefit the protection, or even creation of tern nesting areas.
Furthermore, for the resident IBA trigger species Bare-eyed Pigeon, Caribbean Elaenia and Pearly-eyed Thrasher information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking. Bird monitoring should be continued and monitoring requirements should be periodically reviewed to ensure efficient allocation of resources. Cat abundance and their impacts at tern

nesting areas should be determined particularly if the management action recommended above is attempted.

2.3.4 IBA Klein Bonaire (AN 012)

2.3.4.1 Location, boundaries & size

Klein Bonaire is an island, situated approximately ca 800 m offshore from Kralendijk on mainland Bonaire. The total size of the island is 707 ha, the area of the surrounding waters is 1,345 ha.
Proposed changes to the boundaries are made to basically correspond with the islands perimeter (*Figure 4*): 1) East buffer zone – reduced in such a way that it does not include "mainland" Bonaire

2.3.4.2 Protection status

Klein Bonaire is owned by the island government. The island and surrounding reef are protected within the Bonaire National Marine Park, and are managed by STINAPA Bonaire National Park Foundation. The island is designated as a nature area ("Natuur") in Bonaire's Spatial Plan and designated as a RAMSAR site since 2000.

2.3.4.3 Description

Klein Bonaire is an uninhabited lime-stone island. The vegetation has been severely impacted from a long history of felling trees and overgrazing by introduced goats, and is dominated by low shrubs. Although currently degraded, the dry-forest habitat has great potential for restoration due to the absence of herbivores. STINAPA has conducted (limited) tree planting on Klein Bonaire to restore the original vegetation. Sprinkled along the shoreline are three saltwater lakes (saliñas), and some freshwater springs. Sandy beaches that are important sea turtle nesting grounds, are interspersed with coral rubble strands with low shrubby vegetation. Debrot (1997) provides a brief biological inventory for the island.

Core areas in the IBA include: 1) West pond – important habitat for waterbirds; 2) South pond – important habitat for waterbirds.

2.3.4.4 Current monitoring and research

The following counts have been running in the IBA: 1) Surveys of terns and plovers were carried out on the island in 2001 and 2002 (Wells & Wells, 2006).

Table 13. Occurrence of IBA trigger species in IBA Klein Bonaire (source BirdLife International 2012g). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Klein Bonaire	**AN 012**		**Area: 2,052**
Species	Criterion	Status	Population size (quality)
Least Tern *Sterna antillarum*	B4i	B	100 IND (poor)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	8 IND (poor)
Caribbean Elaenia *Elaenia martinica*	A2	R	6 IND (poor)

2.3.4.5 Bird species

The IBA is important for three bird species (*Table 13*): one species is restricted to the breeding season, two species are year-round residents. Breeding Least Terns are of regional importance for the population. Censuses of breeding birds in 2001-2002 estimated at least 50 breeding pairs of Least Terns,

mainly in the saliñas on the western side of the island (Wells & Wells, 2006). Apart from terns Klein Bonaire is a key breeding habitat for wading birds.
Information on abundance and distribution of the two resident IBA trigger species (Bare-eyed Pigeon and Caribbean Elaenia) is scarce. Point transect counts in July 2006 did not yield records of these species but did yield a record of the Caribbean Coot (Del Nevo, in lit).

2.3.4.6 Threats

Habitat degradation is the most severe threat to the IBA. Disturbance from occasional visitors to the island and depredation of nests and eggs by cats (and possibly mice and rats, if still present), are likely low to moderate current potential threats to nesting terns.

Table 14. Threats to the spatial and ecological integrity of IBA Klein Bonaire. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Habitat degradation[1]	4	3	4	48	No	No
Cats	3	3	2	18	No	Yes
Rats/Mice	3	3	2	18	No	Yes
Human disturbance (Recreational)	1	3	1	12	No	Yes

[1] *Habitat degradation is considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.3.4.7 Measures

Goats were exterminated from the island in the 1980s, and it may also be free of introduced rats and mice but further assessment is required. The island still has a feral cat population. Efforts to restore the forest habitat should be increased.

2.3.4.8 Knowledge gaps

Quantitative information on breeding terns is scarce or lacking. Research is needed to assess the impact of cats on the reproductive success of breeding terns. Such data will provide information on the necessity for cat control.
Information on abundance and distribution as well as information on ecology and potential threats of the resident IBA trigger species Bare-eyed Pigeon, and Caribbean Elaenia is scarce or lacking. A broad scale survey of the abundance and diversity of dry-forest habitat bird species would also prove valuable, especially if incorporated into a long-term monitoring scheme to determine the effectiveness of management actions.

Yellow-shouldered Amazon *Amazona barbadensis*

Yellow-shouldered Amazon is a parrot with a restricted and fragmented distribution along the northern coast of Venezuela, on the Venezuelan islands, Margarita and La Blanquilla, and on Bonaire. The species has declined over the last century with decreasing numbers and retracting distribution, e.g. the population on Aruba disappeared (Voous, 1983). The decline has been largely caused by poaching of animals for the trade market, but habitat destruction and degradation had negative impacts as well.
In the breeding season the habitat consists of xerophytic vegetation i.c. dry scrublands dominated by cacti and thornbush with scattered small trees. Outside the breeding season the habitat use seems less restricted; when birds occur in woodlands as well. Presumably breeding is a response to local conditions and its timing may therefore vary between years. The breeding season is apparently from February to June, but begging young were reported as late as October. Clutch-size is reportedly 2-3 on Bonaire
Food consists of various wild and cultivated fruits, seeds and flowers.

The total population is assessed to number several thousands. Present population estimates, however, are not readily available. Annual island wide surveys of roost sites on Bonaire yielded a minimum of 865 individuals on Bonaire in 2012 (www.salbanoslora.org), whereas a population estimate using distance sampling methods (Buckland et al, 1993) amounted to 2800 individuals (Rivera-Milán & Simal, 2011).

2.3.5 IBA Lac Bay (AN 013)

2.3.5.1 Location, boundaries & size

The Lac Bay IBA is situated along the coast on the south east side of Bonaire. The Lac area contains a few major vegetation types (Freitas et al. 2005) ranging from salt flats and coastal barrens to woodlands and mangroves. The total area of this IBA is 2,117 ha, of which the land area amounts to 1,452 ha.
Proposed changes to the boundaries are (*Figure 4*): 1) North east shoreline – unimportant kunuku area should be excluded from the area.

2.3.5.2 Protection status

Lac Bay is state owned and has been proposed to become formally part of the National Park system. It is managed by STINAPA Bonaire National Park Foundation. Underwater portions of the area are protected within Bonaire National Marine Park with specific regulations related to activities within the area and use of natural resources including mangroves. Lac Bay is a designated as a RAMSAR site as well.
The area around Lac Bay's coast is designated in Bonaire's Spatial Plan as nature area ("Natuur") and the waters within the lagoon are part of the island's Marine Park ("Water – Marinepark"). Interestingly the mangrove forest areas are not marked on the Planning Document "Ruimtelijk Ontwikkelingsplan Bonaire", they are simply represented by the marine park. The spatial plan recognizes a saliña near Cai on the northeast and several archeological areas ("Waarde – Archeologie") are scattered across the IBA. Cai, Kontiki resort on the west and Sorobon at the southern end of the IBA, are marked as recreational areas ("Recreatie – Dagrecreatie or – Verblijfsrecreatie"). There are small clusters of housing ("Wonen") and small industrial areas for a single windmill ("Bedrijf – Windenergie") and a disused shrimp farm ("Bedrijf – Visteelt").

2.3.5.3 Description

Lac Bay is a shallow bay protected from the open ocean by a coral reef. Open water with sea grass beds and the coral reef form two of the three major habitats in the IBA. The third major habitat type is located in the northern part of the bay, where ca 100 ha of mangrove are present. This mangrove does already

exist for 850 years. The Mangrove Info Center Bonaire, which is established in 2002, is located next to it. On the north side of the mouth of the bay a small fishing harbour is situated. On the south side of the bay a small resort and two windsurfing centres are located. Along the northwest corner of the area some farms and homes can be found.
Core areas in the IBA include: 1) Mangroves; 2) Shallow waters

2.3.5.4 Current monitoring and research

The following counts and bird monitoring programmes are running in the IBA: 1) monthly Flamingo counts conducted by the Directorate of Spatial Planning and Development. Imares-Wageningen UR has conducted several recent baseline and exploratory studies in the Lac area (Debrot et al, 2010a,b, 2012; Slijkerman et al, 2011) and has completed an assessment of the avifauna of the area during the fall migration season of 2011 (Debrot et al, 2013).

2.3.5.5 Bird species

The IBA is important for three bird species, which are all year-round residents (Table 15). Though the area is supposed to meet the 1% global threshold for Yellow-shouldered Amazon in the past (roost of approximately 100 individuals in Sept/Oct 2001), this parrot is not typically found in the Lac Bay, and is considered to be not present in the area anymore. Information on abundance and distribution of the two other resident IBA trigger species (Bare-eyed Pigeon and Caribbean Elaenia) is scarce.
The manchineel stands (*Hippomane mancinella*) adjacent to lac are important roosting sites for various pigeon species, among which Bare-eyed Pigeon (Harms & Eberhard 2003) while the coastal areas of Cai are documented nesting habitat for the Least Tern (Debrot et al, 2009). The shallow waters of the IBA provide foraging areas for several species of wading birds and terns. Numbers of Greater Flamingo regularly meet but less frequently exceed the 1% regional threshold. Scarce species like Snowy Plover, Wilson's Plover and Least Tern are regularly present in the area. Lac Bay has an important concentration of the Reddish Egret (*Egretta rufescens*) an IUCN "Near Threatended" (NT) species which nests in the mangroves of the bay (Debrot et al, 2013).

Table 15. Occurrence of IBA trigger species in IBA Lac Bay (source BirdLife International 2012h). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Lac Bay	**AN 013**		**Area: 2,117 (1,452 land)**
Species	Criterion	Status	Population size (quality)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	Present
Yellow-shouldered Amazon *Amazona barbadensis*	A1, A2, A3	R	No longer present
Caribbean Elaenia *Elaenia martinica*	A2	R	Present

2.3.5.6 Threats

Goats and donkeys are the most severe threats to the IBA's spatial and ecological integrity. Potential threats come from pollution and increased nutrient loading from septic leaching and increased sedimentation from land clearing and poor construction practices, especially from hotel development. IBA trigger species are not known to be prone to disturbance. However, increasing recreational use of Lac Bay by windsurfers, kayakers, and snorkelers, and activities which may cause disturbance of foraging flamingos and other birds may have negative effects, although this has not been carefully documented. Roost sites for Yellow-shouldered Amazons and other birds should be carefully mapped to ensure that they are located within areas protected from illegal cutting, since this could be a threat if they roost outside such areas.

Table 16. Threats to the spatial and ecological integrity of IBA Lac Bay. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	Extent	Impact	Permanence	Score	Data needed to confirm possibility of threat	Data needed on extent/ specifics of threat
Goats	4	4	3	48	No	No
Donkeys	4	4	3	48	No	No
Habitat degradation[1]	4	3	4	48	No	No
Human disturbance (Windsurfing and beach use)	2	3	2	12	No	No
Pollution and nutrient loading	3	3	1	9	No	Yes
Sedimentation	2	2	2	8	No	Yes
Human disturbance (Mangrove tours)	1	2	1	2	No	No

[1] *Habitat degradation is considered here as something that has happened, whereas introduced herbivores are considered as an on-going threat (driving on-going habitat degradation and erosion).*

2.3.5.7 Measures

Herbivore exclusion or control is needed to prevent continued degradation of the mangroves. Proper wastewater management needs to be in place.

2.3.5.8 Knowledge gaps

For the resident IBA trigger species Bare-eyed Pigeon, and Caribbean Elaenia information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking. The development of systematic bird monitoring, beyond flamingo counting should be developed. Special attention should be paid to an assessment of the use of Lac Bay by the Reddish Egret.

Hydrological research including assessments of nutrient loads has been conducted by Progressive Environmental Solutions during their work between 2006 and 2010. The extent of pollution, nutrient loading and sedimentation is alarming and should be monitored (Slijkerman et al, 2011). Importantly, all monitoring should be combined with an assessment on the impact on bird populations.

2.3.6 IBA Pekelmeer saltworks (AN 014)

2.3.6.1 Location, boundaries & size

The Pekelmeer saltworks IBA is situated in the southern part of Bonaire. The total area of this IBA is 6,197 ha, of which 4,203 ha is land. Proposed changes to the boundaries are (*Figure 4*): 1) Northern boundary to be extended to include additional important ponds.

2.3.6.2 Protection status

Much or most of the IBA is leased to the commercial salt-works company Cargill by the government. Most of the area (perhaps over 90%) is now under active management for salt production, but 55 ha area in the northern part of the area where the majority of the Greater Flamingos nest, has been designated as Flamingo Breeding Reserve since 1969. A section along the southwest side has been proposed as a "Strict Reserve" and the remainder (excluding the crystallizer basins for the saltworks on the western side) as an "Island Park". The Flamingo reserve is managed by Cargill.
With the exception of the intensively used industrial area ("Bedrijf – Zoutwinning") most of the land and water is designated in Bonaire's Spatial Plan as Nature ("Natuur; Water – Natuur") despite being actively managed for salt production. Pekelmeer and the flamingo reserve are designated as a Ramsar site ("Ramarsargebied"). The thin strip between the salt works and the coast is largely used for recreation ("Recreatie – Kustzone"), with a few scattered and small developments including an antenna, the Willemstoren lighthouse ("Beschermingswaardig"), and a single residence ("Wonen").

2.3.6.3 Description

In the past the Pekelmeer consisted of a series of natural shallow lagoons. It has been modified over hundreds of years for salt production. Industrial salt production, however, commenced in 1968 by AKZO Nobel. Since then the area has subsequently been modified by controlling water levels within a series of condenser lagoons for maximum salt production through evapotranspiration. The area is largely open with only low vegetation, but low bushes grow along the shores of some of the lagoons.

Core areas in the IBA include: 1) Flamingo breeding areas; 2) southern ponds

2.3.6.4 Current monitoring and research

The following counts and monitoring programme is running in the IBA: 1) monthly Flamingo counts conducted by Cargill as part of an island wide program run by the Directorate of Spatial Planning and Development.

2.3.6.5 Bird species

The IBA includes large areas of habitat for wading and seabirds as well as the regionally significant flamingo breeding area. The area is important for six bird species (Table 17): three species are restricted to the breeding season, three species are year-round residents. Breeding birds of open, sparsely vegetated landscapes form an important part of the IBA: Greater Flamingo and four tern species. The IBA is best known for its breeding colony of Greater Flamingos. Prior to 1968 when industrial salt production started at the Pekelmeer, the number of breeding pairs was estimated at 2,500. During the last decade, total numbers on Bonaire have fluctuated between about 1,500 and 7,000 generally some 3,000 birds were present. Numbers of nests has varied widely from only a few in some very dry years to as many as 1,300 in 1996, with most nests in the area designated as a flamingo sanctuary within the commercial salt works at Pekelmeer. The IBA regularly meets or exceeds the BirdLife 1% Caribbean thresholds for Greater Flamingo. The IBA is important for terns (Debrot et al, 2009). It was estimated to hold 582 Least Terns during the 2002 breeding season (>10% of regional population). Outside the breeding season numbers can be higher, with a count of for instance 650 Least Terns in August 2012. In 1999 a breeding colony of 340 Sandwich "Cayenne" Terns was present (being >1% of global population). Breeding season surveys in 1999 and 2002 yielded 170-174 adult Royal Terns breeding in the IBA, constituting over 10% of the regional population. Surveys in the breeding season in 2002 came up with 60 adult Common Terns breeding in the IBA, a number representing >1% of the regional population.

Table 17. Occurrence of IBA trigger species in IBA Pekelmeer salt works (source BirdLife International 2012i). Qualification criterion, status (B = breeding, W = wintering, R = resident) and population size (IND = individuals, BP = breeding pair).

Pekelmeer saltworks	**NA 014**		**Area: 6,197**
Species	Criterion	Status	Population size (quality)
Greater Flamingo *Phoenicopterus ruber*	A4i	R	3,000 IND (poor)
Royal Tern *Sterna maxima*	B4i	B	170-174 adults only (poor)
Sandwich Tern *Sterna sandvicensis*	B4i	R	340 IND (poor)
Common Tern *Sterna hirundo*	A4i	B	60 IND (poor)
Least Tern *Sterna antillarum*	B4i	B	582 IND (poor)
Bare-eyed Pigeon *Patagioenas corensis*	A3	R	-

2.3.6.6 Threats

Destructive foraging of free-ranging donkeys is considered to be the most severe threat to the IBA's spatial and ecological integrity. Management of the habitats and levels of industrial disturbance from the commercial salt works are most likely anthropogenic activities that potentially have an impact on birds. Such disturbances can easily be limited. Construction of nesting islands in the condenser ponds that are not subject to industrial traffic or disturbance might be a method to restore tern use of southern Bonaire to former levels.

Table 18. Threats to the spatial and ecological integrity of IBA Pekelmeer saltworks. The threats are quantified according to the so-called RAPPAM method described by Ervin (2003). See Appendix II for details.

Threat	**Extent**	**Impact**	**Permanence**	**Score**	**Data needed to confirm possibility of threat**	**Data needed on extent/ specifics of threat**
Donkeys	4	3	3	36	No	No
Inappropriate management	3	3	2	18	No	Yes
Human disturbance (Industrial)	4	2	2	16	No	No
Human disturbance (Recreational, dog walking)	1	3	2	6	No	No

2.3.6.7 Measures

The removal of donkeys would benefit the regeneration of vegetation. The value of this area to nesting terns has declined dramatically compared to historic levels. However, Debrot et al. (2009) indicate that the value of this area for breeding terns could probably be improved greatly by the relatively inexpensive measure of constructing small islands for breeding in the various condenser ponds. Predation of eggs and chicks by the Laughing Gull (*Larus atricilla)* is also a problem for nesting terns (Debrot et al. 2009). The numbers of the latter species are increasing due to the food supply offered by the open landfill of the island. The situation with this species should be monitored to see if control measures are called for. It

would be good to set up a bird management plan between Cargill and the Directorate of Spatial Planning and Development.

2.3.6.8 Knowledge gaps

For the resident IBA trigger species Bare-eyed Pigeon information on abundance and distribution as well as information on ecology and potential threats is scarce or lacking. Furthermore, it may be prudent to periodically review the monitoring and management carried out by Cargill staff to ensure expectations are being met.

2.3.7 Gaps in IBA coverage

On Bonaire several areas are identified that host IBA key species or other valuable bird species:

1. Ponds north of Dos Pos – seasonally important for various waterbirds including Caribbean Coot
2. Ponds east of Kralendijk – seasonally important for various waterbirds including Caribbean Coot and Flamingo
3. Urban parrot roosts – important seasonally and possibly year-round for parrots foraging in urban areas
4. Seru Largu – important area for Grasshopper Sparrow (*Ammodramus savannarum*).

2.4 Synthesis

2.4.1 IBA trigger species per island

All in all 18 trigger species occur in the nine IBAs in the Caribbean Netherlands (*Table 19*). The IBAs on the Windward islands of Saba and Sint Eustatius host ten and eleven species respectively. Saba is important for breeding Audubon's Shearwater and Red-billed Tropicbird, seabird species with a high conservation priority. The Saba Coastline IBA is the only IBA in the Caribbean Netherlands that qualifies for Audubon's Shearwater. Saba's IBA qualifies for another seven species which are all year-round residents with a restricted world's breeding distribution. Sint Eustatius is important for the breeding Red-billed Tropicbird, as well as another eight species: Bridled Quail-dove, hummingbirds and songbirds with a restricted range.

The IBAs on the Leeward island of Bonaire host ten trigger species. Some of Bonaire's IBAs are important for breeding seabird species with a high conservation priority like Royal, Sandwich, Common and Least Tern. Furthermore Bonaire's IBAs are important for a number of species with a restricted range, of which Caribbean Coot and Yellow-shouldered Amazon have a high conservation priority.

2.4.2 Conservation priorities

Though all trigger species are in need of conservation measures, the ones that are more threatened or more vulnerable have a higher conservation priority. According to IUCN criteria, two species have the highest conservation priority: the "Near Threatened" Caribbean Coot and the "Vulnerable" Yellow-shouldered Amazon. The other listed species qualify in the category Least Concern (*Table 19*), and are considered to be not threatened. The IUCN criteria, however, are applicable in a worldwide context. Applying the IUCN criteria to seabirds on a Caribbean scale Schreiber (2000) qualified several of the IBA trigger species as more threatened than IUCN suggests. Based on the IUCN-criteria all seabird species qualify in the 'lowest' category "Least Concern". Schreiber's classification lists Audubon's Shearwater as "Near-Threatened", Red-billed Tropicbird, Sandwich Tern, and Least Tern as "Vulnerable", Royal Tern as "Endangered", and Common Tern as "Critically Endangered". Given the most recent insights on seabird taxonomy the IUCN will probably follow Schreiber's classification in the future.

Table 19. Occurrence of trigger species for each IBA, IBA-criterion (see Appendix I), IUCN criterion (IUCN 2001) and -between brackets- regionally adapted criterion for seabirds (Schreiber, 2000): LC = least concern, NT = Near-Threatened, V = Vulnerable, E= Endangered and CE= Critically Endangered.

	Saba	**Sint Eustatius**		**Bonaire**						(IUCN (Schreiber)
Species	AN 006 Saba coastline IBA	AN 007 Boven	AN 008 The Quill	AN 009 Washington-Slagbaai National Park	AN 010 Dos Pos	AN 011 Washikemba-Fontein-Onima	AN 012 Klein Bonaire	AN 013 Lac Bay	AN 014 Pekelmeer Saltworks	
Audubon's Shearwater *Puffinus lherminieri*	B4ii									LC (NT)
Red-billed Tropicbird *Phaethon aethereus*	A4ii	A4ii								LC (V)
Greater Flamingo *Phoenicopterus ruber*				B4i					A4i	LC
Caribbean Coot *Fulica caribaea*							A 1			NT
Royal Tern *Sterna maxima*									B4i	LC (E)
Sandwich Tern *Sterna sandvicensis*				B4i					B4i	LC (V)
Common Tern *Sterna hirundo*				A4i					A4i	LC (CE)
Least Tern *Sterna antillarum*				B4i		B4i	B 4i		B4i	LC (V)
Bridled Quail-dove *Geotrygon mystacea*	A2		A2							LC
Bare-eyed Pigeon *Patagioenas corensis*				A3	A3	A3	A 3	A3	A3	LC
Yellow-shouldered Amazon *Amazona barbadensis*				A1, A2, A3	A1, A2, A3	A1, A2, A3		A1, A2, A3		Vu
Purple-throated Carib *Eulampis jugularis*	A2		A2							LC
Green-throated Carib *Eulampis holosericeus*	A2	A2	A2							LC
Antillean Crested Hummingbird *Orthorhyncus cristatus*	A2	A2	A2							LC

Table 19 continued.

	Saba	**Sint Eustatius**		**Bonaire**						IUCN (Schreiber)
Species	AN 006 Saba coastline IBA	AN 007 Boven	AN 008 The Quill	AN 009 Washington-Slagbaai National Park	AN 010 Dos Pos	AN 011 Washikemba-Fontein-Onima	AN 012 Klein Bonaire	AN 013 Lac Bay	AN 014 Pekelmeer Saltworks	
Caribbean Elaenia *Elaenia martinica*	A2	A2	A2	A2	A2	A2	A2	A2		LC
Pearly-eyed Thrasher *Margarops fuscatus*	A2	A2	A2	A2	A2	A2				LC
Scaly-breasted Thrasher *Margarops fuscus*			A2							LC
Brown Trembler *Cinclocerthia ruficauda*			A2							LC
Lesser Antillean Bullfinch *Loxigilla noctis*	A2	A2	A2							LC

2.4.3 Efficacy of IBAs

IBAs form an important part of a network set up for the conservation of bird species, providing the IBA's spatial and ecological integrity is maintained. IBAs however, have a few **potential** shortcomings that should be taken into consideration when implementing IBAs and preparing management plans:

- Sufficient size and adequate design of IBAs; their size must be large enough compared to home ranges of species, and IBAs must contain critical habitats for trigger species. In our boundary definition and mapping we have addressed these issues for each of the nine IBAs treated.
- Degradation of the unprotected surrounding ecosystems can have profound adverse effects on an IBA
- Inappropriately planned or managed IBAs; insufficient involvement of stakeholders and inadequate attention to compliance are common failures
- IBAs can create an illusion of protection when in fact no protection is offered; so-called paper parks.

The first two shortcomings need to be especially considered for migratory species and seabirds. Currently IBAs for seabirds in the Caribbean (and elsewhere) are primarily aimed at the reproduction areas, whereas also their feeding grounds during the breeding season are essential for their reproductive success and survival . Lack of knowledge on seabird's diets, their feeding areas and the possible threats posed on these areas, however, should not delay the implementation of IBAs. The implementation is a process of learning by doing, parallel to filling in knowledge gaps that are necessary to take appropriate measures or to adjust and fine-tune the measures taken. Despite the potential shortcomings of IBAs a well-managed coherent network of Important Bird Areas will strengthen the long-term conservation of trigger species in the Caribbean Netherlands.

3 Quality Assurance

IMARES utilises an ISO 9001:2008 certified quality management system (certificate number: 57846-2009-AQ-NLD-RvA). This certificate is valid until 15 December 2012. The organisation has been certified since 27 February 2001. The certification was issued by DNV Certification B.V. Furthermore, the chemical laboratory of the Environmental Division has NEN-AND-ISO/IEC 17025:2005 accreditation for test laboratories with number L097. This accreditation is valid until 27 March 2013 and was first issued on 27 March 1997. Accreditation was granted by the Council for Accreditation.

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Appendix I - Global IBA Criteria

A1. Globally threatened species
Criterion: The site is known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern.

Notes: The site qualifies if it is known, estimated or thought to hold a population of a species categorized by the IUCN Red List as Critically Endangered, Endangered or Vulnerable. In general, the regular presence of a Critical or Endangered species, irrespective of population size, at a site may be sufficient for a site to qualify as an IBA. For Vulnerable species, the presence of more than threshold numbers at a site is necessary to trigger selection. Thresholds are set regionally, often on a species by species basis. The site may also qualify if holds more than threshold numbers of other species of global conservation concern in the Near Threatened, Data Deficient and, formerly, in the no-longer recognized Conservation Dependent categories. Again, thresholds are set regionally.

A2. Restricted-range species
Criterion: The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).

Notes: This category is for species of Endemic Bird Areas (EBAs). EBAs are defined as places where two or more species of restricted range, i.e. with world distributions of less than 50,000 km2, occur together. More than 70% of such species are also globally threatened. Also included here are species of Secondary Areas. A Secondary Area (SA) supports one or more restricted-range species, but does not qualify as an EBA because less than two species are entirely confined to it. Typical SAs include single restricted-range species which do not overlap in distribution with any other such species, and places where there are widely disjunct records of one or more restricted-range species, which are clearly geographically separate from any of the EBAs.

A3. Biome-restricted species
Criterion: The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

Notes: This category applies to groups of species with largely shared distributions of greater than 50,000 km2, which occur mostly or wholly within all or part of a particular biome and are, therefore, of global importance. As with EBAs, it is necessary that a network of sites be chosen to protect adequately all species confined to each biome and, as necessary, in each range state in which the biome occurs. The 'significant component' term in the Criterion is intended to avoid selecting sites solely on the presence of one or more biome-restricted species that are common and adaptable within the EBA and, therefore, occur at other chosen sites. Additional sites may, however, be chosen for the presence of one or a few species which would, e.g. for reasons of particular habitat requirements, be otherwise under-represented.

A4. Congregations
Criterion: A site may qualify on any one or more of the four criteria listed below:
i). Site known or thought to hold, on a regular basis, ≥ 1% of a biogeographic population of a congregatory waterbird species.
ii). Site known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species.
iii). Site known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species

iv). Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

Notes

i. This applies to 'waterbird' species as defined by Delaney and Scott (2006) and is modelled on Criterion 6 of the Ramsar Convention for identifying wetlands of international importance. Depending upon how species are distributed, the 1% thresholds for the biogeographic populations may be taken directly from Delaney & Scott, they may be generated by combining flyway populations within a biogeographic region or, for those for which no quantitative thresholds are given, they are determined regionally or inter-regionally, as appropriate, using the best available information.

ii. This includes those seabird species not covered by Delaney and Scott (2002). Quantitative data are taken from a variety of published and unpublished sources.

iii. This is modelled on Criterion 5 of the Ramsar Convention for identifying wetlands of international importance.

iv. Thresholds are set regionally or inter-regionally, as appropriate.

Appendix II - Threat classification method

The issues and threats considered in this report are considered to be external pressures. 'Pressures' such as finance, governance, laws, staff, administration etc are not included. Pressures are forces, activities or events that are taking part in an area and may have a detrimental effect on the natural resources of the Protected Area. Pressures include both illegal and legal activities, and may result from direct and indirect impacts of an activity. Depending on the nature of the pressure it can be seen as an issue or a threat. The score for the pressures is established using a WWF method (Ervin, 2003) where each pressure is given a score out of 4 for its Extent, Impact and Permanence. These are then multiplied and the resulting score gives the degree of pressure. Further explanation is given below.

Extent is the range across which the impact of the activity occurs. The extent of an activity should be assessed in relation to its possible occurrence. For example, the extent of fishing would be measured relative to the total fishable area. The extent of poaching would be measured relative to the possible occurrence of the species population. The extent of nutrient enrichment would likely be measured throughout an entire protected area.

- 4 = "Throughout" means that an activity occurs in 50% or greater of its potential range
- 3 = "Widespread" means occurrence in between 15 and 50% of its potential range
- 2 = "Scattered" occurs in between 5 and 15% of its potential range
- 1 = "Localised" occurs in less than 5% of its potential range

Impact is the degree, either directly or indirectly, to which the pressure affects overall protected area resources. Possible effects from motorized vehicle recreation, for example, could include soil erosion and compaction, stream siltation, noise disturbance, plant damage, disruption of breeding and denning sites of key species, fragmentation of critical habitat, introduction of exotic species and increased access for additional threats, such as poaching.

- 4 = "Severe" impact is serious damage or loss to protected area resources, including soil, water, flora and/or fauna, as a direct or indirect result of an activity.
- 3 = "High" impact is significant damage to protected area resources.
- 2 = "Moderate" impact is damage to protected area resources that is obviously detectable, but not considered significant
- 1 = "Low" impact is damage that may or may not be easily detectable, and is considered slight or insignificant.

Permanence is the length of time needed for the effected PA resource to recover with or without human intervention. Recovery is defined as the restoration of ecological structures, functions and processes to levels that existed prior to the activities occurrence at an impact moderate or above. Recovery time assumes that the activity ceases, and that either management interventions take place, or natural processes are allowed to occur. The degree of permanence will depend on factors such as the type of damage, the ability for human intervention to restore the resources, and/or the regenerative capacity of the resource itself.

- 4 = "Permanent" is damage to a resource that cannot recover naturally, or with human intervention, within 100 years
- 3 = "Long term" damage can recover in 20 to 100 years.
- 2 = "Medium term" damage can recover in 5 to 20 years.
- 1 = "Short term" damage can recover in less than 5 years

Threat level	Score	Descriptor	Possible management approach	Example
Severe	64 48 36	An activity occurs in 50% or greater of its potential range Impact is serious damage or loss to protected area resources, including soil, water, flora and/or fauna, as a direct or indirect result of an activity. Damage that cannot recover naturally, or with human intervention, within 100 years.	Extensive, intervening, on-going management required. Without management the threat will remove a considerable portion of values of the Protected Area. Specific funding and projects, use of international expertise wide range of stakeholders involved.	Invasive goats in Terrestrial Parks. Goats not only eat native vegetation and rare species but degrade the landscape providing a catalyst for erosion whilst removing habitat for other species.
High	32 27	Occurs in between 15 and 50% of its potential range Impact is significant damage to protected area resources. Damage can recover in 20 to 100 years.	Targeted, intervening, on-going specific management actions. Without management the threat will greatly reduce or remove values of the Protected Area, and easily escalate to a severe threat.	Anchoring of commercial ships in a Marine Park; likely to be relatively localised but anchors not only break down the structure of coral reefs and seagrass beds, but also remove habitat which takes many years to recover.
Moderate	24 18 16	Has the potential to be a high threat, but does not occur over more than 15%m of its range OR damage is not significant OR damage can recover in 5 to 20 years.	Targeted monitoring, some intervention and on-going management actions. Without this the threat will reduce Protected Area values or could escalate to a high threat.	Sand mining on beaches is often localised and effects nesting turtle species. Management will be required to prevent the removal of sand especially when turtles are nesting.
Low	12 9 8	Occurs in between 5 and 15% of its potential range. Impact is obviously detectable, but not considered significant. Damage can recover in 5 to 20 years.	Targeted monitoring as part of operational management. Without management Protected Area values could be degraded in the future	Trampling around trails will degrade vegetation, which will be detectable but may not be significant considering the size of the area or the level of the impact. Some areas may become degraded without management intervention.
No Threat	6 5 4 3 2 1	Occurs in less than 5% of its potential range Impact may or may not be easily detectable, and is considered slight or insignificant. Damage can recover in less than 5 years.	Basic observational monitoring during patrols, awareness amongst staff	Litter is usually localised, and often only impacts the aesthetics of the Protected Area. Litter can be removed during patrols or more organised events such as clean ups.

Appendix III- IUCN criteria

The criteria used for the global status of species are based on IUCN (2001).

EX Extinct
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EW Extinct in the wild
A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CR Critically endangered
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

EN Endangered
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

VU Vulnerable
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

NT Near threatened
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LC Least concern
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DD Data deficient
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NE Not evaluated
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

Justification

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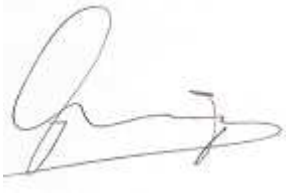
The scientific quality of this report has been peer reviewed by a colleague scientist and the head of the department of IMARES, and two external reviewers.

Approved: Cor Smit
Researcher

Signature:



Date: 8 April 2013

Approved: Jakob Asjes
Department head

Signature:

Date: 26 April 2013