

A Proposal Towards a Dutch Caribbean Marine Mammal Sanctuary

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Executive Summary

Based on the goals set forth in the Dutch Biodiversity Policy Programme, The Netherlands has a traditionally strong commitment to protect biodiversity and marine mammals both internationally and in its own national and Kingdom waters. Last year the responsible ministry, namely the Netherlands Ministry of Economic Affairs, Agriculture and Innovation (EL&I), developed a management plan for the biological resources of the recently declared Dutch Caribbean Exclusive Economic Zone. The Dutch Caribbean EEZ was formally declared on June 10, 2010, and amounts to more than 90.000 km² of diverse tropical marine habitats. One of the key ambition coming forth from that plan was to develop a Dutch Caribbean Marine Mammal Sanctuary (MMS). This report provides the necessary review and background on which to base such an endeavour.

Our updated review establishes beyond doubt that the Dutch Caribbean EEZ has a rich and diverse marine mammal fauna which merits more extensive protection. Even though the fauna is only poorly known, based almost exclusively on incidental sightings and strandings, it amounts to a minimum of 19 marine mammal species, and possibly up to more than 30. Without exception, all documented species appear on protected species lists of one or more treaties ratified by the Kingdom, and/or its constituent countries. Large differences are apparent between the leeward and windward sectors of the Dutch Caribbean EEZ, both in terms of species composition and conservation issues. Throughout the region, cetaceans are playing an increasingly important role in island economies as an important natural attraction for eco-based recreation and tourism, and in this respect the Dutch Caribbean also possesses major potential.

We here propose the establishment of a MMS as the cornerstone to sustainable conservation and management of these charismatic animals. Ecological arguments for the establishment of habitat protection by means of the concept of sanctuaries are outlined, as are the many environmental issues that would eventually need to be addressed within the sanctuary.

Legal designation of a marine mammal sanctuary (MMS) would form the first and most important step which provides the framework for all broader (international cooperation) and in depth (knowledge and conservation development) initiatives. Once established, the fuller implementation of a marine mammal sanctuary should be seen as a gradual process, involving development of knowledge, policy, rules and regulations, public and stakeholder participation. In this the Netherlands would follow and importantly reinforce the efforts of other nations who have already established MMS's within the region.

Favourable pre-conditions for the establishment of a MMS in the Dutch Caribbean include the fact that

- a) all cetaceans already have a legal status in the Dutch Caribbean EEZ which calls for actual protection,
- b) the most deleterious fishing practices are already significantly limited and controlled within Kingdom waters,
- c) the key enforcer, namely the Coastguard, is already strongly present (largely due to other reasons),
- d) the islands generally have a strong tradition of marine protected areas in coastal habitat,
- e) the incremental costs for research and enforcement needed to establish a sanctuary is modest,
- f) public support is high, thanks to the generally high level of development and awareness of the public,
- g) indigenous fishery practices do not conflict with cetacean conservation, and
- h) whale watching interests are only in their infancy.

We conclude our review by proposing the following key action points to establishing a MMS:

- a) Legal designation of the EEZ (one or both sectors) as MMS, along with establishment of legal guidelines for interacting with cetaceans (whale watching).
- b) Establish bonds of cooperation with sister sanctuaries in the region (France, USA, Dominican Republic), (e.g. regional stranding and sightings data network).
- c) Conduct baseline quantitative surveys of cetacean distribution and assessments in light of sources of deleterious sound sources and risks of vessel strikes.
- d) Review and adapt existing national and insular legal frameworks to improve these, preferably by developing separate and standardized marine mammals legislation.
- e) Develop information systems to promote the development of a whale (cetacean) watching industry.
- f) Train and equip marine parks and island veterinarians to conduct elementary autopsies and collect basic stranding specimens for analysis of causes of mortality, contamination levels and genetics, and link them to international academic institutions who will accept and analyse the specimens in regional context.
- g) Develop species action plans (e.g. humpback).
- h) Conduct cetacean surveys and management reviews every 5 years to assess marine mammal status and conservation progress.

Terms of Reference

On the 10th of October 2010, the Netherlands Antilles was divided into new national structure based on the expressed wishes of the inhabitants of these islands. Each island acquired a new status within the Kingdom of the Netherlands. In the process, St. Maarten and Curaçao opted for the status of separate nations within the Kingdom, much as Aruba had already had since 1986, while the islands of Saba, St. Eustatius and Bonaire opted to become special municipalities within the Netherlands proper. Following the declaration of an Exclusive Fishery Zone (EFZ) in 1993, an Exclusive Economic Zone (EEZ) was declared in the Dutch Caribbean on the tenth of June 2010.

The declaration of the Dutch Caribbean EEZ combined with the new responsibilities that the Netherlands assumed towards its new “Caribbean Netherlands” islands, set the stage for the joint development of a nature management plan for the biological resources of the EEZ. The purpose was to outline the manner in which the Caribbean EEZ and the Saba Bank in particular may be used in a sustainable manner, based on a shared vision and common set of goals (see Meesters *et al.* 2010).

One of the key areas of ambition coming forth from this EEZ management plan concerned the topic of marine mammal conservation. This ambition closely follows the intention of the Kingdom with regards to the goals set forth in the Dutch Biodiversity Policy Programme “Beleidsprogramma Biodiversiteit 2008-2011”. In this respect, 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 marine mammals in its own waters and internationally as well.

Hence, the work set forth in this report follows directly from the EEZ natural resource management plan as developed by the former Ministry of Agriculture, Nature and Food Security (LNV). That Ministry was fused with the Ministry of Economic Affairs into a single new Ministry of Economic affairs, Agriculture and Innovation. This ministry continues to actively exercise its mandate with respect to the biodiversity of the Caribbean Netherlands and commissioned this study.

The action points pertaining to marine mammals as formulated in the EEZ nature management plan were as follows:

- a) join the eastern Caribbean marineMMPA mammal sanctuary initiative of neighbouring states by declaring the Dutch Caribbean EEZ as a Marine Mammal Sanctuary (MMS),
- b) develop marine mammal research projects to further evaluate and asses the importance of the EEZ as suggested by previous research. In this it may be optimal to tie into current regional joint projects to identify and quantify marine mammal populations by means of surveys (the French “Agoa” marine mammal sanctuary initiative, the US Stellwagen Bank National Marine Sanctuary (SBNMS) and the “Sanctuario de Mamíferos Marinos de la República Dominicana” (SMMRD).

This report develops both of these ideas further to help pave the way for the implementation of Dutch Caribbean Marine Mammal Sanctuary as well as to draft the basis for regional cooperation for marine mammal conservation.

1 Introduction

The Caribbean Sea is a relatively small, semi-enclosed sea in the Central Western Atlantic. It is shared by many nations and territories and is under high and growing pressures from anthropogenic environmental stressors which include fishing pressure, recreational disturbance, shipping and pollution. The area constitutes critical habitat in the life history of at least 30 cetacean species of which over 60% have already been documented for the Dutch Caribbean waters. The main anthropogenic threats for the marine mammals in the Dutch Caribbean waters are fishing-related mortality, underwater sound, ship strikes, behavioural disturbance (through whale watching e.g.), marine pollution, live capture, climate change and habitat degradation. At the same time these large, wide-ranging and charismatic pelagic species are of significant ecological and growing economic importance to the nations of the region. The only extant marine mammal endemic to the Caribbean is the West Indian manatee, *Trichechus manatus ssp. manatus*, which has recently been recorded as incidental in both sectors of the Dutch Caribbean, and the UNEP has devised a regional action plan for this species (UNEP 2010). The other endemic marine mammal, the West Indian monk seal, *Monachus tropicalis*, historically occurred in the leeward sector and likely near the windward sector of the Dutch Caribbean (Debrot 2000), but is now extinct.

Three appendices to this report (A, B and C), provide a faunistic update and fairly establish the maritime areas of the Dutch Caribbean as possessing a diverse and heterogeneous cetacean fauna (Debrot *et al.* 2011; Debrot *et al.* in press, and Witte *et al.* in prep.) of at least 19 marine mammal species. Probably, between five and ten additional species can be expected to be documented eventually, even based on incidental and opportunistic observations and strandings (Ward *et al.* 2001). Since the statutory changes took place in the Kingdom of the Netherlands in October 2010, the Netherlands has become joint steward and internationally responsible for a considerable marine cetacean biodiversity. In this, a marine mammal sanctuary could form the main cornerstone for cetacean protection, as well as for the sustainable development of cetaceans as an economic resource for the islands. As conservation value is an essential prerequisite for conservation effort, action and expenditure, one purpose of this report was to provide an update of the cetacean fauna and thereby establish its value to conservation. The latest formal assessment (Debrot *et al.* 1998) had been limited to only 70 records for the leeward Dutch Caribbean. In this assessment we expanded the number of records to 209 for the leeward sector and 84 records for the windward sector of the Dutch Caribbean, representing more than a four-fold increase in available information. The bulk of that assessment is provided in the form of three above-mentioned appendices. With the conservation value of the cetacean fauna of the Dutch Caribbean duly established in the appendices, in this report we only give a summary description of the cetacean fauna as the focus of this report is to:

- a) provide an assessment of the feasibility of a marine mammal sanctuary for the Dutch Caribbean,
- b) explain its conceptual and practical conservation value,
- c) sketch the legal setting for such an initiative,
- d) identify the key issues that need to be addressed for its effective implementation, and
- e) provide key action steps by which to achieve a marine mammal sanctuary.

In addressing these topics, this report aims to provide the global and regional context in which a marine mammal sanctuary would fit and discusses the areas that need to be addressed for the sanctuary to fulfil its ultimate purpose which is to ensure that the marine mammals are able to maintain self-sustaining populations throughout their natural range (UNEP 2008). To achieve this goal establishing a MMS should lead to better protection of the species from human influences and protection of enough critical habitat of sufficient quality to maintain viable populations. To achieve this, species specific measures might be required.

2 The Dutch Caribbean EEZ

The Dutch Caribbean EEZ consists of two sectors, a southern sector associated with the leeward ABC-islands (Aruba, Bonaire and Curaçao) lying off the coast of Venezuela, and a northern sector, associated with the windward islands of Saba, St. Eustatius and St. Maarten (Fig. 1). Respectively these sectors have a surface area of approximately 71.198 km² and 21.803 km²). The Dutch Caribbean EEZ, contains large surface areas of valuable marine habitat important to a diversity of marine mammals. These include mangrove and seagrass habitats of former and potential future renewed importance for the endangered West Indian- manatee, shallow coastal habitat used by resident populations of coastal dolphins as nursery areas for their young, expansive shallow bank areas (Saba Bank) likely still calving areas for the endangered humpback whale, as well as deep water upwelling areas of submarine topography important for rare deep-diving beaked whales. In their review paper on the status of marine conservation at the turn of the millennium, Debrot and Sybesma (2000) have roughly outlined the diversity and order of magnitude of various key marine habitats concerned (Table 1).

Tabel 1. Preliminary quantitative overview of coastal habitat categories for the seven territories of the Dutch Antilles (from Debrot and Sybesma 2000)

| | Aruba | Curaçao | Bonaire | St. Maarten | St. Eustatius | Saba | Saba Bank |
|--|------------|------------|------------|--------------|---------------|------------|-----------|
| Capital | Oranjestad | Willemstad | Kralendijk | Phillipsburg | Oranjestad | The Bottom | - |
| Surface area (km ²) | 190 | 444 | 288 | 34 | 21 | 13 | 2200 |
| Total inhabitants | 83600 | 150000 | 14200 | 38000 | 2000 | 1200 | 0 |
| Population density (/km ²) | 440 | 338 | 49 | 1118 | 95 | 92 | 0 |
| Littoral habitats (approx. ha) | | | | | | | |
| Coral reefs | 990 | 4560 | 4372 | 692 | 180 | 14 | 18958 |
| Sea grass beds | 3520 | 494 | 104 | 2799 | 82 | 56 | ? |
| Reefal algal beds | 1247 | 2223 | 3335 | ? | ? | ? | ? |
| Mangroves | 292 | 55 | 79 | 0 | 0 | 0 | 0 |
| Salinas | 0 | 378 | 2178 | 60 | 0 | 0 | 0 |
| Undeveloped coastline (km) | 35 | 90 | 77 | 5 | 20 | 16 | 0 |

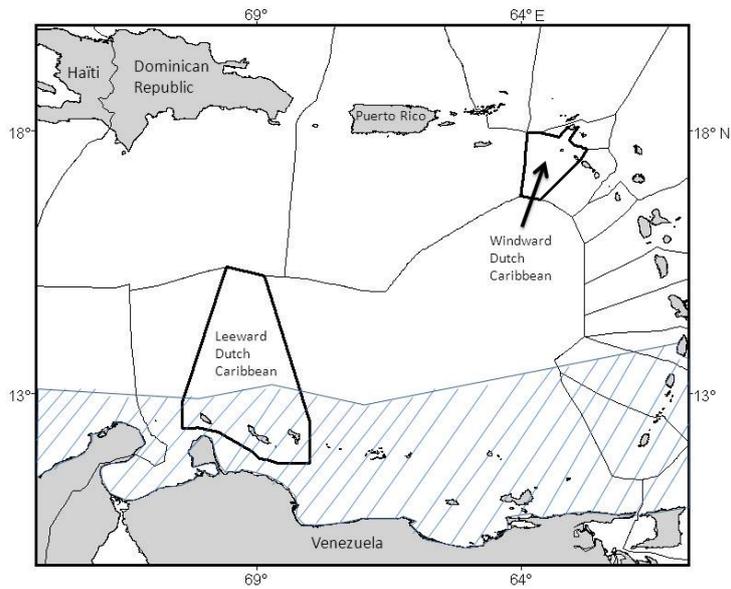


Figure 1. Map of the Caribbean showing the location of the two sectors of the Dutch Caribbean EEZ. The shaded area indicates (roughly) the main upwelling zone of the southern Caribbean.

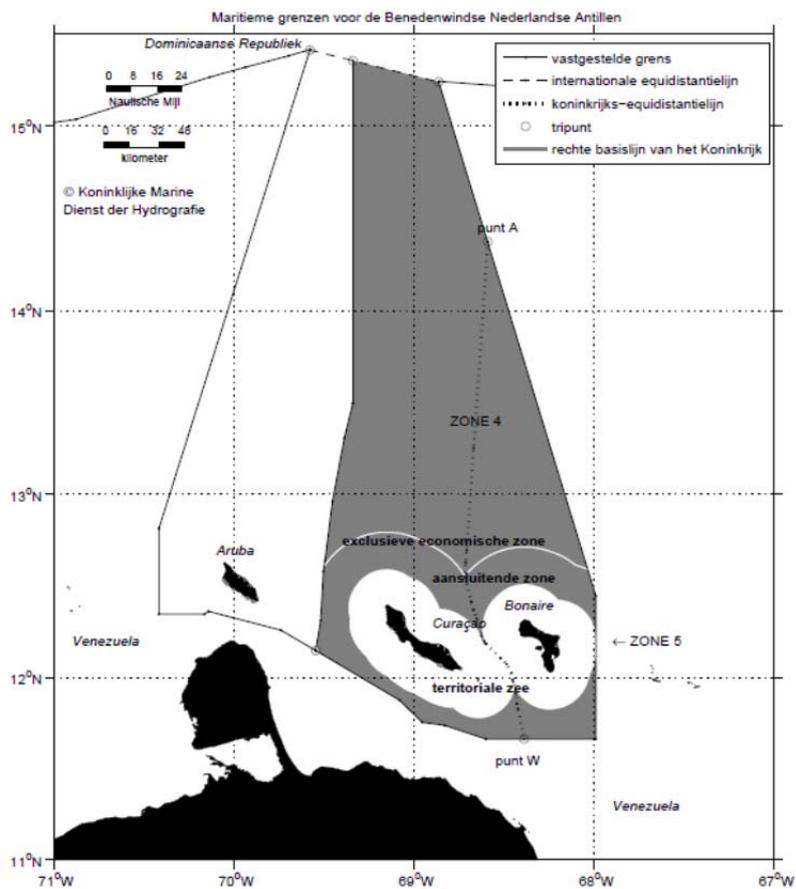


Figure 2. Detailed map of the leeward Dutch Caribbean EEZ sector around the ABC islands (Appendix 1 from "Besluit grenzen exclusieve economische zone van Aruba en de Nederlandse Antillen", Stb. 2010, 277).

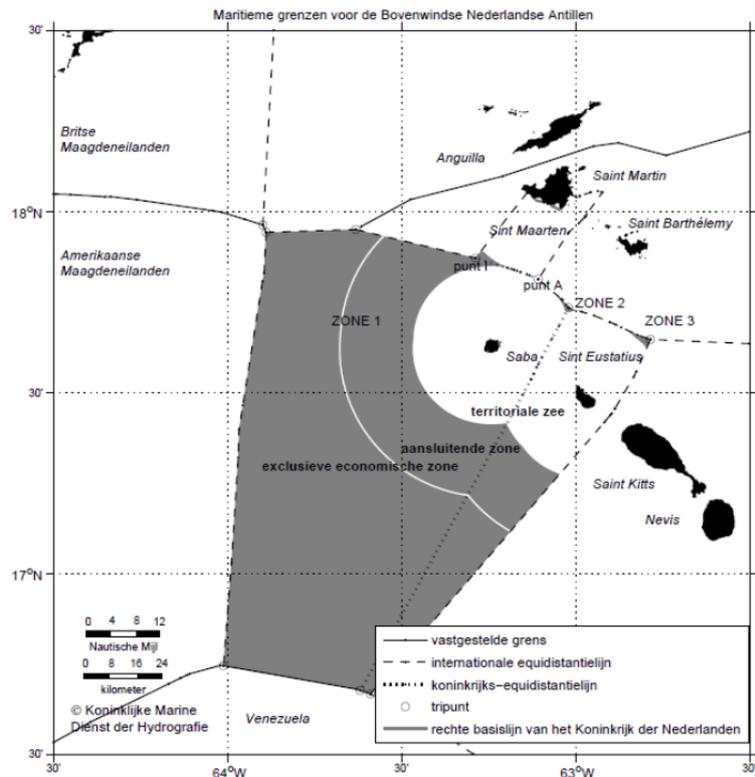


Figure 3. Detailed map of the windward Dutch Caribbean EEZ sector around Saba, St. Eustatius and St. Maarten (Appendix 2 from "Besluit grenzen exclusieve economische zone van Aruba en de Nederlandse Antillen", Stb. 2010, 277).

3 Marine Mammal Fauna

The newly set up marine mammal database for the Dutch Caribbean contains 209 marine mammal records for the leeward islands: 160 sightings and 49 strandings or animals found dead in the water, amounting to 19 confirmed species in total (Table 2). For the windward Dutch Caribbean we compiled 84 marine mammal records comprising 9 previously published records and 75 new records. A total of 8 species are documented, 6 of which are cetaceans. So far 20 different marine mammals species have been documented for the Dutch Kingdom waters; 15 species for Curaçao (including the West Indian Manatee), 15 for Aruba, 11 for Bonaire, 9 for St. Maarten (including an unidentified seal and the West Indian Manatee), 4 for Saba (and the Saba Bank) and 4 for St. Eustatius.



Figure 4. A rare West Indian manatee (center of image) photographed at Playa Ascencion, Curaçao in 2005 (photo: A. Debrot)

Table 2. Overview of extant marine mammal occurrences in the windward and leeward Dutch Caribbean (Debrot et al. 2011, in press; Witte et al. in prep).

| Species | Scientific name | Saba | St Mrt. | St Eust. | Aruba | Bonaire | Curacao. |
|-----------------------|--------------------------------|------|---------|----------|-------|---------|----------|
| blue whale | <i>B. musculus</i> | ? | ? | ? | ? | ? | ? |
| fin whale | <i>B. physalus</i> | ? | ? | ? | ? | ? | ? |
| sei whale | <i>B. borealis</i> | ? | ? | ? | ? | ? | ? |
| Bryde's whale | <i>B. edeni</i> | ? | ? | ? | ? | S | B |
| common minke whale | <i>B. acutorostrata</i> | ? | ? | ? | - | - | - |
| humpback whale | <i>Megaptera novaeangliae</i> | V | V | V | ? | V | V |
| sperm whale | <i>Physeter macrocephalus</i> | B | B | V | S | ? | B |
| pygmy sperm whale | <i>Kogia breviceps</i> | ? | ? | ? | ? | ? | ? |
| dwarf sperm whale | <i>Kogia simus</i> | ? | ? | ? | S | ? | S |
| Cuvier's beaked whale | <i>Ziphius cavirostris</i> | ? | S | ? | S | S | B |
| Blainville's beaked | <i>Mesoplodon densirostris</i> | ? | ? | ? | ? | ? | ? |
| Gervais' beaked whale | <i>Mesoplodon europaeus</i> | ? | ? | ? | S | S | S |
| killer whale | <i>Orcinus orca</i> | ? | ? | ? | V | V | V |
| short-finned pilot | <i>G. macrorhynchus</i> | V | V | ? | S | V | B |

| Species | Scientific name | Saba | St Mrt. | St Eust. | Aruba | Bonaire | Curacao. |
|-----------------------|------------------------------|------|---------|----------|-------|---------|----------|
| false killer whale | <i>Pseudorca crassidens</i> | ? | ? | ? | V | ? | ? |
| pygmy killer whale | <i>Feresa attenuata</i> | ? | ? | ? | ? | ? | ? |
| melon headed whale | <i>Peponocephala electra</i> | ? | ? | ? | ? | B | S |
| rough toothed dolphin | <i>Steno bredanensis</i> | ? | ? | ? | V | ? | V |
| Risso's dolphin | <i>Grampus griseus</i> | ? | ? | ? | S | ? | ? |
| bottlenose dolphin | <i>Tursiops truncatus</i> | V | V | V | V | V | V |
| panropical spotted | <i>Stenella attenuata</i> | ? | ? | ? | V | V | B |
| Atlantic spotted | <i>Stenella frontalis</i> | ? | V | ? | B | ? | ? |
| spinner dolphin | <i>Stenella longirostris</i> | ? | V | V | V | V | V |
| clymene dolphin | <i>Stenella clymene</i> | ? | ? | ? | ? | ? | ? |
| striped dolphin | <i>Stenella coeruleoalba</i> | ? | ? | ? | S | ? | B |
| long beaked common | <i>Delphinus capensis</i> | - | - | - | ? | ? | ? |
| Fraser dolphin | <i>Lagenodelphis hosei</i> | ? | ? | ? | ? | S | ? |
| West Indian manatee | <i>Trichechus manatus</i> | ? | V | ? | ? | ? | V |
| Caribbean monk seal | <i>Monachus tropicalis</i> | † | † | † | † | † | † |
| unid. seal | <i>Pinniped sp.</i> | - | V | - | - | - | - |
| Total native, extant: | | 4 | 9 | 4 | 15 | 11 | 15 |

- = not occurring (as far as known); ? = possible occurring no sightings confirmed; † = extinct; Int. = Introduced/Escaped; S = stranded or found dead; V = (visual) sighted alive; B = both (stranded and sighted alive).

3.1 Windward EEZ

Results suggest that whereas beaked whales and Bryde's whale are more common around the leeward Dutch islands, humpback whales are more common around the windward Dutch islands. In the windward sector, humpback whale sightings amounted to 45% of all records which could mean that the area may form part of its former (or current) calving grounds. This species remains relatively rare in the leeward sector (5% of records) and continues to be targeted by aboriginal fishing in its destination wintering grounds to the east, where the relict breeding population is small compared to historic levels (Reeves et al. 2001, Stevick et al. 1999). The species is of growing interest to tourism in the region and urgently needs full protection from all hunting in the southern Caribbean. In comparison to the leeward Dutch islands (Aruba, Curaçao and Bonaire), documented cetacean strandings were few in the windward islands (St. Maarten, Saba and St. Eustatius).

3.2 Leeward EEZ

The leeward EEZ sector lies downstream from seasonal upwelling areas off Venezuela that support the largest fishery of the Caribbean (Sturm 1991). This sector stands out for its high occurrence of beaked whales (especially Gervais' beaked whale) and the Bryde's whale.

Figure 5 shows the relative frequency of records by species for the leeward Dutch Caribbean. The largest number of records are for the bottlenose dolphin (41) and spinner dolphin (40). These are followed by rorqual whales (20 - including 10 Bryde's whale records) and panropical spotted dolphin (14), short-finned pilot whale (11), humpback whale (10), Gervais' beaked whale (9), sperm whale (8), Atlantic spotted dolphin (8) and Cuvier's beaked whale (7). However, in terms of number of individuals, the spinner dolphin is much more common (1,379) than the bottlenose dolphin (544), followed by short-

finned pilot whale (370) and pantropical spotted dolphin (106). Human induced mortalities and disturbance due to coastal tourism and recreation are key and growing concerns in the southern Dutch EEZ sector.

Bryde’s whales, bottlenose dolphins, spinner dolphins, pantropical spotted dolphins, Atlantic spotted dolphins and rough-toothed dolphins appear to be present year-round in the waters of the leeward islands. Humpback whale, sperm whale, Gervais’ beaked whale, Cuvier’s beaked whale, killer whale and short-finned pilot whales occur here at least part of the year.

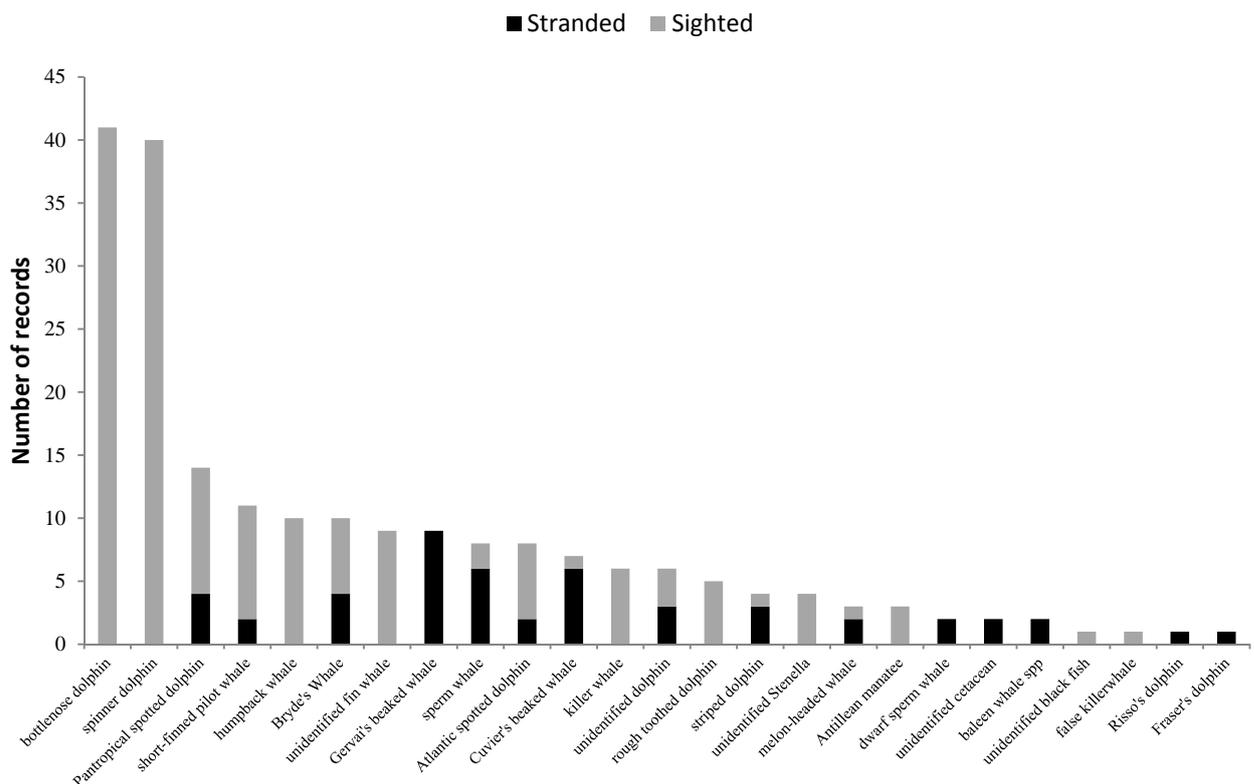


Figure 5. Number of cetacean records (strandings in black, sightings in grey) for all cetacean species recorded for the leeward Dutch Caribbean.

Marine mammal strandings are much more common in the leeward Dutch Caribbean (24%) than in the windward Dutch Caribbean (3% of records) and may have increased in recent decades (Figure 6). In the last 5-year period (2005-2009), reported strandings appear to have been lower. While temporal development in overall strandings appear evident, it is not clear whether this represents an actual increase in cetacean stranding rates, or in the likelihood of detection due to the general increase in (public) interest in cetaceans.

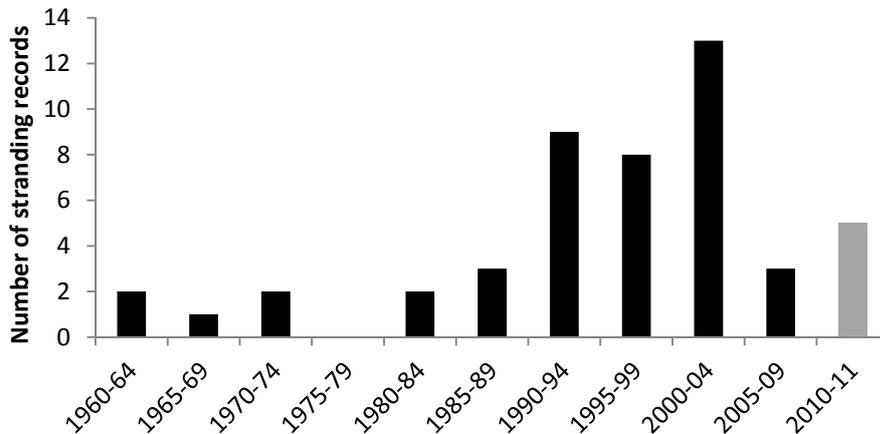


Figure 6. Number of recorded strandings in the leeward Dutch Caribbean islands, per five-year periods from 1960 to 2009 (black, n = 43). Strandings for the two year period 2010-2011 are in grey.

There is no clear seasonal pattern in the occurrence of pooled cetacean records (across species) in the leeward islands (Figure 7), although the data suggest a bimodal pattern with peaks in the first and third quarters of the year. A bimodal annual pattern has also been suggested for the occurrence of important baitfish in the leeward Dutch Caribbean (Zaneveld 1962) which might explain the pattern for the marine mammals.

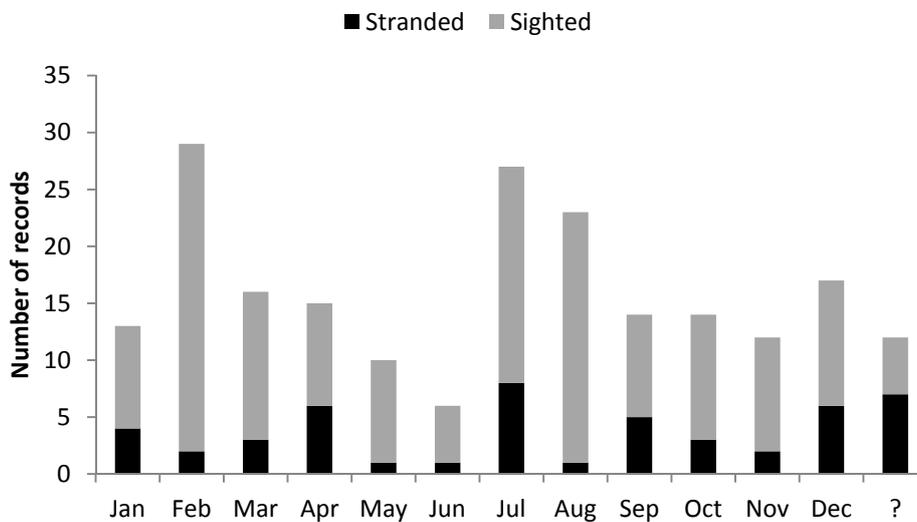


Figure 7. Distribution of combined species records according to calendar month for the leeward Dutch Caribbean.

For more detailed information on the marine mammals of the two EEZ sectors of the Dutch Caribbean we refer to appendices A, B and C.

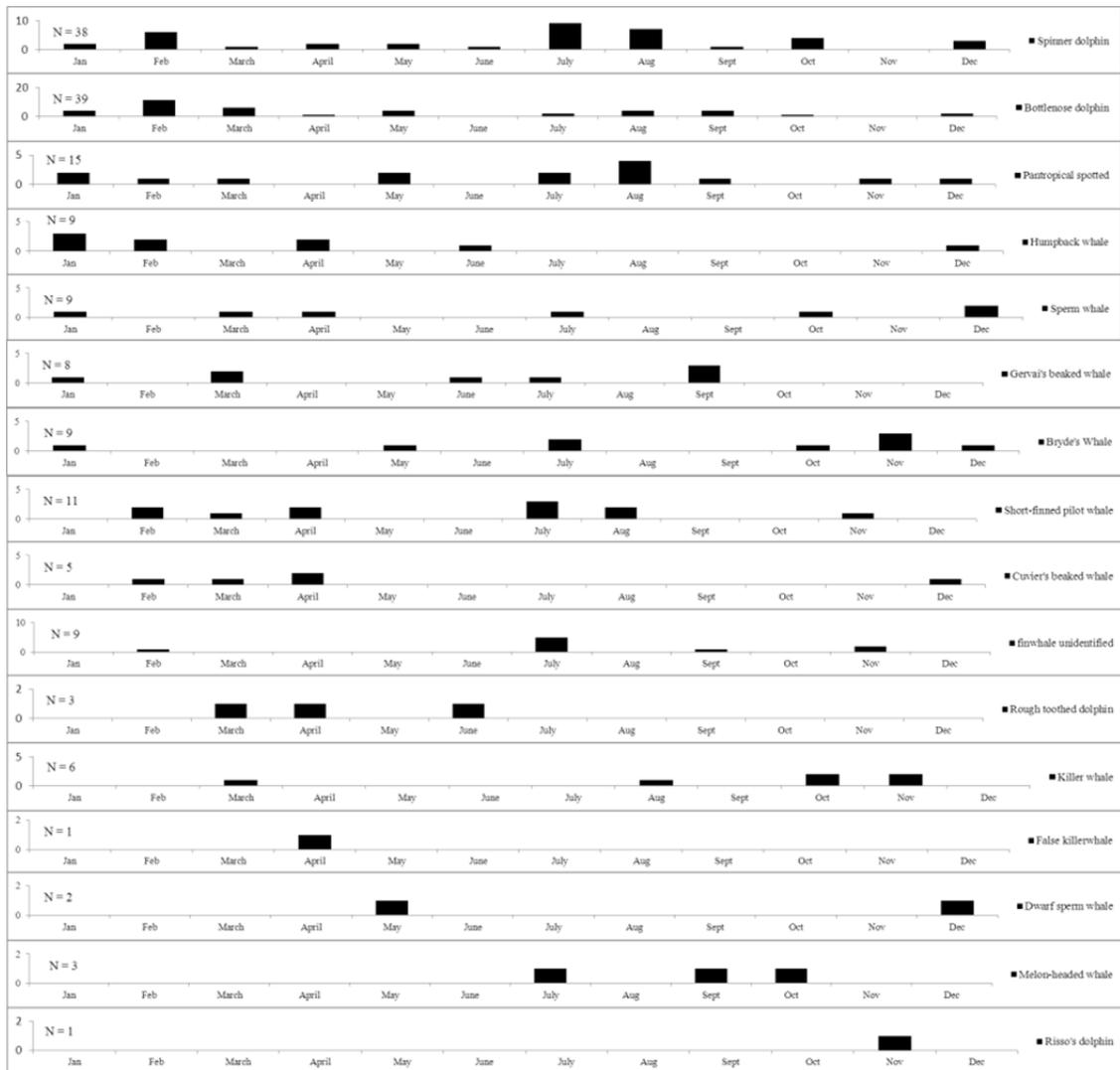


Figure 8. Numbers of records by month for all extant cetacean species documented in the leeward Dutch Caribbean islands.

4 History of Marine Mammal Sanctuaries

Origins: The first international Marine Mammal Sanctuary was established in the Antarctic in 1938, to protect whales in an area of the sea where they were not (yet) subject to commercial whaling. The second Marine Mammal Sanctuary was established by the international whaling nations (IWC) in 1979, extending south to 55°S latitude. As with the Antarctic sanctuary, every ten years the continuation of this sanctuary is up for review. Two additional proposals for the establishment of sanctuaries in the South Atlantic and South Pacific have been pending for a number of years, but as yet have failed to achieve the three-quarters majority of votes needed to change become designated IWC Sanctuaries.

In the concept of the International Whaling Commission (IWC), Marine Mammal Sanctuaries are waters closed to commercial whaling (IWC 2005). However, in the case of the Dutch Caribbean, whaling is no issue. For the Dutch Caribbean, therefore, the idea for marine mammal sanctuary is to establish a marine protected area where the cetaceans can benefit even more extensive protection from mortality (e.g. from becoming by-catch in fishing gear) and disturbance. Hoyte (2011) provides an extensive worldwide review and handbook for cetacean habitat conservation and planning.

First Caribbean MMS: The first Caribbean marine mammal sanctuary was established in October 1986, with the “Silver Bank Humpback Whale Sanctuary” when the Dominican Republic decided to protect the mating, calving and nursery grounds of humpback whales. In 1996, the sanctuary was extended to include Navidad Bank and part of Samana Bay, covering the three main humpback breeding areas in Dominican waters. At this time the sanctuary was renamed Sanctuario de Mamíferos Marinos de la República Dominicana (Marine Mammal Sanctuary of the Dominican Republic), or SMMRD in Spanish. Today, the SMMRD protects all marine mammals within its 19,438-square-mile area.

Caribbean Marine Mammal Action Plan: One of the goals of UNEP's Specially Protected Areas and Wildlife (SPA) Protocol is to develop specific regional and national management plans for endangered, threatened or vulnerable species in support of national biodiversity conservation efforts. In order to achieve this, Parties of SPAW developed a draft Marine Mammal Action Plan (MMAP) for the Wider Caribbean Region (WCR) in 2005 (UNEP 2005).

French MMS initiative announced: By means of a July 27th, 1995 decree, all marine mammals found in all French Caribbean territorial waters are integrally protected. At the plenary session of the International Whaling Commission in St Kitts & Nevis in June 2006, France presented its project for a marine mammal sanctuary in the French West Indies. In 2006, the Contracting Parties to the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region provided the first international recognition of the French initiative. The resulting AGOA Marine Mammal Sanctuary is further discussed under

Sister Sanctuary Agreement: In 2006 a “sister sanctuary agreement”, was also established between the Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts and the SMMRD of the Dominican Republic. The rationale behind the agreement was to help foster management coordination between the two marine protected areas (which cover both the breeding and the feeding grounds of the same whale population) and to help improve humpback whale recovery in the North Atlantic. The two sanctuaries embarked on exploring new avenues, including joint research, monitoring, education and capacity building programmes.

It's not unlikely that at least some of the humpback whales from these sanctuaries mate or breed at or near the Saba Bank. For trans-boundary species such as the endangered humpback whale, sister sanctuaries can serve as stepping stones for protection throughout an ocean basin (Ward 2007).

5 Ecological Arguments for the Need for Sanctuaries

Aside from species protection, **area or habitat protection** is a key concept in ecology. It stems from the realization that protected animals cannot survive where the habitat that they need is not also protected. The critical importance of habitat protection is easy to understand for a site bound organism, but is gradually also being applied to migratory species whether they be butterflies, birds or in this case cetaceans. The establishment of habitat-linked protection is a new and growing process in marine mammal conservation.

Because cetaceans are highly mobile, often migrating thousands of kilometres per year during the course of their normal life functions, the concept of a connected **network of protected areas** is emerging (and hence the need for international cooperation among sanctuaries). For the most seasonally migratory species (such as proposed for the humpback whale), protection is not only needed in their summer feeding grounds but also in their warm winter calving grounds. Finally the areas designated as protected habitat need to be **sufficiently large** to provide meaningful protection. Here, the concept of minimal viable population (MVP) comes into play. In cetaceans the size of sanctuaries takes on new meaning due to the fact that anthropogenic sounds in the marine environment have been shown to travel long distances in water and form a proven threat to the health and survival of marine mammals. By protecting habitat extra emphasis is/ or can also be given to the preservation of habitat quality (habitat types needed during the various life stages, free of disturbance and pollution, and with sufficient food).

Finally, in light of global environmental change which is occurring increasingly rapidly, habitat protection, which focuses not on species but whole habitats and ecosystems is the **only way to build resilience in the ecosystem** needed, not only to support marine mammals, but also the whole diverse life-support system for marine biodiversity.

For the above reasons marine protected areas are more and more being seen to form a cornerstone for marine biodiversity and also cetacean conservation. A marine mammal sanctuary by definition focuses on habitat protection and regional habitat connectivity for both migratory and residential regional cetacean populations. The location of the two sectors of the Dutch Caribbean EEZ would complement and reinforce the regional sister sanctuaries in the context of both habitat quality and ecological connectivity (see also Figure 10).

6 Economic Potential

Marine mammals are spectacular animals that are of growing significance to recreation and tourism throughout the Caribbean region as well as in the Dutch Caribbean. As the popularity of and access to cetaceans grows, they are of growing importance as key species to the sustainable economic development of coastal communities throughout Latin-America and the Caribbean (B. Galletti, CCC, Chile, 2011 winner Future for Nature Awards). Their economic value is no longer as an industrial fisheries resource but in terms of experiential recreational and touristic value as they provide visitors of the coastal zone with memories that last a life long. They even open possibilities for whale watching as a distinct product once a minimum dependable density of cetaceans is reached. Live cetaceans bring economic and ecosystem advantages to many island nations year after year (Scarpaci and Parsons 2011). Therefore, they are certainly worth more to man alive than dead, but many (nations) in the eastern Caribbean apparently still do not appreciate this, or do not know how to make the switch.

While whale watching in the Caribbean has grown in recent years to an important new 10+ million dollar a year industry, it continues to have additional potential. To achieve this, first adequate protection and recovery are needed. Such has been the case in Curaçao with sea turtles. Until the 1990's sea turtles were so rare that they were only sporadically seen. However, since their legal protection by the island government in 1996, numbers have rebounded to the extent that sea turtle sighting can today be offered as a major attraction in various areas of the island (e.g. Debrot *et al.* 2005). The same is the case in Bonaire and Aruba. Likewise, for the leeward Dutch islands to truly benefit from the potential of marine mammals, protection must come first. The most spectacular species without question for ecotourism is the humpback whale but sightings of other species are exciting to tourists as well. The results of our study show that marine mammals, particularly the endangered and targeted humpback whale make notably regular and consistent use of the windward Dutch EEZ, but remain rare in the leeward sector. However, this species, along with others, continues to be hunted on artisanal scale in the eastern Caribbean. This activity is based in St. Vincent and the Grenadines which have a IWC regulated quota for 20 humpback whales for the period 2002-2007.

The St. Maarten Nature Foundation conducted a Marine Mammal Census project which lasted from February until May 2011. The goal of this project was to conduct a wide scale census of all Marine Mammals found in St. Maarten territorial waters, including within the Man of War Shoal Marine Park. As a result of this study, several questions were answered concerning abundance, seasonality, migration routes and the feasibility of regulated wild whale and dolphin watching trips. If the distribution of both the humpback whale and dolphin species are consistent with this initial data, then structured dolphin and whale watching tours are a real possibility on St. Maarten, especially between the months of January and March, which coincide with the peak of the tourist high season. The economic benefits of whale watching tours can be a significant boost to the economy of St. Maarten (SMNF 2011). Of course, whale watching would have to follow strict rules to ensure that the animals are not harassed through wrong behaviour by individual mariners and/ or by too many whale watching vessels at the same time (i.e. the need for a code of conduct).

Cetacean Hotline

To make cetaceans more available for sighting to all interested parties, it would be especially valuable to have a hotline where mariners can report their sightings and coordinates real time. By doing this and making the information available on-line, other interested parties could easily determine which direction to navigate to increase chances of a successful whale watching trip. The marine parks of each island would be ideal organizations to run such a hotline, not only as a public service but also in support of

research and conservation. Such a hotline could also serve to report and inform about other charismatic species of interest to nature buffs, such as manta rays and whale sharks.

7 Favourable Preconditions for Implementations

Legal designation of a marine mammal sanctuary would form the first and most important step which provides the framework for all broader (international cooperation) and in depth (knowledge and conservation development) initiatives. Once established, the fuller implementation of a marine mammal sanctuary is a gradual process, involving development of knowledge, policy, rules and regulations, public and stakeholder participation. An example of a recent marine mammal sanctuary choosing for this approach has been the AGOA Marine Mammal Sanctuary of the French Caribbean. After establishment, their first large project has been to conduct a quantitative survey to help identify priority areas and species, for research and conservation.

Establishment of a MMS is also a dynamic process as new and heretofore unrecognized threats to marine mammals become known and as the wide-sweeping effects of global change come into play. As in all management processes, a cycle of implementation, review, evaluation prioritization and adaptation would be in order.

The Dutch Caribbean would embark on this process with a significant advantage in that:

- a) all cetaceans already have a legal status in the Dutch Caribbean EEZ which calls for actual protection,
- b) the most deleterious fishing practices are already significantly restricted and controlled within Kingdom waters,
- c) the key enforcer, namely the coastguard, is already strongly present (largely due to other reasons),
- d) the islands by and large have a strong tradition of marine protected areas in coastal habitat,
- e) the incremental costs for research and enforcement needed to establish a sanctuary would be modest,
- f) public support is high, thanks to the generally high level of development and awareness of the public,
- g) absence of conflict with the indigenous fishery practices,
- h) whale watching interest which are recently being promulgated and growing are still only in their infancy. To introduce guidelines now is much easier than later, after practices, expectations and perceived rights are firmly embedded.

8 Legal Context for a Marine Mammal Sanctuary

This chapter describes the legal context that needs to be considered when establishing a marine mammal sanctuary. Such legal context that applies to a marine mammal sanctuary in the Dutch Caribbean can refer to context at the global, regional, national and insular levels.

8.1 Global

ICRW, 1946

The purpose of the International Convention for the Regulation of Whaling is to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry (ICRW 1946). The International Whaling Commission (IWC), the body created to implement the ICRW, treats the baleen whales and the sperm whale as protected species. Some convention members do not recognize the IWC's competence over small cetaceans. However, the IWC Scientific Committee's Subcommittee on Small Cetaceans reviews the status of populations and strategies for addressing specific conservation problems facing small cetaceans.

Stockholm, 1972

The UN 1972 Stockholm "Declaration on the Human Environment" and the "Action Plan for the Human Environment" highlight and recognize international obligations and point to the means to ensure compliance (via the 109 recommendations from the Action Plan). The Stockholm conference was the first global environmental meeting of governments, which stated that long-term economic progress needs to be linked with environmental protection. According to this declaration, natural resources, including flora, fauna and representative samples of natural ecosystems, must be safeguarded for present and future generations through careful planning and management (Sohn 1973). In Rio 1992 (see CBD below) this Declaration was reaffirmed and built upon.

CITES, 1973

The Convention on International Trade in Endangered Species of Flora and Fauna (CITES) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of endangered species. States that have agreed to be bound by the Convention ('joined' CITES) are known as Parties. Although CITES is legally binding—it does not take the place of national laws. Rather it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level (CITES 1979).

CITES lists all of the baleen whales, the sperm whale, the tucuxi (*Sotalia fluviatilis*) and the West Indian manatee in Appendix I as species in danger of extinction and that are or may be threatened by trade. Most other small cetaceans that occur in the wider Caribbean are in Appendix II, listed as species that may become threatened with extinction unless trade is regulated.

MARPOL, '73/'78

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the most important convention for the protection of the marine environment from ship pollution from accidental or operational causes. This convention is of special relevance to the conservation of marine mammals because they have been shown to be very vulnerable to several forms of pollution such as oil pollution and trophic concentration of dangerous man-made contaminants. The convention has been ratified by the majority of states relevant for international maritime transport based on the percentage of the world tonnage they represent. The Convention contains regulations for the prevention of pollution by oil (Annex

1) and requires all new oil tankers to have double hulls to reduce the risk of accidental discharge. Annex II contains regulations and discharge criteria and measures for noxious liquid substances in bulk. Discharge is never permitted within 12 miles of any coast, while areas designated as special areas have more stringent restrictions. Annex III governs pollution by harmful substances carried in packaged form; Annex IV governs the control of sewage pollution at sea and Annex V regulates pollution by garbage and totally prohibits the dumping of all forms of plastic. This Annex allows for the designation of some seas as special areas where stricter rules may apply. The Caribbean Sea including the Gulf of Mexico and Wider Caribbean Area were included in that list of special areas and this will take effect from May 2011. Annex VI of MARPOL governs air pollution from ships. The Netherlands Antilles has been party to the convention since 1973.

CMS, 1979

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. Important countries for Caribbean marine mammals, such as Venezuela, Colombia, Guiana and Suriname are not parties to this convention. This convention lists all great whales except for the Bryde's whale as "endangered" (Appendix 1) and most small cetaceans as "potentially benefitting significantly from international cooperation" (Appendix 2). The CMS provides a mechanism for the development of legally binding regional agreements on marine mammals. The Netherlands Antilles is party to this convention as well.

UNCLOS, 1982

The most comprehensive international agreement on the seas is the United Nations *Convention on the Law of the Sea* of 1982 (UNCLOS III) which came into force in 1994, and the Netherlands Antilles are a contracting party. It addresses the prevention of pollution and recognizes the duty of care of all states with regard to the marine environment. The Convention is comprehensive in its treatment of the duty of states to protect the marine environment. It expressly states that standards and procedures must be implemented in keeping with international rules and standards, and that states should develop the rules and systems to protect the environment in specific contexts. The development of systems of implementation however is the duty of specialist agencies of regional or global scope. In this context, the *International Maritime Organization* (IMO) and its Conventions as well as the *Caribbean Region's Environmental Maritime Treaties*, the *Cartagena Convention* and its protocols are instructive for the Caribbean Region. Of importance as well, is the fact that UNCLOS is recognized as creating international obligations only by states that have signed and ratified the convention. Notably absent from this group are two important states for this region: Venezuela and the United States of America. For non-signatory states, customary international law and less comprehensive treaties still provide policy coverage on many overlapping matters.

With respect to marine mammals, Article 65 of UNCLOS, declares that states are to "*co-operate with a view to the conservation of marine mammals and in the case of cetaceans shall in particular work through the appropriate international organizations for their conservation, management and study.*" Article 194(5) further states that "*measures must be taken to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species*". Finally, Article 244(2) encourages States to "*actively promote the flow of scientific data and information and the transfer of knowledge resulting from marine scientific research.*"

MMAP, 1984

The basic objective of the Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals (MMAP) is *"to promote the effective implementation of a policy for conservation, management and utilisation of marine mammals which would be widely accepted to governments and the public"*. The MMAP is built around five concentration areas namely; policy formulation, regulatory and protective measures, improvement of scientific knowledge, improvement of law and its application and enhancement of public understanding. Species covered by the Action Plan include all strictly marine species of mammals (cetaceans, pinnipeds and sirenians), as well as riverine species of dolphins, seals and otters.

CBD, 1992

The Convention on Biological Diversity is dedicated to promoting sustainable development. Conceived as a practical tool for translating the principles of Agenda 21 (of the 1992 UN Conference on Environment and Development) into reality, the Convention recognizes that biological diversity is about more than plants, animals and microorganisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. Therefore it puts sustainable development as the foundation for environmental protection. The Netherlands Antilles have been party to the Convention of Biological Diversity since 1992.

Principle 4 of this convention is instructive: *"In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it"*. Principle 7 emphasizes that states should *"cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem"*. Principle 12 encourages consensus before taking action to deal with global or trans-boundary environmental issues. It recognizes that effective environmental governance will only be sustainable with the participation of all stakeholders.

BWN, 2004

Another important international convention for the protection of the marine environment is the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) adopted in 2004, due to enter into force after ratification by 30 states that together should represent 35 per cent of world-wide merchant shipping tonnage. The aim is to curb the spread of harmful organisms and pathogens in the ballast water and sediments of ships from one region to another. Ballast water is used to provide stability of ships. Larger ships, including cruise ships, take ballast water when the ship is without cargo in one region and discharge this water when cargo is loaded in another region. Mixed in with ballast water, biological materials are also discharged. These often are non-native species that destroy the balance of ecosystems in the areas where this water is discharged or pathogens which may affect cetaceans and cause epidemics. So far the convention has been signed by only 27 states, accounting for just over 25% of world tonnage (as compared with the MARPOL Annexes which average over 85% of world tonnage). Therefore, it is not yet in effect.

Ramsar (wetlandsconvention) (Ramsar, Iran 1971)

The oldest international treaty of importance to coastal habitat important to marine mammals is the Ramsar wetlands convention, particularly with respect to habitat on Bonaire. Parties are obligated to protect and conserve designated aquatic habitat. For Bonaire the Ramsar wetlands of relevance to marine mammals are the 800 ha Lac Bay (a mangrove lagoon with important nursery function for food fish for coastal cetacean species and mangrove pool habitat typical for the endangered manatee (Debrot et al. 2006), and the shallow coastal areas surrounding Klein Bonaire, an official Ramsar wetland and habitat to coastal dolphins. In 2007 important jurisprudence was created when the Crown halted

construction plans at Lac based on Ramsar treaty obligations (Verschuuren 2008). Hence this legislation provides very real protection to essential cetacean habitat.

8.2 Regional

Cartagena Convention and its SPAW Protocol 1990.

The principal international convention that relates to the protection of cetaceans at the regional level in the Caribbean area is the Cartagena Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region of 1983 and its protocols, particularly the “Specially Protected Areas and Wildlife Protocol” (SPAW 1990). This convention was signed by the Netherlands Antilles on 24 March 1983. It was ratified on 16 April 1984. The SPAW protocol was signed on 18 January 1990 and ratified on 2 March 1992.

Table 3 provides the IUCN Red List status for the species occurring in the WCR and in the Dutch Caribbean. As can be seen, only two species documented for the Dutch Caribbean are considered vulnerable to extinction at this point in time. These are the sperm whale and the West Indian manatee. All other species are classified as either “least concern” (9 species) or “data deficient” (7 species). For most of these species very little is known about their population biology, and conservation status in the region.



Figure 9. Spinner dolphins off St. Eustatius (photo: T. Bervoets)

Table 3: IUCN Red List status of marine mammals occurring in the WCR (IUCN 2008). Species names in bold letters indicate those species documented for the Dutch Caribbean.

| Species | Scientific name | IUCN status | IUCN trend | Red List EEZ |
|------------------------------------|-------------------------|------------------------|-------------------|--------------|
| North Atlantic right whale | Eubalaena glacialis | Endangered | Unknown | |
| blue whale | B. musculus | Endangered | Increasing | |
| fin whale | B. physalus | Endangered A1d | Unknown | |
| sei whale | B. borealis | Endangered | Unknown | |
| Bryde's whale | B. edeni | Data deficient | Unknown | |
| common minke whale | B. acutorostrata | Least concern | stable | |
| humpback whale | Megaptera novaeangliae | Least concern | Increasing | Vuln. |
| sperm whale | Physeter macrocephalus | Vulnerable A1d | Unknown | Vuln. |
| pygmy sperm whale | Kogia breviceps | Data deficient | Unknown | |
| dwarf wperm whale | Kogia simus | Data deficient | Unknown | |
| Cuvier's beaked whale | Ziphius cavirostris | Least concern | Unknown | |
| Blainville's beaked whale | Mesoplodon densirostris | Data deficient | Unknown | |
| Sowerby's beaked whale | Mesoplodon bidens | Data deficient | Unknown | |
| Gervais' beaked whale | Mesoplodon europaeus | Data deficient | Unknown | |
| True's beaked Whale | Mesoplodon mirus | Data deficient | Unknown | |
| killer whale | Orcinus orca | Data deficient | Unknown | |
| long-finned pilot | Globicephala melas | Data deficient | Unknown | |
| short-finned pilot whale | G. macrorhynchus | Data deficient | Unknown | |
| false killer whale | Pseudorca crassidens | Data deficient | Unknown | |
| pygmy killer whale | Feresa attenuata | Data deficient | Unknown | |
| melon headed whale | Peponocephala electra | Least concern | Unknown | |
| tucuxi | Sotalia fluviatilis | Data deficient | Unknown | |
| guiana dolphin | Sotalia guianensis | Data deficient | Unknown | |
| rough toothed dolphin | Steno bredanensis | Least concern | Unknown | |
| risso's dolphin | Grampus griseus | Least concern | Unknown | |
| bottlenose dolphin | Tursiops truncatus | Least concern | Unknown | |
| pantropical spotted dolphin | Stenella attenuata | Least concern | Unknown | |
| Atlantic spotted dolphin | Stenella frontalis | Data deficient | Unknown | |
| spinner dolphin | Stenella longirostris | Data deficient | Unknown | |
| clymene dolphin | Stenella clymene | Data deficient | Unknown | |
| striped dolphin | Stenella coeruleoalba | Least concern | Unknown | |
| short beaked common dolphin | Delphinus delphis | Least concern | Unknown | |
| long beaked common dolphin | Delphinus capensis | Data deficient | Unknown | |
| fraser dolphin | Lagenodelphis hosei | Least concern | Unknown | |
| boto | Inia geoffrensis | Data deficient | Unknown | |
| West Indian manatee | Trichechus m. manatus | Vulnerable A3cd | Decreasing | Vuln. |
| Caribbean monk seal | Monachus tropicalis | Extinct | none | Ext. |
| hooded seal | Cystophora cristata | Vulnerable | Declining | Vuln. |

Table 4: Relevant convention appendices in which WCR marine mammal species are mentioned.

| Species | Scientific name | CITES | Unclos | SPAW | CMS | CMS POP | IWC |
|------------------------------------|--|-----------|----------|-----------|-------------|-----------------|---|
| North Atlantic right whale | <i>Eubalaena glacialis</i> | I | I | II | I | | protected ww |
| blue whale | <i>B. musculus</i> | I | I | II | I | | protected ww special permit and commercial whaling under objection |
| fin whale | <i>B. physalus</i> | I | I | II | I | COP7 | special permit catches |
| sei whale | <i>B. borealis</i> | I | I | II | I | COP7 | special permit catches |
| Bryde's whale | <i>B. edeni</i> | I | I | II | II | COP7 | protected ww commercial catches under objection and subsistence catches |
| common minke whale | <i>B. acutorostrata</i> | I | I | II | | | protected ww; local subsistence whaling |
| humpback whale | <i>Megaptera novaeangliae</i> | I | I | II | I | | |
| sperm whale | <i>Physeter macrocephalus</i> | I | I | II | I/II | COP7 | protected ww |
| pygmy sperm whale | <i>Kogia breviceps</i> | II | I | II | II | | protected ww |
| dwarf sperm whale | <i>Kogia simus</i> | II | I | II | II | | protected ww |
| Cuvier's beaked whale | <i>Ziphius cavirostris</i> | II | I | II | II | | protected ww |
| Blainville's beaked whale | <i>Mesoplodon densirostris</i> | II | I | II | | | protected ww |
| Sowerby's beaked whale | <i>Mesoplodon bidens</i> | II | I | II | | | protected ww |
| Gervais' beaked whale | <i>Mesoplodon europaeus</i> | II | I | II | II | | protected ww |
| True's beaked whale | <i>Mesoplodon mirus</i> | II | I | II | | | protected ww |
| killer whale | <i>Orcinus orca</i> | II | I | II | II | | protected ww |
| long-finned pilot whale | <i>Globicephala melas</i> | II | I | II | | COP2 | protected ww |
| short-finned pilot whale | <i>G. macrorhynchus</i> | II | I | II | II | | protected ww |
| false killer whale | <i>Pseudorca crassidens</i> | II | I | II | II | | protected ww |
| pygmy killer whale | <i>Feresa attenuata</i> | II | I | II | | | protected ww |
| melon headed whale | <i>Peponocephala electra</i> | II | I | II | II | | protected ww |
| tucuxi | <i>Sotalia fluviatilis</i> | I | I | II | II | | protected ww |
| Guiana dolphin | <i>Sotalia guianensis</i> | I | I | II | | | protected ww |
| rough toothed dolphin | <i>Steno bredanensis</i> | | I | II | | | protected ww |
| Risso's dolphin | <i>Grampus griseus</i> | II | I | II | II | not Car. | protected ww |
| bottlenose dolphin | <i>Tursiops truncatus</i> | II | I | II | II | not Car. | protected ww |
| pantropical spotted dolphin | <i>Stenella attenuata</i> | II | I | II | II | COP6 | protected ww |
| Atlantic spotted dolphin | <i>Stenella frontalis</i> | II | I | II | II | | protected ww |
| Spinner dolphin | <i>Stenella longirostris</i> | II | I | II | II | COP6 | protected ww |
| clymene dolphin | <i>Stenella clymene</i> | II | I | II | II | not Car. | protected ww |
| striped dolphin | <i>Stenella coeruleoalba</i> | II | I | II | II | not Car. | protected ww |
| short-beaked common dolphin | <i>Delphinus delphis</i> | II | I | II | | | protected ww |
| long-beaked common dolphin | <i>Delphinus capensis</i> | II | I | II | | | protected ww |
| fraser Dolphin | <i>Lagenodelphis hosei</i> | II | I | II | II | | protected ww |
| boto | <i>Inia geoffrensis</i> | II | I | II | | | protected ww |

| Species | Scientific name | CITES | Unclos | SPAW | CMS | CMS POP | IWC |
|---------------------|-----------------------------------|-------|--------|------|-----|---------------------|-----|
| West Indian manatee | <i>Trichechus manatus manatus</i> | I | | II | | Panama and Honduras | |
| Caribbean monk seal | <i>Monachus tropicalis</i> | I | | | | | |
| hooded seal | <i>Cystophora cristata</i> | III | | II | | | |

The Cartagena Convention was adopted in Cartagena, Colombia on 24 March 1983 and entered into force on 11 October 1986, for the legal implementation of the Action Plan for the Caribbean Environment Programme.

The Cartagena Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region is a comprehensive, umbrella-agreement for the protection and development of the marine environment. This regional environmental convention provides the legal framework for cooperative regional and national actions in the WCR.

The Dutch Caribbean is party to the UNEP's Specially Protected Areas and Wildlife Protocol (SPAW). This Protocol has been internationally recognized as the most comprehensive treaty of its kind. The SPAW Protocol preceded other international environmental agreements in utilizing an ecosystem approach to conservation and was entered into force on 18 June 2000.

The Protocol acts as a vehicle to assist with regional implementation of the broader and more demanding global Convention on Biological Diversity (CBD). The objective of the Protocol is to protect rare and fragile ecosystems and habitats, thereby protecting the endangered and threatened species residing therein. The Caribbean Regional Co-ordinating Unit pursues this objective by assisting with the establishment and proper management of protected areas, by promoting sustainable management (and use) of species to prevent their endangerment, and by providing assistance to the governments of the region in conserving their coastal ecosystems.

The Protocol also assists with the promotion of and linkages to the Ramsar and CITES Conventions. The protocol calls for the development and implementation of protection plans for endangered species and lists all marine mammal species of the region as protected. It is also based on SPAW by which the regional MMAP (see below) was commissioned. Clearly, Kingdom members are called upon to take active measures by implementing marine mammals on a national basis.

8.3 National

The Kingdom of the Netherlands is formed by four constituent countries, the Netherlands (including the special municipalities Bonaire, St. Eustatius and Saba – BES Islands), Aruba, Curaçao, and St. Maarten. The jurisdictional zones involved in managing marine mammals in the Dutch Caribbean involve Kingdom maritime zones (EEZ waters), national waters of four countries, and island maritime zones for the islands of Bonaire, Saba and St. Eustatius. This amounts to eight jurisdictions at the various levels of government. In addition, several island governments have apportioned either all or part of the waters that fall under their authority a special legal status as "marine parks". These form an additional jurisdictional category at the island (or national) level.

In these various zones, marine mammals may be afforded protection by means of treaty obligations, or national or insular ordinances concerning general nature management, fisheries management, or marine parks. Another often-used possibility would be ordinances regarding animal welfare (particularly as

regards captive live animals). However the latter type of legislation does not exist in the Dutch Caribbean.

In this section we provide a rough assessment of the principal laws and ordinances which do (or which should) offer marine mammals legal protection so as to arrive at key recommendations on how to proceed further.

8.3.1 Kingdom jurisdiction

The Kingdom of the Netherlands declared an EEZ over which they carry authority with regard to the exploitation and management of biological marine resources. A management plan has recently been drafted for the EEZ (Meesters et al. 2010). In the Kingdom maritime zone the various international treaties (discussed above) to which the Kingdom is party provide the legal grounds for marine mammal protection.

Within the EEZ, surrounding the islands, lie the areas of insular jurisdiction. In the case of Aruba, Curacao and St. Maarten the island territorial waters actually concern national waters as these islands are separate nations within the Kingdom. These waters stretch out to 12 nautical miles from land. In the case of Bonaire, Saba and St. Eustatius, the 12 mile zones correspond to island-level legislation as these islands now are part of the Netherlands. Within the territorial waters several islands have further declared marine parks which may or may not extend outwards to the 12 mile zone, and may or may not encircle the whole island.

8.3.2 Netherlands jurisdiction (Bonaire, Saba, St. Eustatius)

Dutch mainland nature legislation does not apply to nature management in Bonaire, Saba and St. Eustatius. 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 it is the "**Wet grondslagen natuurbeheer- en bescherming BES**", that provides the legal envelope for nature management. Through this framework law, the issues/topics for which the Ministry of EL&I carry significant and/or final responsibility include:

1. nature policy research "BO" (Beleidsondersteunend Onderzoek),
2. nature policy development,
3. legally required scientific research tasks "WOT" (Wettelijke Onderzoekstaken) which largely refer to baseline and monitoring as required via various international treaty obligations,
4. international representation and reporting for the various nature treaties,
5. a national biological inventory "Milieu en Natuurbalans" and information systems, and
6. nature policy, management, implementation in Kingdom seas (such as the EEZ, Saba Bank and marine mammals).

While the island governments continue to carry their own management responsibility for island territory waters, this list does address many critical needs that are required for sustainable management of cetaceans, particularly with respect to the Kingdom waters.

8.3.3 Insular jurisdiction within the Caribbean Netherlands

a) Saba Marine Environmental Ordinance (AB 1987, No. 10)

The Saba Marine Environmental Ordinance makes no specific mention of marine mammals or of internationally protected species. Therefore marine mammals are not yet protected in Saba island waters. In the interim, and until which time that this situation is improved, Art. 8 provides a possible framework for some protection. This article states that "activities which are harmful to the marine

environment are not permitted in the Saba Marine Park” and that “it is prohibited to intentionally destroy the marine environment in the Saba Marine Park”. If these are interpreted broadly then it may afford marine mammals partial protection. However, no jurisprudence to this extent yet exists. Article 17 further provides penalties for infractions (max. one month in prison of a fine up to NAF 5000,--), while Art. 18 defines infractions as “misdemeanors”. Art 7 provides a framework for additional regulations to be issued based on a General Island Resolution. From this we can conclude that grounds for legal protection of marine mammals in Saba is still deficient, and deserves work.

b) St. Eustatius Marine Environmental Ordinance (AB 1996, No. 3)

The St. Eustatius Marine Environmental Ordinance makes no specific mention of marine mammals or of internationally protected species. Therefore marine mammals are not yet protected in St. Eustatius island waters. In the interim, and until which time that this situation is improved, Art. 3 provides a possible framework for some protection. This article namely states that “ it is prohibited to commit acts that conflict with this Ordinance and damage the interests of the nature and environment within the underwater park of St. Eustatius. Also, Article 9 states that “It is forbidden to commit acts within the Statia Marine Park that damage or can damage the underwater environment”, and that it is forbidden to commit acts intentionally that can destroy the underwater environment of the marine park. If these articles are interpreted broadly then it may afford marine mammals partial protection. As far as known no jurisprudence to this extent yet exists. Article 24 further provides penalties for infractions (max. one month in prison of a fine up to NAF 5000,--). Article 25 defines violations as “misdemeanors”. In contrast to the Saba Marine Ordinance, the ordinance itself does not foresee possibilities for additions or amendments by General Island Resolution. However, (according to the St. Eustatius National Parks marine parks management plan), treaties implemented by the National (Netherlands Antilles) Nature Conservation Ordinance, such as CITES, SPAW protocol of the Cartagena Convention, CMS, and the CBD overrule regulations stipulated within this island ordinance. From this we can conclude that there appear to be some grounds of support for effective legal protection of marine mammals in St. Eustatius, but that an update is dearly needed.

c) Bonaire Island Nature Ordinance (AB 2008, No. 23 and island resolution AB 2010, No.15)

Under article 11, the Island nature Ordinance establishes all CITES appendix I, Bonn-convention appendix I, SPAW appendix I and II and IAS appendix I species as protected in the territory of Bonaire. Hence, all marine mammals are included as protected species inside Bonaire territory. The same article provides the ability to include additional protected species based on an island resolution. Article 13 extends protection to include protection against disturbance. Article 27 further provides penalties for infractions (max. one month in prison and fines up to NAF 5000,--). By means of island resolution AB 2010, No. 15, a large number of additional species needing local protection are defined as protected species in Bonaire. Up to now, of all Dutch Caribbean islands, Bonaire has the most extensive protective legislation. Nevertheless, enforcement remains a problem.

8.3.4 Insular jurisdiction for Kingdom island nations

a) St. Maarten Nature Conservation Ordinance (A.B. 2003, No. 25)

This St. Maarten ordinance designates all species listed in the addendums of the Bonn Convention, addendums I and II of the SPAW Protocol, and addendum I of the CITES Treaty as protected species in St. Maarten (Art. 16). This article also provides the possibility to designate additional species as protected or to set special regulations for species listed in addendum III of SPAW by means of a General Island Resolution. Art. 17 provides additional scope for protection in that it adds that it is forbidden to kill, wound, capture or even disturb or upset protected species. However, no definitions are provided for the concepts of “disturb” or “upset”, leaving these definitions open for interpretation. Also, the whole

ordinance provides no mention of sanctions or fines. As a consequence, of inbuilt weaknesses, this ordinance only provides limited scope for actual protection of marine mammals in St. Maarten waters.

b) Curacao Fishery Law of 2009 (AB 2009, No.48)

The Curacao Fishery Law of 2009 (AB 2009, No.48) prohibits the use of cetaceans as fishing bait (Art. 2) and prohibits fishing for cetaceans without a permit from the Executive Council (Art. 9). In the case of Curacao waters the available legislation only provides limited scope for real protection of marine mammals.

c) Aruba

Aruba developed a five-year wildlife (flora, fauna and habitat) conservation action plan that includes workable and achievable goals to aid the preservation of the wildlife of Aruba, and a long-term vision on nature conservation and nature development for a lasting future. However Aruba has no local protection of marine mammals as it has no marine environmental ordinance and marine mammals are not defined as protected species.

8.3.5 Overall Assessment

In general terms it can be concluded that the network of legislation offering protection to marine mammals in the Dutch Caribbean is largely incomplete. Flaws discussed above include cases in which marine mammals are not defined as protected species, in which disturbance and harassment are prohibited but not defined, legislation is ratified but no sanctions are stipulated etc. Also, nowhere are guidelines given for interacting with marine mammals in the wild, and no legal guidelines are established that regulate how captive marine mammals should be kept and treated. In addition, penalties for violations when defined, are generally low (e.g. Saba and St. Eustatius).

Upgrading insular and island community legislation on a case by case basis at each jurisdictional level obviously offers one way forward. However, it may be advisable to develop separate new legislation specifically for marine mammal protection such that the various jurisdictions may (then) apply it as consistently as possible.

9 Regional Initiatives and Cooperation

Three larger projects as being exemplary of a) international cooperation and coordination, b) a comprehensive and holistic conservation approach, c) large-scale quantitative surveys:

- a) **Wider Caribbean Marine Mammal Action Plan:** In 2008 the UNEP drafted a regional marine mammal action that provides a valuable framework and rallying point for concerted action towards the conservation of marine mammals in the wider Caribbean. The plan identifies priority actions and key partners for a list of issues critical to effective conservation and management of cetaceans in the region.

The Wider Caribbean MMAP identifies five target areas:

1. increased scientific knowledge;
2. enhanced public understanding;
3. protective measures;
4. policy development and
5. improvement of law and its application.

In this, marine protected areas provide the key underpinnings for the actual implementation of protective measures as listed under item 3 in the Wider Caribbean MMPA. In other words, a MM Sanctuary represents the implementation phase of conservation policy.

- b) **Agoa Marine Mammal Sanctuary:** In 2010 the government of France declared a marine mammal sanctuary for their Caribbean territories centred around Guadeloupe and Martinique. This action will provide critically needed additional protection for cetaceans in a 123,000 km² part of the Caribbean and tropical Atlantic, and forms a valuable complement to the sanctuary established earlier by the Dominican Republic (1996) to the west and by the USA (1972) on the summer feeding grounds of the humpback whale of the east coast of the USA (Stellwagen bank).
- c) **REMMOA aerial megafauna surveys:** Beginning in 2008 the French Agency for Marine Protected Areas, as one of the first nations in the region, funded directed marine mammal surveys of its various tropical territories, including its Caribbean maritime territory. This project, known as the REMMOA survey (REcensements des Mammifères marins et autre Mégafaune pélagique par Observation Aérienne) is providing critical new insights into relative densities of cetaceans and other pelagic megafauna in a geographical area for which quantitative data have been dearly lacking.

9.1 Sister Sanctuary Program

Stellwagen Bank National Marine Sanctuary (Massachusetts, USA)

The Stellwagen Bank MNS was established in 1992 on the basis of the U. S. Marine Protection, Research and Sanctuaries Act. It amounts to some 842 square miles of rich habitat that also provides feeding and nursery grounds for more than a dozen cetacean species, including the endangered humpback, northern right, sei, and fin whales. Stellwagen established the world's first sister sanctuary with the Dominican Republic's Santuario de Mamíferos Marinos de la República Dominicana to protect the endangered migratory humpback whale on both ends of its range.

Recently, in an agreement between the National Oceanic and Atmospheric Administration (NOAA) and the Bermuda Department of Environmental Protection a new sister sanctuary will be established over the

Bermuda triangle. The philosophy of establishing an interlinking network of important cetacean habitat focusing on the humpback is developing the possibility for “life-cycle protection” for this long-lived species across its full migratory range south to the eastern Caribbean.

Participation in, and support of this sister sanctuary program offers important prospects for international cooperation and research for the Dutch Caribbean Marine Mammal Sanctuary.



Figure 10. Map of the existing western-north Atlantic network of connected marine mammal sanctuaries (MMS) and its spatial relation to possible Dutch Caribbean Marine Mammal Sanctuary areas in the eastern Caribbean.

9.2 Conferences

International Conferences on Marine Mammal Protected Areas:

The first International Conference on Marine Mammal Protected Areas (ICMMPA) took place on Maui, Hawai'i in 2009. It built plans for networks of protected areas, which will conserve vulnerable species and the places on which they depend. The Conference ended with recommendations from the Steering Committee to continue the momentum built by conference workshops to address common challenges and share solutions for the management of marine mammals around the globe.

The second one took place on Martinique, French Caribbean, in November 2011, and was hosted by the French government. The theme of this 2nd International Conference is the protection of endangered

species and their threatened habitats, with a view to discussing actions which impact negatively, gaps, lessons learnt and to develop scenarios, contingency and precautionary approaches. This venue will also be used as an opportunity to inform stakeholders, marine mammal scientists and the wider public about Caribbean's environmental and marine conservation efforts and to promote the Agoa sanctuary for marine mammals in the French West Indies.

Marine Mammal Stranding Workshops:

In 2009 the Dutch Caribbean Regional Workshop for Effective Implementation for Marine Mammal Stranding Response (DCSW) was hosted by the Curacao Sea Aquarium. The Southern Caribbean Cetacean Network (SCCN), recently established on Curaçao, organized this stranding workshop in cooperation with the Dutch Caribbean Nature Alliance (DCNA), and the Eastern Caribbean Cetacean Network (ECCN). Twenty-one participants representing Protected Area management organizations, government departments, and non-governmental organizations from six Dutch Caribbean islands attended—Aruba, Bonaire, Curacao, St. Eustatius, St. Maarten, and Saba. The participants agreed that designation of a marine mammal sanctuary in Dutch Caribbean waters should be pursued in conjunction with the existing 'sister sanctuaries' of the Dominican Republic and U.S. Stellwagen Bank National Marine Sanctuary (SBNMS), and the French initiative to establish a marine mammal sanctuary around the French islands (Hoetjes and Ward 2009).

Cartagena Convention (6th Conference of Parties) Caribbean 2010:

The 6th Conference of Parties (COP6) took place in October 2010. The progress of the "Protecting Habitats and Migration Corridors for Marine Mammals in the South and Northeast Pacific and the Wider Caribbean through Marine Protected Area Networks (LifeWeb Project)" was also discussed with respect to the Caribbean (IWC 2011a: p. 8). The regional objectives are to:

- (1) provide an overview of habitats and regional-scale migration routes for marine mammals in need of better management;
- (2) introduce integrated planning approaches, including the topic of marine spatial planning, MMPA (marine mammal protected areas) networks design and good practices on transboundary governance;
- (3) use integrated marine spatial planning and management in a demonstration project for the Wider Caribbean);
- (4) develop strategic communication products to 'Make the Case' for integrated management.

Activities to date were reported.

Progress was also discussed on the "Improving Capacity in the Wider Caribbean Region" project IWC 2011a: p. 8). The objectives of this project are:

- (1) improve and centralise the level of information and knowledge on the status, distribution and threats of marine mammals in the region;
- (2) identify critical habitats for marine mammals in the region; and
- (3) improve understanding of tourists and tourism stakeholders on marine mammal natural history, conservation and best practices for marine mammal viewing.

The regional workshops on stranding (discussed above) and whale watching (discussed below) relate specifically to the objectives of this project.

Workshop on Marine Mammal Watching in the Wider Caribbean Region:

A Marine Mammal Watching Workshop has recently taken place in Panama (25-29 October 2011). It was organized by the government of Panama under the auspices of UNEP and was also funded by the U.S.

National Fish and Wildlife Foundation, U.S. Marine Mammal Commission, the French Marine Protected Area Agency, UNEP-CEP, SPAW RAC, Humane Society International, International Fund for Animal Welfare and the Pacific Whale Foundation. A key review paper presented was on whale watching guidelines around the world (Carlson 2011). The main theme was the development of overarching principles and best practice guidelines for marine mammal watching in the wider Caribbean region. The Dutch Caribbean by Henriquez (2011) of the Aruba Marine Mammal Foundation, acting on behalf of the Dutch Caribbean Cetacean Network (DCCN). In her participant report, Henriquez indicates that a preliminary action plan was drafted for the development of national marine mammal watching codes of conduct and that these were recommended to participant countries. A preliminary code of conduct was drafted as well as a datasheet. These will soon be available on-line. As interest in whale watching in the Dutch Caribbean grows, continued participation in the future should be considered. The cep.unep website gives access to many valuable documents.

9.3 Important information sources and websites:

<http://iwcoffice.org> (International Whaling Commission)

<http://icmmpa.org> (International Commission for Marine Mammal Protected Areas)

<http://sanctuaries.noaa.gov> (International Activities Office National Marine Sanctuaries)

<http://stellwagen.noa.gov>

<http://www.cep.unep.org/meetings-events/regional-workshop-on-marine-mammal-watching-in-the-wider-caribbean-region>

10 Anthropogenic Factors to Address in a Marine Mammal Sanctuary

10.1 Fishing-related mortality

Fisheries can be very dangerous to marine mammals in that the animals may

- a) Be targeted specifically as a source of human food or bait for the fishing industry
- b) Get caught or entangled in gear incidentally and die
- c) Suffer from depleted food supply or habitat damage caused by fishing practices.

In the Dutch Caribbean, direct taking of cetaceans is largely illegal and does not form part of the cultural tradition of these islands. Therefore, it is a negligible problem.

Fisheries by-catch is the single greatest and best documented threat to cetacean world-wide (Reeves *et al.* 2005, Gilman *et al.* 2006). On a Caribbean basin-wide basis, it is further recognized that trends and status of cetaceans cannot be understood in isolation from fisheries (Bjorkland *et al.* 2007). However, specific information on the impacts of Caribbean fisheries on cetacean populations remains very limited (Vidal *et al.* 1994, Romero *et al.* 1997, Romero *et al.* 2001, Borobia and Barros 2006). In a study for Puerto Rico and the Virgin Islands, accidental capture and entanglement in fishing gear were the most common human-related cause of lethal strandings (Mignucci-Giannoni *et al.* 1999). Marine mammals have been found to be killed by entanglement or capture in fishing gear such as long lines and gill nets in the Dutch Caribbean. (Debrot *et al.* 2011). Research elsewhere has shown that this is often associated with bubble-lesions in the tissues, probably due to animals not being able to surface normally to blow off supersaturated gases (Moore *et al.* 2009). While the use of long-lines in the EEZ is limited and partially regulated, the use of potentially dangerous gears in the coastal zones (e.g. Dawson and Slooten 2005) that fall under island jurisdiction may already be or may develop into a problem (e.g. Aruba). Assessment of the extent of this problem is a priority (IWC 2011a: p. 42).

10.2 Underwater noise

Marine mammals use sound for critical life functions and have well developed hearing capability (Richardson *et al.* 1995, McLeod and D'Amico 2006). They are very sensitive to submarine underwater sound. A recent review sketches the wide extent of anthropogenic noise in the marine environment today (Hildebrand 2009). Simple noise caused by commercial shipping can induce acoustic masking, thereby seriously impairing possibilities for communication in endangered species over long ranges (Clark *et al.* 2009), while the noise from outboard motors can interfere with communication in dolphins over short to medium ranges (Scarpaci *et al.* 2000, Jensen *et al.* 2009).

The potential direct impacts of sound include physical damage to auditory or non-auditory tissues, perceptual, such as interfering or altering intraspecific communication, behavioural, such as short or long-term displacement from an area or interruption of important behaviours (breeding, nursing, feeding), and chronic, such as increased vulnerability to disease. Potential indirect impacts include reduced availability of prey and or increased vulnerability to numerous hazards (Parsons and Dolman 2004).

Tougaard *et al.* (2009) show that the area of sound effects from pile driving to harbour porpoise is more than 20 km in the relatively shallow North Sea. Lucke *et al.* (2010) and Brandt *et al.* (2011) reach similar conclusions and also saw how noise from pile driving led to a long-term decrease for the totality of over the entire the pile driving construction period. In an area surrounded by deep waters such as the islands of the Dutch Caribbean, the distances can be expected to be even further. However, with pile driving

going on over a period of several month, Lucke et al. (2010) also documented the presence of harbour porpoises in the vicinity of the pile driving site towards the end of the construction period. This gave rise to the concern that several animals were exposed to numerous impulses at damaging intensities.

Sounds caused by sonar to detect submarines as often used during military exercises and operations can even be very dangerous and even deadly. The same is true for other forms of sound such as caused by underwater munitions detonations (Bree and Kristensen 1974) or shock trials for military vessel hulls (Clarke and Norman 2005). For the latter type of interventions, mitigation can be successful in minimizing negative impacts (Clarke and Norman 2005). Human disturbance can also lead to chronic stress, which influences animals health (Wright et al. 2009). Therefore marine sanctuaries need to address this matter, by limiting or excluding anthropogenic sound sources. This is particularly critical for deep diving beaked whales (Wright et al. 2009) which have been found to react more sensitively to intense sounds from military sonars than other species. Numerous mass stranding events of these species have been linked to Anvy operations involving submarine hunting sonars (e.g. Frantzis 1998). The authors call for large acoustic exclusion and buffer zones around MPA's as sound travels much further underwater than in air and protected sites would still be ensonified at intense sound levels even if the sound source is outside the MPA. In essence MPA' s thus need to preferably be large. Hatch and Frstrup (2009) stress the need for sound management in marine protected areas.

Essential input for underwater sound management in marine mammal sanctuaries (i.e. excluding or restricting sound sources) include: a) knowing where and when the concentrations of different marine mammals are to be found, b) their relative susceptibility to various sound sources. When this knowledge is combined with knowledge regarding current sound sources and distribution of those sources, it is also possible to assess the current extent of this potential problem.

10.3 Ship strikes

Worldwide more than 50% of shipping density occurs in about 2% of the ocean surface (Leaper and Panigada 2011).The Caribbean is one of the intensively used areas and will become even more so after the construction to double the capacity of the Panama Canal is completed in 2014. Modern shipping involves large ships that move at ever increasing speeds. These form a great danger to marine mammals. In this large whale species are particularly vulnerable and especially animals with calves (Richardson *et al.* 2011). Today ship strikes are even one of the principal sources of mortality for fin whales in the Mediterranean (Panigada *et al.* 2011). One ship strike to a juvenile Bryde's whale has been recorded for Bonaire while in Venezuela ship strikes to both Bryde's whale and smaller cetaceans have been noted (UNEP 2008). To prevent or reduce the risks of ship strikes, it is necessary to direct traffic to areas where the chance of ship strikes is lower, to have ships travel at lower speed in sensitive areas, or to use special radar to aid in early detection. To do this first a clear picture is needed of preferred locations and/or seasonal distribution and density of the animals and then to recommend where ships should avoid them (Vanderlaan *et al.* 2009).

All these three sources of mortality have been documented for the Dutch Caribbean and contribute to strandings. As pointed out, strandings became more frequent in recent years. However these only represent a small portion of the total mortality that they represent as maybe 90% or more of the animals may disappear at sea and never reach land (Williams *et al.* 2011). Strandings significantly underestimate actual mortalities.

10.4 Whale watching

Real-life encounters with whales will help people to get to know more about these animals, and let their compassion grow for whales and other marine creatures. Done responsibly, whale watching is also a

popular and lucrative ecotourism industry for coastal towns and cities throughout the world. However, whales and dolphins are easily disturbed by the presence of people, whether they are in a boat or aircraft as well as activities such as swimming and diving, feeding, touching, and making noise. The potential problems from disturbance may include altering their behaviour, displacement from important habitat areas, and reduced breeding success. Therefore to ensure that potential impacts from watching whales and dolphins (either commercially or recreationally) are managed appropriately guidelines are needed. The intent of these guidelines is to provide a framework that allows people to observe and interact with whales and dolphins in a way that does not cause harm to the animals. Although the goal of whale watching is basically the same everywhere in the world, the whales and environment vary from place to place. In the Caribbean, the International Fund for Animal Welfare (IFAW) collaborated with local governments, community organizations and whale watching operators to create responsible whale watching guidelines. These guidelines, along with IFAW-supplied field guides and posters, are currently being used by whale watch operators on five islands in the region. After an evaluation it is determined whether this needs to be extended for the wider Caribbean.

While commercial whale-watching vessel operators are necessarily aware of whale watching guidelines and, generally follow them, many private recreational vessel operators are not familiar with the guidelines and frequently interrupt the activities of marine mammals. Although one boat is not likely to cause significant disturbance just by watching whales, repeated violations of the whale watching guidelines are likely to lead to significant disturbance of cetaceans. The impacts of whale watching are due both to the presence of the vessels (turning the whales' attention away from activities like foraging, feeding, socializing and breeding) and to the noise the vessels produce (reducing the ability of whales to detect their prey, communicate, and navigate). In their 2011 report, the IWC scientific committee highlights concerns about recent disturbance to cetaceans in the leeward Dutch Caribbean from recreational whale watching and points to the need for guidelines for the developing industry (IWC 2011a: p. 55).

The key principles for whale watching are:

- a) Whale watching activity must allow cetaceans to continue whatever behaviour they are engaged in at the time of contact. Care should be taken to ensure that they are not disturbed or interrupted in their activities by the approaching vessel.
- b) The goal of whale watching should not be interaction but observation of undisturbed cetacean behaviour. When cetaceans decide to interact with whale watchers, the cetaceans should always remain in control of the situation: that is, they should be free to determine the duration and nature of any interaction.
- c) On a long-term basis, whale watching should not lead to changes in cetacean group behaviour or dynamics, a change in habitat use, or a decline in reproductive success.

Key information sources can be found at the cep.unep.org/meetings-events/regional-workshop-on-marine-mammal-watching-in-the-wider-caribbean-region website.

10.5 Pollution

Marine debris: Marine litter and oil contamination are pervasive problems in the Dutch Antilles (Debrot *et al.* 1995 and 1999). A recent review has shown that marine debris has become an increasing factor affecting the health and survival of marine mammals. Simmonds (2011) provides an overview and concludes that plastic ingestion in cetaceans has been widely documented, often being established to have been the cause or likely cause of death of the animals in question. The species at greatest risk appear to be suction feeders such as sperm whales and beaked whales (Simmonds, 2011; Jacobsen *et al.* 2010). Plastic has already been found in the stomach of a beaked whale stranded in Curacao (Debrot

1998). Moreover, Rios *et al.* (2007) have found that plastics can collect anthropogenic pollutants from sea water and pass these into the food web when consumed by marine organisms. Such contaminants can have a variety of effects, ranging from impaired health, to decreased survival of offspring (Hall *et al.* 2009).

Oil spills: The Deep Water Horizon oil spill in the Gulf of Mexico has caused hundreds of strandings by marine mammals. Marine mammals are exposed to contamination through various routes, including inhalation, ingestion and exposure through the skin. Ingestion may include direct ingestion of oil or tar balls in the water or through consumption of contaminated prey organisms. Among the most toxic compounds for mammals and other organisms are the polycyclic aromatic hydrocarbons (PAHs), originating from crude oil and its derivatives (fuels). The Caribbean is one of the world's most important oil producing areas with at least 5 million barrels of oil moving through the area on a daily basis (UNEP 1989). PAHs are known to be rapidly taken up by vertebrates in which the toxic effects can include liver disease, cardio-toxicity and immune suppression (Stein *et al.* 1993). Burning of oil produces a whole list of other toxic compounds, while they may also be exposed to dispersants (Fuller *et al.* 2004).

For this reason an effective oil spill response is necessary in the case of a calamity. Effective oil spill response entails at least three phases: rescue, exposure assessment and restoration. Protocols are needed for offshore surveillance, necropsy, rescue and rehabilitation, sample collection, storage and processing. Guidelines to an effective oil spill response have been developed in the USA (NOAA 2006). Based on the Deep Water Horizon oil spill, these are now being revised and adapted (T. Rowles, pers. comm.). Oil spill sensitivity mapping and readiness have been identified as priorities for implementation of the EEZ management plan for the Dutch Caribbean (Meesters *et al.* 2010).

10.6 Live capture and captive animals

Marine mammals are often held in captivity for economic gain, and there has been considerable recent interest in establishing such a venture in St. Maarten. Vail (2005) provides an overview for captive marine mammals in the Caribbean. These ventures are costly to run properly and remain internationally contentious. If done improperly, keeping marine mammals in captivity may be cruel, may serve as a source of infectious diseases for native populations and may help to endanger threatened wild populations by stimulating the removal of individuals from small wild stocks. They are also not without risk to humans. Such programs are costly to run properly and can bring a bad reputation to nations and islands by harming their touristic image. For these reasons, establishing such programs need to be evaluated very carefully and strict regulations and controls are an absolute must. In the Dutch Caribbean, the only island on which marine mammals are currently held in captivity is Curacao. There currently exist no legal guidelines for such ventures. These are clearly necessary. In the windward islands, the high frequency of hurricanes makes such projects even more risky. For instance, in 2008 the hurricane Omar destroyed facilities of Marine World., Ltd., St. Kitts, and four South American sea Lions, *Otaria byronia*, escaped into the wild, putting the animals, the public and nature at risk, .

10.7 Climate change

The IWC has repeatedly devoted considerable attention to this topic since they held their first special workshop on the effects of global change on cetaceans in Hawaii in 1996 (IWC 2011b). Conceptual frameworks have been developed and several insights generated. Species thought to be most vulnerable to climate change are the freshwater dependent-species and those limited to other restricted habitats such as ecological "cul de sacs" which present barriers to migration or movement. The general conclusion is still that modelling climate change is already difficult and predicting the effects thereof on cetaceans

presents many uncertainties. The potential effects of climate change on ocean currents and productivity in the Caribbean remain highly speculative as well as any potential effect of such changes on the indigenous marine mammals. A general observation made was that most critically endangered marine mammals are presently already more threatened by other sources of mortality which therefore deserve priority at this juncture. A proposal from the IWC Vienna climate change meeting concerning the IUCN Red List designations, lists 15 species which appear to be especially vulnerable to climate change effects. (SC/63/SM WP 2). Only two of the 15 species listed occur in the Caribbean Sea (and the Dutch Caribbean). These are the common bottlenose dolphin, especially vulnerable due to cumulative anthropogenic effects stemming from the coastal habits of inshore populations, and the orca, in view of its high organo-chlorine exposure.

With so much uncertainty about the specific effects of climate change on the various species, the key practical concern can be simplified to the basic concepts of a) preserving sufficient habitat (throughout the ranges of the species) and b) ensuring ecological connectivity so as to improve ecosystem resilience for the systems upon which cetaceans are dependent (McLeod 2009).

10.8 Habitat degradation

Not only are a sufficient number of animals and a sufficient surface of connected space critical to the continued survival of marine mammals, but also the quality of the space in which they live and complete their life functions. The majority of the above-listed anthropogenic factors directly affect habitat quality for marine mammals and need to be addressed in some form. In general, marine habitat quality, which can be defined as the sum of the biotic and abiotic parameters that define the marine space in which the species live and need to complete their life cycle, is seriously under pressure, worldwide but also in the Caribbean. In this respect two key general observations need to be made:

- 1) Because of ecological connectivity, and the fact that marine mammals also depend on habitat that lies outside the MMS, measures will also be needed to protect habitat quality in areas outside the MMS.
- 2) As impacts by man are most concentrated on land and take place from the shore, understandably, habitat degradation impacts coastal species most directly.

11 Research

Ultimately, relatively little is known about the ecology and conservation of the cetaceans of the Caribbean. The Caribbean region including the Dutch Caribbean have not been targeted by dedicated or consistent marine mammal research efforts and continues to remain seriously data deficient with respect to cetaceans (Ward *et al.* 2001, IWC 2007, UNEP 2008, Debrot *et al.* 2011; Laran *et al.* 2011). Most knowledge is based on incidental and opportunistic stranding and sighting data. Yet expansion of the knowledge base is critical to effective management and conservation. Therefore, collaborative directed surveys to elucidate cetacean hotspots, distribution and migration patterns are essential to a basic understanding of the life history of these large, highly trans-boundary, vulnerable species, as well as to cetacean conservation on a regional scale. The IWC has pinpointed this lack of knowledge again during the 2011 IWC meetings in Trømso and calls upon Caribbean range states to further develop their cooperation in the fields of cetacean research and conservation in particular by conducting large scale directed surveys and assessments (IWC 2011, p. 54: "that more work is needed on the distribution and abundance of cetaceans in the Caribbean and recommends continued and expanded cooperation on large-scale directed surveys").

Scientific research is a costly matter requiring considerable expertise, expensive equipment for analysis of samples, and/or costly ship survey time (Debrot *et al.* 2011). Much of this is beyond the scope of small island institutes but this does not mean that local organizations cannot fulfil a pivotal role in data and specimen collection, that in conjunction with a consortium of Dutch and/or international institutions can yield critical new insights for conservation and management. However, to function properly in that capacity, local organizations need to be equipped and trained to effectively document, sample and preserve stranding specimens. To this extent, several workshops have recently been held (see above: Regional Initiatives). Focal organizations need to be identified for each island and equipped to address stranding incidents.

11.1 Key research priorities

Strandings: Strandings provide essential opportunities to gain insight into toxin exposure levels, genetic identification of species and stocks structure, diet and causes of mortality. All of these areas require access to expensive equipment and expertise, combined with proper field assessment, necropsies, and specimen collection.

Quantitative distribution of cetaceans: The nature and extent of the use of various habitats by marine mammals in the Dutch Caribbean remains poorly known. From the management perspective, such data are critical for the assessment of risks, key areas to exclude traffic, sources of sound and or conflicting fishing practices Therefore, directed, quantitative marine mammal surveys are a priority (IWC 2011a: p. 54).

Recovery of the southern Caribbean humpback stock: An important issue to investigate is the slow recovery of the southern Caribbean humpback stock. To assess the situation, important questions to answer especially regard summer feeding ground and winter calving ground fidelity of the humpbacks in the southern Caribbean. For this, individual identification based on tail fluke marking patterns offers good prospects. The databases needed to gain such insight have been established but field observations in the southern Caribbean remain lacking.

Beaked whales: The southern sector appears to be quite important for rare beaked whales (Debrot et al. 1998). Their use of the southern Caribbean should be assessed in greater detail and acoustic research presents opportunities for this.

12 Dutch Caribbean Marine Mammal Sanctuary Action Plan

We here list eight key action points aimed at the implementation of a Dutch Caribbean Marine Mammal Sanctuary. The most important one is action point *a*, as it can provide the key framework for all other action points. Other than that, we here only remark that while the listed action points clearly support each other, they are not sequentially dependent and can take place in parallel, depending on the availability of capacity, funding or other opportunities relating to each of them individually.

- a) Legal designation of the EEZ (one or both sectors) as MMS, along with establishment of legal guidelines for interacting with cetaceans (whale watching).
- b) Establish bonds of cooperation with sister sanctuaries in the region (France, USA, Dominican Republic), (e.g. regional stranding and sightings data network).
- c) Conduct baseline quantitative surveys of cetacean distribution and assessments in light of sources of deleterious sound sources and risks of vessel strikes.
- d) Review and adapt existing national and insular legal frameworks to improve these, preferably by developing separate and standardized marine mammals legislation.
- e) Develop information systems to promote the development of a whale (cetacean) watching industry.
- f) Train and equip marine parks and island veterinarians to conduct elementary autopsies and collect basic stranding specimens for analysis of causes of mortality, contamination levels and genetics, and link them to international academic institutions who will accept and analyse the specimens in regional context.
- g) Develop species action plans (e.g. humpback).
- h) Conduct cetacean surveys and management reviews every 5 years to assess marine mammal status and conservation progress.

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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.

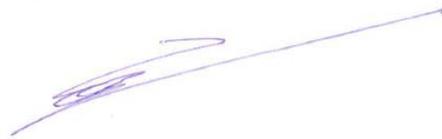
Justification

Report Number: C149/11
Project Number: 4308201068

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

Approved: dr. ir. H.V. Winter
scientific reseacher

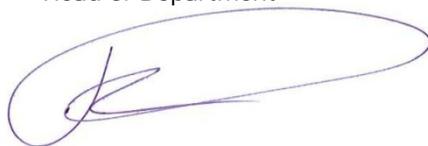
Signature:



Date: 12 December 2011

Approved: F.C. Groenendijk, MSc.
Head of Department

Signature:



Date: 12 December 2011

Annex A. Marine mammals of the Windward Dutch Caribbean (in press)

Marine Mammals of the northeastern Caribbean Windward Dutch Islands: Saba, St. Eustatius, St. Maarten, and the Saba Bank

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Abstract

At least 33 native species of marine mammals have been documented from the Wider Caribbean Region (WCR). For many of these species, the waters of the region serve as primary habitat for critical activities that include feeding, mating and calving.

In 2010 constitutional changes in the Dutch kingdom have led to its responsibility for the sustainable management and conservation of the marine biodiversity in the Exclusive Economic Zones (EEZ) and territorial waters of the Caribbean islands Saba, St. Eustatius and Bonaire. Marine mammals are to be considered in any conservation efforts, but data on their biology, life history, distribution and behavior, in particular around the windward Dutch islands (Saba, St. Eustatius and St. Maarten), is scarce.

In this study we compiled 84 marine mammal records for the waters of Saba Island, St. Eustatius and St. Maarten, comprising 9 previously published records and 75 new records. In comparison to the leewards Dutch islands (Aruba, Curacao and Bonaire), most records are based on sightings and not strandings. There is an indication that beaked whales and Bryde's whale are more common around the leeward Dutch islands, whereas humpback whales are more common around the windward Dutch islands.

This study concludes that more dedicated efforts are needed to better document and understand cetacean composition, seasonality and use of the both the windward and leeward Dutch Caribbean maritime territory. Such initiatives should help further clarify any potential regional differences as well the underlying causes thereof. Several nations, including the USA, the Dominican Republic and France, have established marine mammal sanctuaries in their Caribbean waters. Declaring the Dutch EEZ as a marine mammal sanctuary as well as dedicated research would be a vital step to the conservation of marine mammals in this region.

keywords

Caribbean Islands, marine mammals,

The Dutch Caribbean maritime Exclusive Economic Zones (EEZ) as established on June 10, 2010, fall principally in the pelagic zone of the Venezuela Basin, and concern two discontinuous areas, separated by a minimum of some 550 km. One is based around the southeastern Caribbean island group of

Aruba, Bonaire and Curaçao, and amounts to some 70 thousand square kilometers of sea surface (13°11'42.81"N 69°10'51.99"W). The other is based around the northeastern Caribbean islands of Saba, St. Eustatius and St. Maarten, and amounts to a total sea surface of some 20 thousand square kilometers (17°22'54.56"N 63°30'17.95"W) (figure 1).

While in the last 20 years several studies have been published providing basic descriptions of the marine mammal fauna of the southeastern Caribbean leeward Dutch waters (e.g. Debrot and Barros 1992, 1994; Agudo and Ponson 1996; Leduc et al. 1997; Debrot 1998; Debrot *et al.* 1998; Debrot 2000; Barros and Debrot 2006; Debrot *et al.* 2006), practically no new information has been published about the marine mammals of the northeastern Caribbean windward Dutch waters, and no overview of available information has yet been made.

With the new constitutional changes that took place on 10 October 2010 in the Dutch kingdom, Saba, St. Eustatius and Bonaire have integrated into the Netherlands proper as special overseas municipalities, while Curacao and St. Maarten have become new autonomous overseas entities within the Kingdom of the Netherlands. The ultimate responsibility for the sustainable management and conservation of the marine biodiversity in the EEZ of Saba, St. Eustatius and Bonaire, as well as the territorial waters of these islands will come to lie with the Ministry Economic Affairs, Agriculture & Innovation of the Netherlands (EL&I). In preparation for this expanded responsibility, this ministry has been developing a management plan for the EEZ (Meesters *et al.* 2010).

One critical group in need of protection are marine mammals which form an integral and charismatic part of the marine ecosystem. At least 33 native species of marine mammals have been documented from the Wider Caribbean Region (WCR): namely six species of baleen whales, 24 species of toothed whales, one sirenian (the West Indian manatee), and two pinnipeds (the extinct Caribbean monk seal, and the vagrant hooded seal).

For many of these species, the waters of the region serve as primary habitat for critical activities that include feeding, mating and calving. Of these, at least 16 species have been recently documented for the waters of the leeward Dutch Caribbean, including the West Indian manatee (Agudo and Ponson 1996, Debrot et al. 1998, Debrot et al. 2006). Although some species have been studied extensively elsewhere, data concerning the biology, life history, distribution and behavior of most marine mammal populations in the Caribbean Sea remain sparse.

In this paper we assemble and assess both published and previously unpublished records of marine mammals for the northeastern Caribbean Dutch waters. We present a large number of unpublished sightings by reliable observers identifying distinctive species as well as sightings reported but not identified with certainty. The paper provides a basic overview and preliminary synthesis of existing knowledge, as well as an orientative list of other key species to be expected based on research available for several bordering maritime territories.

Records

We here provide an overview of 84 marine mammal records for the windward Dutch Caribbean waters, comprising 9 previously published records and 75 new records (Table 1). While 58 records can be confirmed to species level, 26 remain unidentified. A total of eight distinct species can be confirmed, one of which only to the family level.

Family Pinnepedia

Pinnipedia sp.

Naturally occurring hooded seals (*Cystophora cristata*) have been confirmed nearby from Puerto Rico and St. John, USVI (Mignucci-Giannoni and Odell 2001, Mignucci-Giannoni and Haddow 2002). Recalling sightings of hooded seals two years earlier from nearby Guadeloupe, the sightings of pinnipeds around St. Maarten after hurricane Omar passed in October 2008 could well have concerned the latter species, according to ¹N. Maslach of Resèrve Naturelle. Nevertheless, during the same hurricane, four South American sea Lions, *Otaria byronia*, had escaped from the facilities of Marine World Ltd., St. Kitts. Three of these were eventually caught but one remained at large, such that both sightings of pinnipeds (2008 and 2010) could also have concerned the latter escaped species (²T. Bervoets, pers. comm.). No historical records exist for the extinct West Indian monk seal, *Monachus tropicalis*, in the windward Dutch islands (Debrot 2000).

Family Balaenopteridae

Megaptera novaeangliae Lacepède

The most common records we report are for the humpback whale, which comprised almost half of all records. While according to our experience, dolphins appear to be the most prevalent species in the area (particularly *T. truncatus* and *T. longirostris*), the humpback's size, charisma, conspicuous behavior and song, and tendency to approach close to land, makes it much more noticeable and identifiable than dolphins.

This species demonstrates marked seasonality in the northeastern Caribbean (Mignucci-Giannoni 1998), and occurs principally between November and May. Mignucci-Giannoni (1998) concludes that the humpback whales of the adjacent Virgin Islands waters are largely transients based on the short maximum periods between resightings. While the breeding and calving grounds to the east of the windward Dutch waters are well established, sightings of mother and calf pairs on the Saba bank, as well as the presence of relatively warm shallow bank habitat means that further research will be needed to determine whether parts of this expansive bank may still serve as calving grounds to the recovering population of western Atlantic humpbacks. Most recovery of the Western Atlantic humpback population has been seen for the subpopulation wintering in the northeastern greater Antilles, while the recovery for those wintering in the eastern Caribbean lags (Swartz *et al.* 2003).

Family Physeteridae

Physeter macrocephalus Linnaeus

Five records were compiled for the sperm whale. Sperm whales are relatively common both to the west (Mignucci-Giannoni 1998) and east (Yoshida 2010) of the windward Dutch Caribbean. They are largely restricted to deeper waters where they prey on deepwater squid. In the northeastern Caribbean they are strongly seasonal and are rarely seen from April through September (Mignucci-Giannoni 1998). According to Mignucci-Giannoni (1998), most sightings of this species occur on the leeward side of islands. However, this may say more about the distribution of observers than of the whales themselves. For the windward Dutch Caribbean, all five sightings recorded are for the first quarter of the year.

¹ N. Maslach

² T. Bervoets ADD contact information

Family Ziphiidae

Ziphius cavirostris Cuvier

This species is listed based on one published stranding record. Strandings and sightings for goosbeaked whale in adjacent U.S. waters to the west are relatively common (Mignucci-Giannoni (1998), but sightings are also known for areas to the east (Boisseau *et al.* 2006). Around Puerto Rico and the Virgin Islands the species ranks xxxxx in terms of strandings (Mignucci-Giannoni 1996). Most occurrences for the species are for winter and spring (Mignucci-Giannoni 1998).

Family Delphinidae

Globicephala macrorhynchus Gray

The short-finned pilot whale is confirmed for the windward Dutch islands based on three records. It has been reported numerous times from sightings for areas both to the west and east to Guadeloupe (Boisseau 2006), as well as the nearby Anegada Passage (Mignucci-Giannoni 1998), Anguilla and Antigua (Mignucci-Giannoni 1996). Its occurrence in the windward Dutch Caribbean is therefore not surprising.

Stenella longirostris (Gray)

Two records are provided for the long-snouted spinner dolphin. The most nearby sightings of this species concern the area just west of the windward Dutch Caribbean, east of St. Croix (Mignucci-Giannoni 1998).

Tursiops truncatus (Montagu)

Seven sightings are recorded for the bottlenose dolphin. The bottlenose dolphin generally shows preference for shelf waters, and is the most commonly sighted delphinid in Puerto Rico and the Virgin Islands (Mignucci-Giannoni 1998) and is also commonly sighted eastwards to Guadeloupe and beyond (Boisseau *et al.* 2006; Yoshida *et al.* 2010). Its occurrence in the windward Dutch Caribbean is not unexpected or unusual.

Family Trichechidae

Trichechus manatus manatus L.

We list one reliable recent record for the West Indian manatee in the Dutch Caribbean windward islands. The species formerly occurred in the lesser Antilles with a concentration around Guadeloupe (Richard 2001), xx km to the southeastxxxx. Today the species is highly threatened in the region, having practically disappeared throughout the lesser Antilles, except on the coastal swamps of Caroni, Trinidad, close to the mainland of South America (Venezuela). The nearest remnant population hanging on in the Greater Antilles, is centered around Puerto Rico (USFWS 2007). The Puerto Rico manatee population is considered a separate stock of the West Indian subspecies, and is either stable or possibly increasing. While transient animals are occasionally reported for the Lesser Antilles, only one 1988 record is known directly east from Puerto Rico, from the nearby St. Thomas, U.S.V.I. (USFWS 2007). The only recently suitable habitat for this species in the windward Dutch Caribbean is the Simpson Bay Lagoon of St. Maarten, where the last sighting was also recorded in the late 1980s (Debrot *et al.* 2006).

Discussion and Conclusions

The marine mammal fauna for several nearby maritime areas (e.g. U.S.A. and France) are better known than the Dutch Caribbean and provide an indication of additional species to be expected. For areas to the west, namely the Virgin Islands and Puerto Rico, Mignucci-Giannoni (1998) reports the occurrence of 17 species/taxa of cetaceans, of which six are now reliably documented for the windward Dutch Caribbean. For areas to the east and southeast, spanning roughly from Guadeloupe to

Trinidad, Boisseau *et al.* (2006) and Yoshida *et al.* (2001) document the occurrence of whales and dolphins. All six species we here report are also well known from these latter areas towards the east.

Based on Mignucci-Giannoni (1998), other species to be on the lookout for include the largely off-shore Risso's dolphin (*Grampus griseus*) the orca (*Orcinus orca*), as well as deepwater species such as rough-toothed dolphin (*Steno bredanensis*), and pigmy sperm whale, *Kogia breviceps*, all of which have also been documented to the east, from Guadeloupe and beyond towards Trinidad (Boisseau *et al.* 2006, Yoshida 2010). Another likely species is the Atlantic spotted dolphin *Stenella frontalis*, which are relatively common in shallow shelf areas of Puerto Rico and the Virgin Islands and for which Roden and Mullin (2000) document several records to the immediate north and east of the windward Dutch Caribbean waters.

Additionally, common minke whale, *Balaenoptera acutorostrata*, have been recorded several times nearby on the Anguilla Bank, and several records exist for large *Balaenoptera* for areas near St. Croix, directly west of the windward Dutch Caribbean waters (Mignucci-Giannoni 1998). These latter likely regard either the sei whale, *B. borealis*, or fin whale, *B. physalus* (Mignucci-Giannoni 1998). Species which may also occur but would most likely be very rare are: *Stenella clymene*, recorded to the south east off St. Vincent and St. Lucia, but very rare in the Caribbean (Jefferson and Curry 2003); *S. coeruleoalba*: only reported once for the immediate surrounding areas (west of St. Croix) (Mignucci-Giannoni 1998); *Balaenoptera edeni* which appears to be principally a southern Caribbean species (e.g. Romero *et al.* 2001). Watkins *et al.* (1994) document Fraser's dolphins (*Lagenodelphis hosei*) for as nearby as Dominica. However, this species is quite rare and not yet reported near the Virgin Islands. Recent surveys of the eastern Caribbean indicate the pan-tropical spotted dolphin (*Stenella attenuata*) as a common and widespread species from Guadeloupe down to Trinidad (Boisseau *et al.* 2006).

The review of cetaceans for the adjoining Venezuelan waters towards the south, only provides a single record of the humpback whale in the vicinity of the windward Dutch islands (Aves Island, Venezuela), as almost all Venezuelan cetacean records are located in the southeastern Caribbean near mainland Venezuela (Romero *et al.* 2001).

Based on what is known for the leeward Dutch EEZ, some basic faunal differences between the windward and leeward EEZ sectors appear eminent. Briefly, the most important contrasts appear to be a remarkably higher abundance of beaked whales and Bryde's whale around the leeward Dutch islands (see Debrot *et al.* 1998) than around the windward Dutch islands, and a much higher abundance of humpback whales around the windward Dutch islands (this paper_ than around the leeward Dutch islands).

While the Bryde's whale (*B. edeni*) is well known from the Leeward Dutch EEZ (Debrot *et al.* 1998) and the southeastern Caribbean in general (e.g. Mignucci-Giannoni 1998, Romero *et al.* 2001), it appears much less common in the northeastern Caribbean and therefore also in the windward Dutch EEZ. Romero *et al.* (2001) describe this species as principally occurring in the southern Caribbean. The present combined knowledge for the two contrasting sectors of the Dutch EEZ confirm their view.

The rarity of *B. edeni* in the northeastern Caribbean (Mignucci-Giannoni 1996) as opposed to several sightings of the minke whale, *B. acutorostrata*, for that zone give cause to suspect that the most common rorqual whale for the windward Dutch Caribbean will be *B. acutorostrata*.

Based on several crossings from the leeward to the windward Dutch islands, Poppe (1974) further suggests that the southern part of the Venezuela Basin has higher densities of cetaceans than the

northern half. This would correlate with the higher density and species richness of seabirds observed in the southern half of the Venezuela Basin (north of the ABC islands) (Poppe 1974) and might be expected based either on the higher productivity caused by the seasonal upwelling phenomenon of the southern Caribbean (Sturm 1991). This idea would need further corroboration based on committed quantitative survey effort before being confirmed.

Curiously, only two records in the windward Dutch islands concerned strandings. This is an important contrast to the leeward Dutch islands where strandings form a much larger contribution to the available marine mammal records (Debrot *et al.* 1998). This might be ascribable to the general inaccessibility of the coastlines in the windward Dutch islands and therefore an inherently lower likelihood of detection of strandings. Another possibility may be a difference in faunally related mortality rates.

Therefore, as a small contribution towards better management and conservation of Caribbean cetaceans, this study concludes that more dedicated efforts are needed to better document and understand cetacean composition, seasonality and use of the both the windward and leeward Dutch Caribbean maritime territory. Such initiatives should help further clarify any potential regional differences and contrasts in species densities and distributions as well the underlying causes thereof.

While whale watching in the Caribbean has grown in recent years to an important new 10+ million dollar a year industry, the humpback and other whales remain hunted on artisanal scale in the eastern Caribbean. This activity is based in St. Vincent and the Grenadines which have a IWC regulated quota for 20 humpback whales for the period 2002-2007. While as of 2010, Dominica has decided to abandon its formerly pro-whaling stance, four other eastern Caribbean nations continue to vote pro-whaling in the IWC, in support of Japan. As a consequence, the future of whaling remains contended and the protection of the severely depleted humpback stocks of the eastern Caribbean remains ever so critical.

The results of our study show that marine mammals, particularly the endangered and targeted humpback whale make notably regular and consistent use of the windward Dutch EEZ. While absolute densities remain unknown and are difficult to extrapolate to the whole area of approximately 20 thousand square kilometers, the regionally high frequency of humpback sightings may make it the area meaningful to marine mammals, in an of its own merits.

To effectively protect whales, protection of their habitat is also essential. To this end, several nearby nations have already established marine mammal sanctuaries in their Caribbean waters. These include the USA (adjoining waters of Puerto Rico and the U.S. Virgin Islands to the west of the windward Dutch EEZ) and the Dominican Republic further to the west. In September 2010, the French followed suit and declared the Agoa marine mammal sanctuary for their Caribbean overseas water. These sanctuaries are all clustered in the northeastern Caribbean not far from the windward Dutch EEZ. The concepts of habitat size and connectivity are critical to conservation ecology and signify that purely on these criteria alone, the designation of the Dutch EEZ as a marine mammal sanctuary can help bolster these other related conservation initiatives. These considerations, along with the evident current value and potential future increased value of the windward Dutch EEZ for whales, argue for the Netherlands to join the larger international whale conservation initiatives and declare the Dutch EEZ as a marine mammal sanctuary.

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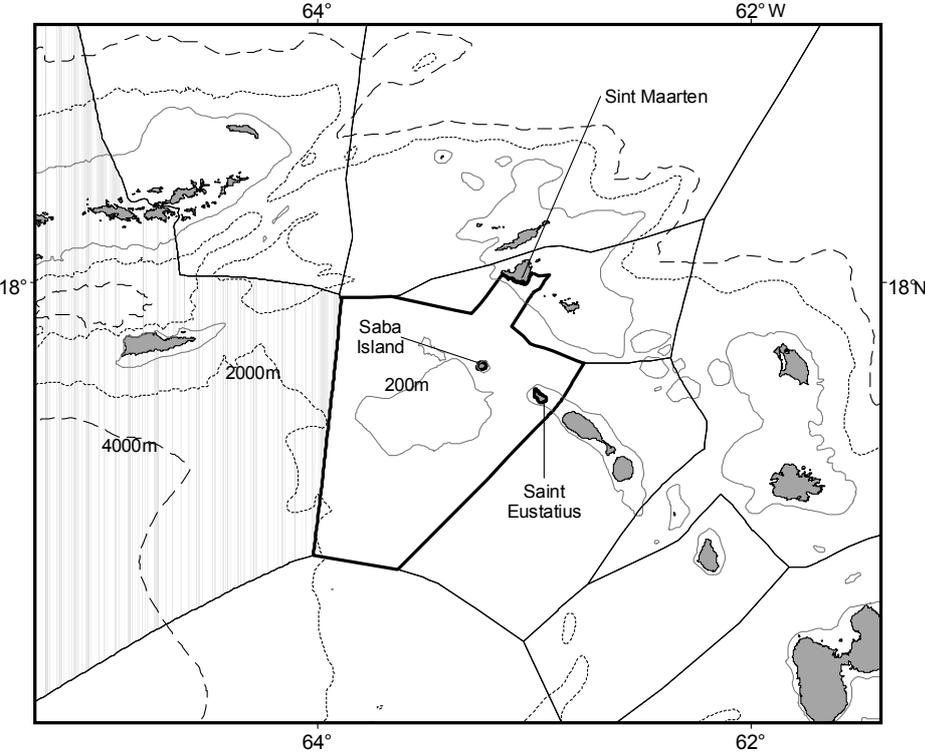
Table 1. Overview of documented marine mammal records for the windward Dutch Caribbean (Saba, Saba Bank, St. Eustatius and St. Maarten).

| Date | Location | Group size | Source/Reported by: | Comments |
|------------------------------------|--------------------------------|--------------|----------------------------------|---------------------------------------|
| Family Pinnipedia | | | | |
| Unidentified pinniped | | | | |
| 21-Oct-08 | St. Maarten, Simpson Bay | several | P. Noach, N. Maslach | several sightings, escaped sea lions? |
| 12-Jun-10 | St. Maarten, Simpson Bay | 1 | T. Bervoets | hotel security video |
| Family Sirenia | | | | |
| <i>Trichechus manatus</i> | | | | |
| 1987-88 | St. Maarten, Simpson Bay | 1 | Debrot et al. 2006/R. Cijntje | |
| Family Delphinidae | | | | |
| <i>Globicephalus macrorhynchus</i> | | | | |
| 31-Mar-02 | Saba | 8 | J. Magor, L. Costenaro | |
| 25-Nov-03 | St. Martin | 36 | Anonymous 2003a,b, P. Ellinger | stranding |
| 30-May-04 | St. Maarten | 1 | Anonymous, 2004, A. Caballero | stranding |
| <i>Stenella longirostris</i> | | | | |
| 19-May-09 | St. Eustatius, Jenkins Bay | 15-20 | T. Bervoets, C. Kull, N. Spanner | 5 identification photos |
| 03-Jun-09 | St. Eustatius, Tumbledown Dick | | T. Bervoets | |
| <i>Tursiops truncatus</i> | | | | |
| Apr-May 1996 | Saba Bank | unspecified | Postma and Nijkamp 1996 | |
| 21-Jun-03 | St. Eustatius (Southeast) | between 8-10 | N. Esteban | |
| 11-Feb-05 | Saba | 7 | J. Magor, L. Costenaro | |
| 2006-2008 | Saba Bank | several | W. Toller, S Lundval 2008 | several sightings |
| 05-Apr-10 | St. Maarten, Molly Beday | | T. Bervoets | |
| 25-Oct-07 | Saba Bank | | M. Kilgour and T. Shirley | |
| 10-Aug-08 | Saba, Fort Bay | several | Sea Saba | |
| Unidentified dolphin | | | | |
| 19-Feb-72 | St. Martin | 2 | Tarusky and Winn 1976 | |
| Apr- May 1996 | Saba Bank | | Postma and Nijkamp 1996 | <i>Pseudorca crassidens?</i> |
| Apr- May 1996 | Saba Bank | | Postma and Nijkamp 1996 | <i>S. clymene?</i> |
| Apr-May 1996 | Saba Bank | | Postma and Nijkamp 1996 | <i>Mesoplodon sp.?</i> |
| 16-Mar-03 | Saba | 40 | J. Magor, L. Costenaro | |
| 27-Dec-03 | Saba | 18 | J. Magor, L. Costenaro | |
| 06-Mar-05 | Saba, Windward Side | 2 | J. Magor, L. Costenaro | |
| 20-25 Mar 2006 | Saba Bank | one | IFWA 2006 | |
| 10-Jun-06 | Saba, Twilight Zone | 3 | J. Magor, L. Costenaro | |

| Date | Location | Group size | Source/Reported by: | Comments |
|-------------------------------|-------------------------------|-------------|--|-------------------------|
| 14-Aug-06 | Saba, Green Island | 35 | J. Magor, L. Costenaro | |
| 24-Mar-07 | Saba, Tent Reef | 30 | J. Magor, L. Costenaro | |
| 31-Jul-07 | Saba, Tent Reef | 12 | J. Magor, L. Costenaro | |
| 10-Sep-07 | Saba, Diamond Rock | unspecified | J. Magor and L. Costenaro | |
| Jul-08 | St. Eustatius (South) | 15-20 | L. Munson, K. McClellan | <i>Delphinus?</i> |
| 29-Aug-08 | Saba, Greer Gut | 8 | J. Magor and L. Costenaro | |
| June-July 2009 | St. Eustatius (North) | 5 | C. Kull, N. Spanner, M. Herriot | |
| 30-Aug-10 | St. Eustatius (Southeast) | several | W. de Gannes | |
| 31-Aug-10 | St. Eustatius (Southeast) | several | W. de Gannes | |
| 07-Jul-10 | Saba (North) | 40-50 | D. Kirkby | |
| 28-Jul-10 | Saba (North) | about 15 | D. Kirkby | |
| 01-Feb-10 | Saba, Ladder Bay | several | J. Magor, L. Costenaro | |
| 14-Mar-10 | Saba, Green Island | 12 | J. Magor, L. Costenaro | |
| 01-May-10 | St. Eustatius | ? | T. Bervoets | <i>Delphinus?</i> |
| 09-May-10 | St. Eustatius | ? | T. Bervoets | <i>Delphinus?</i> |
| Family Physeteridae | | | | |
| <i>Physeter macrocephalus</i> | | | | |
| Jan-Mar 1995 | St. Martin | unspecified | Roden and Mullin 2000 | |
| Jan-Mar 1995 | Saba Bank (West) | unspecified | Roden and Mullin 2000 | |
| 20-25 Mar 2006 | Saba Bank | 5 | IFWA 2006 | photos for 5 animals |
| 20-25 Mar 2006 | Saba Bank | 5 | IFWA 2006 | |
| 27-Feb-07 | Saba (North) | 1 | J. and H. Bijl | photo |
| Family Ziphiidae | | | | |
| <i>Ziphius cavirostris</i> | | | | |
| 25-Jun-66 | St. Maarten | 1 | Bree et al. 1973 | stranding, male |
| Family Balaenopteridae | | | | |
| <i>Megaptera novaeangliae</i> | | | | |
| xxx | St. Eustatius | | Mignucci-Giannoni 1989 | |
| xxx | St. Maarten | | Mignucci-Giannoni 1989 | |
| 25-Feb-95 | Saba Bank | unspecified | Roden and Mullin 2000; Stevick et al. 1999 | |
| Feb-00 | Saba Bank | unspecified | Swartz et al. 2003 | song, 3x |
| 2002 | Saba Bank | | Lundvall 2008 | |
| 27-Mar-02 | Saba | 4 | J. Magor, L. Costenaro | |
| 06-Mar-03 | Saba | unspecified | J. Magor, L. Costenaro | song |
| 6-Mar-03 | St. Eustatius, Anchor Pt. | 2 | Golden Rock Divers | |
| 24-Jan-04 | St. Eustatius - Zeelandia Bay | 3 | N. Esteban | breaching, moving north |

| Date | Location | Group size | Source/Reported by: | Comments |
|----------------|--------------------------------|-------------|---------------------------|----------------------------------|
| 27-Mar-04 | Saba | unspecified | J. Magor, L. Costenaro | song |
| 4-Mar-05 | Saba, Fort Bay | 10-Jul | J. Magor, L. Costenaro | breaching |
| 10-Jan-06 | Saba Bank | 3 | J. Magor, L. Costenaro | breaching, plus calf |
| 1-Oct-06 | Saba Bank | 2 | P. Hoetjes, Lundvall 2008 | female with calf |
| 28-Jan-06 | Saba | unspecified | Sea Saba | song |
| 6-Mar-06 | Saba (North) | 1 | J. and H. Bijl | video |
| 18-Mar-06 | Saba, Twilight Zone | unspecified | Sea Saba | breaching |
| 20-25 Mar 2006 | Saba Bank | 1 | IFWA 2006 | |
| 01-Apr-06 | Saba, Fort Bay | 2 | J. Magor, L. Costenaro | breaching |
| 30-Mar-07 | Saba, Ladder Labyrinth | unspecified | J. Magor, L. Costenaro | song |
| 16-Apr-07 | Saba, Green Island | unspecified | J. Magor, L. Costenaro | |
| 20-Apr-07 | St. Eustatius, Zeelandia Bay | 4 | N. Esteban | breaching, moving north |
| 12-May-07 | St. Eustatius, Oranje Bay | 1 | N. Esteban | breaching |
| 11-Jun-07 | St. Eustatius, Tumbledown Dick | 1 | N. Esteban (T. Keogh) | at tankers at berth for 4-5 days |
| 13-Jan-08 | Saba | unspecified | J. Magor, L. Costenaro | song |
| 23-Jan-08 | Saba, Green Island | 1 | J. Magor, L. Costenaro | |
| 02-Mar-08 | Saba, Tent Reef | 2 | J. Magor, L. Costenaro | |
| 26-Apr-08 | Saba, Ladder Labyrinth | 1 | J. Magor, L. Costenaro | |
| Mar-09 | Saba | unspecified | J. Magor, L. Costenaro | song |
| 02-Apr-09 | Saba, Tedran Wall | 1 | J. Magor, L. Costenaro | breaching |
| 13-Feb-10 | St. Eustatius, Zeelandia Bay | 3 | N. Esteban | heading north |
| 12-Feb-10 | Saba, Cove Bay | 1 | J. Magor, L. Costenaro | breachin |
| 16-Mar-10 | Saba Bank | 1 | J. Magor, L. Costenaro | |
| 01-Apr-10 | St. Eustatius, north | 1 | T. Bervoets | breaching |
| 03-Apr-10 | St. Eustatius, Zeelandia Bay | 2 | N. Esteban | breaching, moving north |
| 04-Apr-10 | Saba (North) | 2+ | J. and H. Bijl | photos |
| 06-Apr-10 | St. Eustatius, Zeelandia Bay | 3 | N. Esteban | breaching, moving north |
| 24-Apr-10 | St. Eustatius, Zeelandia Bay | 3 | N. Esteban | breaching, moving north |
| 01-May-10 | St. Eustatius, Zeelandia Bay | 2 | N. Esteban, T. Keogh | breaching |

Figure 1 The Dutch windward islands and their EEZ around Sint Maarten, Saba Island and Saint Eustatius



Annex B. Marine mammals of the leeward Dutch Caribbean (in review)

A review of the marine mammals of the Leeward Dutch Caribbean with notes on odontocete prey species

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Marine mammals of the Leeward Dutch Caribbean

ABSTRACT

We here provide a new overview and update of the marine mammals of the southern Caribbean leeward Dutch Islands: Aruba, Bonaire and Curaçao. At least 19 species are documented based on 209 sighting and stranding records. The previous principal review, dating from 1998, was based on only 70 records confirming 13 species. Bryde's whales, bottlenose-, spinner-, pantropical spotted- and Atlantic spotted dolphins appear to be present year-round. Humpback whales, sperm whales, Gervais' beaked whales, Cuvier's beaked whales, killer whales and short-finned pilot whales occur at least part of the year. The marine mammal fauna of the leeward Dutch Caribbean is evidently rich and varied. However, a range of human activities, such as coastal tourism, fishery and military activity, have been shown to cause disturbance and mortality to these animals. About a quarter of all records concern stranded animals. This is in sharp contrast to the windward Dutch Caribbean islands where only 3% of all records are from stranded animals. We also provide rare new data on the stomach contents of four stranded odontocete species, including the sperm whale. Most notable is that all Cuvier's beaked whales examined so far in the Leeward Dutch Caribbean contained remains of the crustacean *Gnathophausia ingens*. The Dutch Caribbean continues to remain seriously data deficient in respect to marine mammals. Most knowledge is based on incidental and opportunistic stranding and sighting data. Therefore, collaborative directed surveys are essential to conservation on a regional scale.

Keywords: Aruba, Bonaire, cetaceans, Curaçao, diet, *Gnathophausia*, sightings, strandings

INTRODUCTION

The Dutch Caribbean Exclusive Economic Zone (EEZ) as established on June 10th 2010, falls principally in the pelagic zone of the Venezuela Basin, and concerns two discontinuous areas, separated by a minimum of about 550 km. The leeward area is based around the southern Caribbean island group of Aruba, Bonaire and Curaçao, and amounts to about 71,000 km² of sea surface. The windward area is based around the north-eastern Caribbean islands of Saba,

St. Eustatius and St. Maarten, and amounts to a total sea surface of about 22,000 km² (Figure 1).

Debrot *et al.* (in press) have recently provided an assessment of the marine mammals of the windward Dutch islands. Although in the last decade several new studies have become available which provide additional information on the marine mammal fauna of the leeward Dutch waters (e.g. Debrot 2000; Debrot *et al.* 2006; Maldani 2008; Luksenburg 2011), a summary review of all the available data is still lacking. The aim of this paper is to give an overview of both published and previously unpublished records of marine mammals for the leeward sector of the Dutch Caribbean and to provide new insights into this important component of marine biodiversity.

We compiled, documented and reviewed a large number of published and unpublished strandings, sightings by reliable observers identifying distinctive species, as well as sightings and strandings reported to us but not identified with certainty. In our assessment we also included voluminous documentation freely available in the public media of the islands, such as newspapers, websites and sightings published on YouTube. Most of this material was collected by amateurs and had to be thoroughly re-evaluated, in particular concerning species identification. We decided that at this point we would not include the data collected in several directed studies in Aruba, as they are still on-going and not available. Also, the general results of one large directed study of bottlenose dolphins documenting 135 records of this species for Bonaire (Maldani 2008) are discussed, but not included in the database analysis of records because the directed nature of this study differs with the opportunistic origin of most other records and would skew the results. All other known and validated observations (both sightings and strandings) are added to the Dutch Caribbean marine mammal database (DC-MMDB) set up and managed by IMARES.

RESULTS

Database records

The newly set up marine mammal database for the Dutch Caribbean contains 209 marine mammal records for the leeward islands: 159 sightings and 50 strandings or animals found dead in the water, amounting to 19 confirmed species in total (see table 1). The islands with most species confirmed are Curaçao (15 species, 93 records) and Aruba (15 species – for which baleen whales remain unidentified at species level, 43 records). For Bonaire so far 12 species are identified (73 records).

The largest numbers of records are for the bottlenose dolphin (40) and spinner dolphin (39). These are followed by rorqual whales (20 - including 10 Bryde's whale records) and pantropical spotted dolphin (14), short-finned pilot whale (11), humpback whale (10), Gervais' beaked whale (9), sperm whale (8) and Atlantic spotted dolphin (8) (see figure 2). However, in terms of number of individuals, the spinner dolphin is much more common (1329) than the bottlenose dolphin (506), followed by short-finned pilot whale (370) and pantropical spotted dolphin (106).

There is no clear seasonal pattern in the occurrence of pooled cetacean records (see figure 3) although the data suggest a bimodal pattern. A similar bimodal pattern has been suggested for the occurrence of important baitfish in the leeward Dutch Caribbean (Zaneveld 1962).

Figure 4 suggests a relatively large and consistent increase in the frequency of reported strandings in recent decades, until the latest 5-year period (2005-2009), in which reported

strandings appear to have been lower. However, 2010 and 2011 indicates that the coming 5-year period may be relatively high again, as numbers stranded in 2010-2011 are already higher than in the whole period of 2005-2009. While temporal developments in stranding rates appear evident, it is not clear whether this represents an actual increase in cetacean stranding rates, or in likelihood of detection due to the general increase in (public) interest in cetaceans.

So far none of the species have been found or observed during every month of the year (see figure 5) although the spinner dolphin, bottlenose dolphin, pantropical spotted dolphin and baleen whales are likely to occur year round. This probably also holds true for the rough-toothed dolphin, although registered sightings are only known from March, April and June. During every month of the year one or another deep water specialist (sperm whales, beaked whales or pilot whales) can be observed.

Cuvier's and Gervais' beaked whales as well as killer whales, bottlenose dolphins, pantropical dolphins, and spinner dolphins are known from all three islands. Bryde's whales and humpback whales are known for the waters of Curaçao and Bonaire while for the waters of Aruba all rorqual records remain unidentified or unconfirmed (most likely they concern Bryde's whale). So far the melon-headed whale is unknown for the waters of Aruba while false-killer whale, Risso's dolphin and Atlantic spotted dolphin have exclusively been documented here. The Fraser's dolphin is only recorded for Bonaire. The sperm whale, dwarf sperm whale, short-finned pilot whale and rough-toothed dolphin have not yet been documented for the waters of Bonaire.

SPECIES ACCOUNTS

BALEEN WHALES

Bryde's whale – four strandings, six sightings

Although occurring in low density (Notarbartolo di Sciara 1983) the Bryde's whale (*Baleanoptera edeni*) is the most common rorqual of the south-eastern Caribbean and is the most-often sighted great whale in the leeward Dutch Antilles. Bryde's whale is one of two whale species with a local name, and is known by elder Bonairean fishermen as the "tó-pó" (Debrot 1998), indicating a historically regular appearance, particularly in association with feeding tuna schools. The first documented record for the species dates from 1961 (Soot-Ryen 1961). This species is likely to be relatively common in the summer and late fall months, but present in lower numbers during the remaining part of the year (Figure 5). The animals seen in the leeward Dutch Antilles are probably part of the Venezuelan stock associated with the area of upwelling off the coast of Venezuela, and can be expected to track the seasonal pattern in baitfish abundance (Watkins *et al.* 1979; Zaneveld 1962).

Four of the ten Bryde's whale records concerned dead or stranded animals. In January 2000, one Bryde's whale was found struck dead by collision with a cruise ship just east of Bonaire (Stinapa Bonaire). In July 2000, one animal was found dead on Klein Curaçao (Carmabi) and in October 2001 another one was found at Hambrak, Curaçao. In November 2001, the Coast Guard sighted and photographed two individuals swimming near Oostpunt (Curaçao) (Barros and Debrot 2006).

Unidentified rorqual – two strandings, ten sightings

According to Soot-Ryen (1961) schools of whales were regularly to be observed between Curaçao and Venezuela, especially in May – June and between Curaçao and Bonaire in December. This information was given to him by several people from Curaçao but they could give no indication about which species it were. It was probably involves rorquals. Slijper and van Utrecht (1959) wrote that rorquals occurred in great numbers in the Caribbean especially near the coast of Venezuela. It took until the early nineties before the first specimens were recorded. Both in November 1992 and September 1996, unidentified rorqual whales were observed in the waters of Bonaire and noted (Debrot *et al.* 1998). Also a rorqual whale was sighted near Daimari (Arbua) in 2001 but could not be identified. In July 2004, unidentified rorqual whales were sighted repeatedly for several days along the south coast of Curaçao, probably involving re-sightings of the same pod. On July 11th at least four animals were seen near Oostpunt (Coastguard) and later at least two animals were seen near Jeremi (pers. obs. J. Halabi). For the next three days at least two animals were seen swimming at Cornelisbaai (pers. obs. F. Isabella). The animals were seen foraging within tuna schools, which suggests Bryde's whale as opposed to fin whale (*Baleanoptera physalus*) (Barros and Debrot 2006). In April 2011, one decomposed adult rorqual (Arikok National Park) and later one rorqual calf (Rodger Beach) were found on Aruba, both believed to be Bryde's whales (AMMF). So far, Bryde's whale within the Aruban waters have never been documented with certainty. In October a roqual calf was filmed near Bonaire (Mr. A. Compagne) that couldn't be identified with 100% certainty but most likely was a Bryde's whale. A second calf in one year indicates that the Dutch waters are part of the reproductive area of rorquals.

Other rorqual species such as blue whale (*B. musculus*), sei whale (*B. borealis*) and minke whale (*B. acutorostrata*) have been sighted in deeper waters in the north–central area of the wider Caribbean (Mullin *et al.* 1994), but as yet no records are known for the leeward Dutch islands. We conclude that these species are not likely to be found in the leeward Dutch Caribbean, except incidentally.

humpback whale – ten sightings

Humpback whales (*Megaptera novaeangliae*) in the Caribbean are strongly associated with banks and other shallow waters. They occur as far southwest as the Venezuelan waters (Acevedo *et al.* 2008; Bolaños-Jiménez 1998, 1999; Bolaños-Jiménez and Boher 2001; Bolaños-Jiménez and Villaroel 2003; Reeves *et al.* 2001; Robbins *et al.* 2006; Swartz *et al.* 2003) and therefore most likely occur in the whole leeward Dutch Caribbean (Debrot 1994; Debrot *et al.* 1998; Barros and Debrot 2006). Six sightings were reported up to 1998, but only from Curaçao (4) and Bonaire (2) (Debrot 1994; Debrot *et al.* 1998). Four sightings have been documented since. Three animals were seen near Klein Bonaire in June 2002, one animal was seen at the Aquarius dive site of Bonaire in December 2005 and one Humpback whale was seen near Pink Beach, Bonaire, in January 2007. Finally one animal was seen near Daaibooi, Curaçao in January 2009.

TOOTHED WHALES

sperm whale – six strandings and two sightings

The distributional range of sperm whales (*Physeter macrocephalus*) includes the deeper basins of the Caribbean Sea and Gulf of Mexico (Dufault *et al.* 1999, Gero *et al.* 2007). Until 1998, sperm whales were only reported twice for the leeward Dutch islands, one stranded in 1969 (Carmabi 1971; van Bree 1975) and one sighted in 1993 near Curaçao (Debrot and

Barros 1994; Debrot *et al.* 1998). Since then a total of six additional records have been compiled (1x sighting, 2x entanglement and 3x stranded) for both Aruba and Curaçao waters. On December 5th 2001 the Coast Guard sighted two sperm whales near Oostpunt (Curaçao). Three weeks later one was found dead at Hambrak Chiki (Carmabi). The stomach of this latter specimen contained 141 squid beaks which have been partially identified following Clarke (1986), courtesy of the late Dr. Nelio Barros (Table 2). The key families represented are Histiotteuthidae, Onycoteuthidae and Cranchiidae.

Several fishery-related strandings have also been recorded for this species. In 2003 a dead sperm whale, entangled in Fishing Trawler's ropes, stranded near Baby Beach (Aruba), and in 2010, two dead sperm whales (assumed to be mother and calf) were found entangled in a driftnet a couple of miles offshore in Aruban waters (Carib Media 2011). On January 21st 2011 again a dead sperm whale was found drifting four miles from the Aruban coast. This sperm whale was about 12m long and was in a state of decomposition, indicating it had been dead for at least four days. There were no visible clues as to the potential cause of death, although it did have nylon fishing line wrapped twice around its torso (Carib Media 2011).

dwarf sperm whale – two strandings

Both *Kogia* spp. species have been reported in the wider Caribbean throughout the year implying their residency in the Caribbean. However, so far only two dwarf sperm whales (*Kogia sima*) are known to have stranded on the leeward Dutch islands. One adult specimen stranded on Aruba in 1984, and one calf stranded on Island of Klein Curaçao, in December 1989 (Debrot and Barros 1992, Debrot *et al.* 1998). No records of pygmy sperm whales (*Kogia breviceps*) are known for the leeward Dutch islands or Venezuelan waters yet, and based on the distribution of known records for the wider Caribbean they are unlikely to be found in the south-western Caribbean (Cardona-Maldonado and Mignucci-Giannoni 1999; Bolaños-Jiménez *et al.* 2006). *Kogia* spp. appear to prey on pelagic crustaceans such as *Gnathophausia*, relatively frequently.

Cuvier's beaked whale – six strandings and one sighting

Cuvier's beaked whale (*Ziphius cavirostris*) stranding records indicate that the species occurs in deep basins along most coasts and in areas where the continental shelf is narrow and coastal waters are deep such as around many oceanic islands (Klinowska 1991). The first recorded Cuvier's beaked whale for Curaçao was an unconfirmed sighting from 1961 (van Bree 1975, van Bree *et al.* 1973). Since then six records of strandings have been documented. Twice Cuvier's beaked whales have been reported stranded on Curaçao, one in 1973 and one in April 1997 (St. Annabaai). Twice they were found on Bonaire. Four specimens were found stranded together on Playa Grandi in April 1974 (van Bree and Kristensen 1974) and one was found on Playa Chikitu in February 1991. On Aruba, Cuvier's beaked whales have also been found stranded twice; on Boca Grandi in December 1991 and one at Baby Beach (with photo in local newspaper) on March 30th 2003 (Debrot and Barros 1994; Debrot *et al.* 1998). Four unidentified squid beaks were recovered from the stomach of the 1991 Bonaire specimen, as well as crustacean remains, all belonging to a species of giant lophogastrid mysid *Gnathophausia* cf. *G. ingens*.

Gervais' beaked whale – nine strandings

So far nine strandings concerning twelve Gervais' beaked whales (*Mesoplodon europaeus*) are known from the Dutch leeward islands of which three before 1998: One stranding on

Curaçao in 1990 (Playa Manzanina), a second stranding on Curaçao in 1994 (St. Annabaai) and a double stranding on Bonaire (Playa Onima) in 1997 (Debrot and Barros 1994; Debrot *et al.* 1998). In addition two animals were found stranded on Hadicurari beach in Aruba (Barros and Debrot 2006) in 1998. Since then, a second Aruban stranding was recorded for Rincon (Loong Fat Hoo) in 2004, while four additional strandings were noted for Curaçao: San Nicolas in 1999, and 2004, Slangenbaai in 2003, and Boka St. Michiel in 2006 (Barros and Debrot 2006). The specimen of San Nicolas in 1999 had squid, fish and *Gnathophausia* remains in the stomach, as well as parasitic roundworms. The stomach of the 2004 specimen contained 0.9 g of squid remains, 22.1g of *Gnathophausia* remains, 4.3 g of parasitic roundworms and a 9.0 g plastic fragment. This is the second Dutch Caribbean specimen for which ingestion of plastic is reported. The stomach of the Slangenbaai specimen contained remains of the crustacean *Gnathophausia*, fish bones, 15 squid beaks and parasitic roundworms. The squid beaks were identified by Dr. Nelio Barros as follows: 2 *cf. Teuthowenia* sp.; 1 *Taonius* sp. (Cranchiidae); 2 Lepido-Octopoteuthidae; 2 *Histioteuthis* sp. (Histioteuthidae); 4 Ommastrephidae (*Illex* or *Ommastrephes*) and 4 unidentified. These squids are principally epibenthic and mesopelagic in habit.

Within the study area no live sighting records are known for this species. Beaked whales are generally difficult to distinguish because of few diagnostic characteristics, and difficult to observe because of their deep and long diving habits and low observer densities in their deep water off-shore habitat.

melon-headed whale – two strandings and one sighting

Surveys in the Caribbean during 1988, 1990, and 1994 by Palacios *et al.* (1995, 1996), during 1991 by Jefferson and Lynn (1994), and during 1995 (Mullin, pers. comm) did not yield any sighting of the melon-headed whale (*Peponocephala electra*). However, Debrot *et al.* (1998) reported a stranding (1982) and a sighting (1997) for Bonaire. In addition, since 1998 one animal was found stranded on Lac (Bonaire) on October 5th 1999 (pers. obs. Scholtens in Barros and Debrot 2006).

short-finned pilot whale – two strandings and nine sightings

As the short-finned pilot whale (*Globicephala macrorhynchus*) is known by elder fishermen of the leeward islands as “kabe’i keshi” (literally “cheese head”) it appears to be traditionally present in leeward Dutch Caribbean waters. Although the species has been documented for the wider Caribbean throughout most of the year and was considered to be commonly sighted (Debrot *et al.* 1998), since 1998 it has only been sighted twice (about 50 animals near Watamula in 2006 and the same number near Playa Kalki in 2009 – both SCCN) and one male with hearing loss (Mann *et al.* 2010) was found stranded on July 14th, 2009 on Jan Thiel beach (south coast), Curaçao.

false killer whale – one confirmed sighting

The false killer whale (*Feresa attenuata*) was first confirmed for the leeward Dutch Caribbean by a sighting of twelve animals in the coastal waters of Aruba in April 2010 (Luksenburg 2011). An earlier reported sighting for this species (Agudo and Ponson 1996) appeared to have actually concerned a short-finned pilot whale (LeDuc *et al.* 1997; Debrot *et al.* 1998). In December 2010 a film was uploaded on Youtube showing a sighting of at least three cetaceans in Aruban waters, most likely (but not confirmed) to be false killer whales. Although its distribution in the Caribbean is poorly known, false killer whales have been

reported regularly in the Venezuelan part of the leeward Antilles (Las Aves and Los Roques Islands (Romero *et al.* 2001) and therefore their appearance in the waters of the leeward Dutch islands is not unexpected.

killer whale – seven sightings

The killer whale (*Orcinus orca*) is sighted irregularly in the Caribbean, with anecdotal sightings throughout the West Indies island chain. However, the paucity of records of sightings and strandings indicate that killer whales are relatively rare in the area. From February 2001 through January 2008, twelve sightings were recorded off central and northeastern Venezuela but occurrences of the killer whale off Venezuela remain scarce (Bolaños-Jiménez *et al.* 2009). For the leeward Dutch islands until recently just seven records were known. In March 1995 two animals were seen from Hambrak (Curaçao) and in November 1995 two animals were seen near Baby beach (Bonaire). In October 1996 one animal was seen at Spelonk (also Bonaire) (Debrot 1998). However, in August 2008, the Coast Guard sighted a pod of several killer whales between Bonaire and Curaçao. In October 2009, one killer whale was observed by the Coast Guard near Sta. Catharina (Curaçao) while in November 2009, again several killer whales were observed by them, in the waters of Aruba. In October 2011 two killer whales were discovered one mile from Barbara Beach, Curaçao of which one was a male.

Risso's dolphin – one stranding

The Risso's dolphin (*Grampus griseus*) is considered to be rare in the south-western Caribbean (Bermúdez-Villapol *et al.* 2008). So far only one record is known from the leeward Dutch islands. One adult was found stranded on Aruba in November 1993 (Agudo and Ponson 1996). In Venezuelan waters this species is limited to the north eastern basin, occupying areas with variable underwater relief, with deep slopes (Bolaños-Jiménez *et al.* 2006). Most likely, also in the western Caribbean, Risso's dolphin distribution is related to their main prey: deep-water cephalopods. Therefore they are not expected to be common in the waters of the leeward Dutch islands.

rough-toothed dolphin - five sightings but more unregistered

The rough-toothed dolphin (*Steno bredanensis*) does not appear to be particularly numerous in any specific area of the Caribbean. Bolaños-Jiménez and Boher (1996) reported that rough-toothed dolphins had been sighted off Venezuela but there is only one stranding known of this species in Venezuela. According to a good photo in the local newspaper in 1998 one rough-toothed dolphin was sighted at Mangel Haltu (Aruba) (Barros and Debrot 2006). Until recently this was the only record known for the leeward Dutch islands but by now it appears that this species is resident in the coastal waters of Aruba and maybe also Curaçao. On December 9th 2007 one breaching rough-toothed dolphin was photographed near Malmok, Aruba. On March 29th 2008 three animals were filmed at Boca Catalina (Aruba) and they were (probably) re-sighted and filmed on April 25th. Since then, unregistered observations of adults with their young over several years suggest that the Aruban waters may provide a nursing area for this species. On June 6th 2008 at least eight rough-toothed dolphins (with one juvenile) were filmed by a tourist near Santa Cruz, Curaçao, providing the first evidence for occurrence in its waters.

bottlenose dolphin – 40 opportunistic sightings (and 135 dedicated sightings)

A clearly resident species is the bottlenose dolphin (*Tursiops truncatus*). Debrot *et al.* (1998) mentioned that the bottlenose dolphin was the second most commonly sighted cetacean in the Leeward Dutch Antilles. While the species was evidently present most of the year, peak abundance appeared to be in spring and summer. Besides 25 records for the waters of Bonaire so far, 11 records are known for Curaçao and just 4 for Aruba. Publicly the bottlenose dolphin is well known to occur in Aruban waters but sightings are seldom recorded and therefore within the database this species is almost absent for Aruba. This is also indicated by dedicated observations of the resident bottlenose dolphins along the west coast of Bonaire between 2005 and 2008 resulting in over 135 sightings. In the area around this island photographs of bottlenose dolphins have been taken over three different months in 2008 and over 64 different individuals have been catalogued. Based on these records (not yet added to the DC-MMDB) it's clear that bottlenose dolphins are present year-round in Bonaire. They were reported to always travel in a north-south direction on the west side of the island at all times of day. They were also reported circumnavigating the small island of Klein Bonaire in a counter clockwise manner and then crossing over to the town of Kralendijk to resume north-south movements (Maldini 2008). The observation of a newborn calf suggests that bottlenose dolphins may use the coastal waters of Bonaire as a nursery area (Bonaire Coastal Dolphin Project).

spinner dolphin – 39 sightings

Spinner dolphins (*Stenella longirostris*) are fairly common in the waters of the leeward Dutch islands. So far they represent about 20% of all opportunistic sightings and findings of stranded animals and therefore are the most-commonly sighted species in these waters. They are seen throughout the year with highest number of sightings in July and August (see figure 5). They are numerically by far the most common species found, amounting to 47% of all animals counted. Also in eastern and the adjoining central maritime zones of Venezuela, spinner dolphins are known as fairly common (Romero *et al.* 2001). The first confirmed sighting for the waters of Aruba took place on April 15th 2010. A group of at least 70 were observed about 8 km off the southeast coast (Luksenburg 2011). However it appeared that on December 15th 2007 a group of at least 20 animals was filmed in the coastal waters of Aruba and another six near Belmar on October 13th 2008. Both films were placed on Youtube and links are added to the DC-MMDB. The first record for Curaçao dates from July 5th 1991 (Jefferson & Lynn 1994) and the first record for Bonaire dates from May 29th 1997 (obs. M. Kowalski in Debrot *et al.* 1998).

Atlantic spotted dolphin – two strandings and six sightings

Within the coastal Venezuelan waters the Atlantic spotted dolphin (*Stenella frontalis*) is the most commonly observed species in both sighting frequency and absolute numbers (Bolaños and Villaroel 2003). Despite this, until recently they were not known for the waters of the leeward Dutch Islands. However, several records now exist for Aruba, which lies on the continental shelf. In November 1993 and February 1995, 16 respectively 19 animals were seen on the southeast coast of Aruba while both times one animal of the group stranded on a coral reef (Buikhuizen in: Agudo and Ponson 1996). More recently, on October 13th 2008, three Atlantic spotted dolphins were seen about 15 miles off the coast of Aruba (pers. obs. Eric Mijts). About 2.2 km off Reef Island, Aruba, several Atlantic spotted dolphins with at least one calf among them were seen on April 22nd 2010 (Luksenburg 2011). So far *S.*

frontalis, a typical continental-shelf species, has not been reported for the waters of Bonaire and Curaçao.

panropical spotted dolphin – four strandings and ten sightings

Until 1998, panropical spotted dolphins (*Stenella attenuata*) were only recorded three times in waters of leeward Dutch island. In July 1991 a stranding of a dolphin at Kaap St. Marie, Curaçao was initially identified as striped dolphin but was later confirmed by genetic analysis to be a panropical spotted dolphin (LeDuc *et al.* 1997). In 1995 over 50 animals were seen near Klein Curaçao and another 15 animals near Caracasbaai (Debrot *et al.* 1998). Since then this species was sighted three times (in 1999 near midway Bonaire, in 2002 near Klein Curaçao and in 2005 at Fuikbaai) and found stranded three times at Curaçao (at Barbara Beach in 2000, at Savonet in 2002 and at Avila Beach in 2002) (Barros and Debrot 2006). On 25 September 2010, Luksenburg saw and filmed panropical spotted dolphins in Aruban waters. This was the first photographic documentation of this species in Aruban waters. They were sighted further offshore than the Atlantic spotted dolphins (Luksenburg 2011). Considering these new records and what is known from the wider Caribbean (Mignucci-Giannoni *et al.* 2003), in the study area this species may be less rare than previously thought.

The stomach contents of the 2000 specimen can be reported based on 14 squid beak remains partially identified by the late Dr. Nelio Barros. The squid remains amounted to 3 lower beaks of *Ancistrocheirus lesueuri* (Enoploteuthidae), 3 lower beaks of *Brachioteuthis* sp. (Brachioteuthidae), 5 lower beaks of an ommastrephid (possibly *Illex* sp.), and three beak tips, one likely from a *Megalocranchia* sp. (Cranchiidae). The first two and last species are generally meso-bathypelagic in distribution, whereas the ommastrephid can be epipelagic.

Clymene dolphin – none confirmed

The Clymene dolphin (*Stenella clymene*) was considered to be one of the variations of the spinner dolphin until it was fully described as a distinct species in 1981 (Perrin *et al.* 1981). There is considerable overlap in the range of Clymene and spinner dolphins in the Atlantic, and they are difficult to distinguish at sea (Jefferson and Curry 2003). According to the IUCN this species is native to the Netherlands Antilles. This is based on a record for Carriacou (Grenada) erroneously reported by Perrin *et al.* (1981) for Curaçao (Fertl *et al.* 2003). Within the waters of Venezuela, the species may be rare as there is only one record for an individual incidentally captured in gill nets and utilized for longline shark bait and human consumption (Agudo 1990; Romero *et al.* 1997). Even though the species has not been confirmed for the Dutch Caribbean, because the Clymene dolphin is difficult to distinguish at sea from the spinner, certain sightings recorded here as spinner dolphins could actually concern the Clymene dolphins.

striped dolphin – four strandings and one sightings

Striped dolphins (*Stenella coeruleoalba*) are a deep water species and come near to shore only where the oceanic drop-off (deeper than 200 m) is close to the coastline. This species is not uncommon in the Gulf of Mexico (Jefferson and Schiro 1997) and several records are known from the Caribbean Sea, three of which in Venezuelan waters (Romero *et al.* 2001). In 1972 two animals were sighted between Curaçao and Bonaire (Debrot *et al.* 1998). In 1997 one striped dolphin was found stranded at Parasassa (Debrot *et al.* 1998). Another specimen

initially reported as striped dolphin was later confirmed by genetic analysis to be a pantropical spotted dolphin (LeDuc *et al.* 1997). Just three new records of this species have occurred since 1998. On December 5th 2004 one striped dolphin was found stranded at Superior Producer, Curaçao (Carmabi) and on September 5th 2009 one was found stranded at Westpunt, Aruba (AMMF). In October 2011 one male was found stranded north of Salt Pier on the Southwest coast of Bonaire (Simal 2011).

Fraser's dolphin – one stranding

Fraser's dolphins (*Lagenodelphis hosei*) are a little known tropical species with few records from the Atlantic Ocean (Leatherwood *et al.* 1993). Rarely seen inshore, except around oceanic islands, this tropical pelagic species was first described in 1956 from the remains of an in 1895 beach-washed specimen found on Borneo (Fraser 1956). Like false and pygmy killer whales, they appear to favour deep waters and rarely stray into the relatively shallow depths over the continental shelf. Until very recently, so little was known about this species that there was no basis for speculating about its distribution within the study area. It was hypothesised that it may occur here because it has been spotted in the Gulf of Mexico and north(east)ern part of the Caribbean (Watkins *et al.* 1994, Mignucci-Giannoni *et al.* 1999, Romero *et al.* 2001). However on 5th August 2011 a dead female washed ashore on Bonaire (Sorobon) as a first record for the south-western Caribbean (Witte *et al.* in prep). The specimen had crustacean remains (cf. *Gnathophausia ingens*, AOD, pers. obs.) in its throat.

SIRENIANS

The persistence of the Antillean manatee (*Trichechus m. manatus*) in the Lesser Antilles until the early 17th century suggests that in pre-Columbian times manatees would have also occurred more frequently in the leeward Dutch islands. In pre-Columbian times, suitable habitat for the manatee was possibly present. The species has been widely hunted by early humans and small, isolated populations of this species could easily have been extirpated in the leeward Dutch islands well prior to European colonization (Debrot *et al.* 2005). Today, suitable habitat is clearly absent in and around the ABC islands, and therefore this species only occurs sporadically with three sightings for Curaçao so far. In the late 1970s one animal was seen in the vicinity of Boka Wandomi, on February 1st 2001 a single animal was seen near Directiestrand, Caracasbaai and on September 12th 2005 one was seen and photographed in the coastal lagoon of Ascención on the northeast coast of Curaçao (Debrot *et al.* 2005).

DISCUSSION AND CONCLUSION

FAUNISTIC ASSESSMENT

While some 33 species of marine mammals are known from the Western Central Atlantic, 25 are known from the expansive neighbouring maritime areas of Venezuela (Romero *et al.* 2001). Three of the latter species are principally limited to the freshwater and estuarine Amazon River basin and are unlikely to be encountered in the Dutch Caribbean (Boto, Tucuxi and Guiana dolphin). Species so far not confirmed for the leeward Dutch islands but possibly occasionally occurring (based on their Caribbean-wide distribution) are: fin whale, sei whale, pygmy killer whale and long-beaked common dolphin. Two other species (pygmy sperm whale and Blainville's beaked whale) are less likely to occur but should not be fully ruled out. Fin whales and sei whales may winter in the Caribbean, and occasionally may be sighted where deep water approaches the coast (Gambell 1985; Jefferson *et al.* 2003; Rice 1998). Lira

et al. (1995) for instance reported strandings of two fin whales off Venezuela, but they have not yet been documented for our study area at this point.

The pygmy killer whale (*Feresa attenuata*) is an offshore, tropical and subtropical delphinid found in the Atlantic, Indian and Pacific Oceans with so far just five records for the Caribbean: a pygmy killer whale was by-caught and landed on St. Vincent as part of the lesser Antilles short-finned pilot whale fisheries in 1969 (Caldwell and Caldwell 1971), a mass stranding at the Virgin Islands in 1995 (Mignucci-Giannoni *et al.* 1999), a stranding at Puerto Rico in 1997 (Rodríguez-López and Mignucci-Giannoni 1999) and twice a stranding at the coast of Venezuela (Villaroel *et al.* 1998, Villaroel *et al.* 2001). So far no records no records are known for the Dutch leeward islands.

A beaked whale for which the Wider Caribbean belongs to its range, but so far never recorded for the Dutch sector, is the Blainville's beaked whale (*Mesoplodon densirostris*). Most records for this species are along the Atlantic margins of the Caribbean and the species may only be incidental in the Caribbean proper. Still, it cannot be fully excluded that this species may also occur in the waters of the Dutch leeward islands.

The common dolphin (*Delphinus spp.*) so far has been reported only occasionally from around the Caribbean (Roden & Mullin 2000). The only place within the Caribbean Sea where long-beaked common dolphins (*Delphinus capensis*) are confirmed to occur is off central-eastern Venezuela (Jefferson *et al.* 2009). This is a notable location where coastal upwelling occurs in the Caribbean, northeast Venezuela. Here it is known that this very well-documented (coastal) population of long-beaked common dolphin's specimens are taken in fisheries (Romero *et al.* 1997). So far this species has not yet been observed in Dutch Caribbean waters, but this may be a matter of time given the occurrence in the nearby waters of Venezuela. The short-beaked common dolphin (*D. delphis*) is distributed from north of Newfoundland south to 32°N (Jefferson *et al.* 2009) and is therefore not likely to be found within our study area.

Recent claims for the Wider Caribbean most likely consider extralimital hooded seals (*Cystophora cristata*) or escaped Californian sea lions (*Zalophus californianus*) (Mignucci-Giannoni and Odell 2001). The extinct Caribbean monk seal (*Monachus tropicalis*) namely was virtually wiped out by the early to mid-1900s. Arawak Indians of Curaçao hunted West Indian monk seals at Klein Curaçao within historic times (Debrot 2000; van Grol 1934), but the species is no longer extant.

NOTES ON PREY SPECIES

In this paper we present rare new information on the stomach contents of several cetacean specimens, among which a sperm whale, a Curvier's beaked whale, three Gervais' beaked whales and a pantropical spotted dolphin. Further prey remnants were found in the buccal cavity of a stranded Fraser's dolphin.

Among all toothed whales, the diet of the sperm whale is about the best known (Whitehead 2003). Its diet of cephalopods varies greatly between geographic areas but practically nothing is known for the tropical Western Atlantic (Whitehead 2003). In our specimen, three squid taxa were identified to the species level (Table 2). Beaks of *Taningia danae* were fairly common. This species grows up to 7 feet in length and is relatively cosmopolitan. *Taonius pavo* grows to a mantle length of 50 cm and is found world-wide in temperate and tropical regions. This specimen has often been documented from sperm whale stomachs before. Finally, *Lepidoteuthis grimaldii* is a large squid growing to a mantle-length of more than 3

feet and known from the tropical and subtropical regions world-wide. It has also been commonly documented from sperm whales before. The sperm whale eats principally cephalopod squids and shows a wide dietary range, taking both small and large species from many different families. Nevertheless, evidence indicates that the sperm whale principally targets small prey and that it therefore must feed relatively continuously.

We here report a specimen of Cuvier's beaked whale with squid beaks and *Gnathophausia* crustacean remains in its stomach. Previously, Debrot and Barros (1994) had reported both squid and crustacean remains from the stomach of this species. A recent review of the food habits of this species concludes that *Z. cavirostris* appears somewhat opportunistic but crustacean remains have been only very rarely reported (Santos *et al.* 2001). In this context it is interesting that this is a second specimen from the southern Caribbean with *Gnathophausia* remains in its stomach.

For the four new records we here report for stranded Gervais' beaked whales in Curacao, stomach contents was examined for three of the specimens and all three contained remains of the crustacean *Gnathophausia*. In addition, all the other three Cuvier's beaked whales stranded in the leeward Dutch Caribbean and for which stomach contents have been examined also contained remains of this crustacean (Debrot and Barros 1992, Debrot 1998, Debrot *et al.* 1998). This is noteworthy in light of a recent review by McLeod *et al.* (2003), and suggests that the use of *Gnathophausia* as food by Gervais' beaked whale is especially important in the (southern) Caribbean. Squid taxa identified from the stomach of one our new Gervais' beaked whale specimens are principally epibenthic and mesopelagic in habit, which does fit with what is already known for this species (McLeod *et al.* 2003).

The squid species we here report from the examined stomach of a pantropical spotted dolphin ranged from meso-bathypelagic and epi-mesopelagic in distribution, indicating a wide depth range for food species. The prey species concerned could be taken at depths of 500-1000 m during the day or at shallower depths during the night, as some species are known diel vertical migrators (Dr. Nelio Barros, pers. comm.). The only taxon identified to the species level was the squid *Ancistrochirus lesueuri*. This is a moderately-sized, principally mesopelagic squid with mantle lengths up to 25 cm and cosmopolitan in tropical and subtropical oceans. Wang *et al.* (2003) studied the food habits of the pantropical spotted dolphin in Taiwan and concluded that it may have been foraging for squid at night at depths beyond an upper limit of 150 m. Spott and Chivers (2009) found the species feeding principally at night at depths averaging around 100 m, but not exceeding 200 m. Nevertheless, further studies on food partitioning between several dolphin species suggest that while *S. attenuata* shows a wide dietary niche, it mostly utilizes prey near the surface (Wang *et al.* 2011).

Beaked whales and sperm whales forage on at least three prey types, including crustaceans and fish, but mainly cephalopods. All prey are considered to be deep water species, principally of the meso- to bathypelagic zones. So far at least 131 cephalopod species are mentioned for the wider Caribbean (Judkins 2009). Commercial species of squid and octopus occur throughout the Caribbean (Gracia 2002). Coastal species include the economically important *lologinids* and *octopods*. Offshore, the *ommastrephids* and *histioteuthids* are of greater importance (Judkins 2009). Commercially-interesting squid concentrations are known to be present along the leeward islands and along the coast of Venezuela in areas of upwelling (Voss 1986). However, species diversity around the Dutch leeward islands may be much lower (Judkins 2009). From the Venezuelan continental shelf waters at least 28 cephalopod

species are known, of which *Loligo pealeii*, *L. plei* and *Illex coindetti* are most abundant (Arocha *et al.* 1991).

No less than eleven species of odontocetes take crustaceans at least occasionally, but *Kogia* spp. appears to prey on them relatively frequently. *Gnathophausia*, in particular, has been reported from dwarf and pygmy sperm whale (West *et al.* 2009), Gervais' beaked whale, Cuvier's beaked whale (Debrot and Barros 1994), sperm whale and Fraser's dolphin. A better understanding of the (seasonal) distribution of deep water cephalopods and crustaceans may be key to understanding cetacean foraging in the southern Caribbean.

STRANDINGS AND MAN-RELATED CETACEAN MORTALITIES AND DISTURBANCE

The southern Caribbean Dutch EEZ sector stands out for its much higher stranding incidence and higher frequency of man-caused mortalities in comparison to the northern Caribbean Dutch EEZ. Whereas only three records in the windward Dutch EEZ have so far concerned strandings (Debrot *et al.* in review), in the leeward sector strandings accounted for 24% of all analysed records. There are many potential causes which may underlie or contribute to this large difference between the two sectors. For instance, even the contrasting difference in island size and general accessibility of the coastline between the windward and leeward Dutch islands could play a role (Debrot *et al.* 2011). However the potentially more serious possibility may be a regional difference in cetacean mortality rates, either due to natural or anthropogenic causes, such as the intensive and possibly questionable fishery practices taking place in the southern Caribbean (Sturm 1991, Romero *et al.* 1997) or noise (Mann *et al.* 2010). The need for and added-value of a regional assessment of fisheries-related cetacean mortality has been stressed before (Bjorkland *et al.* 2007).

Debrot *et al.* (1998) pointed out an apparent increase in stranding incidents in the leeward Dutch EEZ after 1989, the causes whereof remained unknown. Since then, strandings (category includes all incidences of dead cetaceans) have continued to remain high (21 strandings since 2000). Van Bree and Kristensen (1974) were the first authors to suggest possible mortalities caused by man (Dutch naval operations) for the stranding of beaked whales in Bonaire. Debrot and Barros (1994) documented a head of *Stenella attenuata* obviously severed by man, but also point out that marine mammals are not taken or used as bait by fishermen in the Dutch Caribbean. This was in contrast to the situation at that time upstream in bordering Venezuela (Romero *et al.* 1997, 2000; Romero and Hayford 2000). Debrot (1998), as well as this study, have documented ingestion of man-made materials by beaked whale stranded in Curaçao. Evidence compiled, indicate that in any case until recently, fishing-related mortality of marine mammals in Venezuela has been frequent and persistent (Agudo 1991, Romero *et al.* 1997). Our documentation of numerous recent cases of man-related mortality (two cases involving sperm whales entangled in fishing gear adrift in Aruban waters) and a lethal ship strike to a juvenile Bryde's whale near Bonaire), show that this issue remains a serious point of concern. In this, it should be kept in mind that detected strandings of dead cetaceans are only a fraction of the actually occurring mortalities (Williams *et al.* 2011).

The last decade has further seen an explosive increase in touristic and recreational use of coastal zones of the leeward Dutch islands of Aruba, Bonaire and Curaçao (Meesters *et al.* 2010). The concomitant massive growth in the number of fast pleasure and recreational

vessels along the coast today means that when cetaceans approach the coasts of these islands during daylight hours they are more easily detected and followed than ever before by the curious and interested public. Increasingly often, this generally well-intentioned and genuine interest in these unique animals takes place in an irresponsible way. Marine mammals are often followed closely and persistently for long distances whereby enthusiasts will swim with these animals and interact at close quarters. No guidelines have been established for human conduct around marine mammals. As public and touristic interest in these animals continues to grow, as well as their detectability and vulnerability to disturbance (fast vessels), the need for protective measures and guidelines is urgent.

ECONOMIC SIGNIFICANCE AND POTENTIAL

Marine mammals are spectacular species that are of growing significance to recreation and tourism throughout the region, as well as in the Dutch Caribbean. Their economic value is no longer as a fisheries resource but in terms of recreational and touristic value. They even open possibilities for whale watching as a distinct product once a minimum dependable density of cetaceans is reached. According to a recent assessment, cetacean densities in Dutch Caribbean St. Maarten may now already be sufficient to warrant directed whale watching as a touristic niche product (SMNF 2011). Bringing economic advantages to many coastal and island nations, cetaceans are certainly worth more to man alive than dead.

Whale watching in the Caribbean has grown in recent years to an important new 10+ million dollar a year industry and it continues to have additional potential. Before using this potential resource, adequate protection and recovery measurements are needed first. An example of such a process can be seen in Curaçao and its sea turtles. Until the 1990's, sea turtles were so rare that they were only sporadically seen. However, since their legal protection by the island government in 1996, numbers have rebounded. Now sea turtle sighting can be offered as a major attraction in various areas of the island (e.g. Debrot *et al.* 2005), as well as in Bonaire and Aruba. In a similar process, for the leeward Dutch islands to truly benefit from the potential of marine mammal tourism, long term conservation of these species and their habitat must come first.

We conclude by pointing out that the Caribbean region including the Dutch Caribbean has not benefited from dedicated or consistent marine mammal research efforts and continue to remain seriously data deficient with respect to cetaceans (Ward *et al.* 2001; IWC 2007; Debrot *et al.* 2011). Most knowledge is based on incidental and opportunistic stranding and sighting data. Therefore, collaborative directed surveys to elucidate cetacean hotspots, distribution and migration patterns are essential to a basic understanding of the life history of these large, highly trans-boundary, vulnerable species, as well as to marine biodiversity conservation on a regional scale.

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Tables and figures:

Table 1: Overview of extant marine mammal occurrences in the leeward Dutch Caribbean as based on 209 incidental sighting records and strandings.

| Species | Scientific name | WCR | CAR | SCAR | Ven. | Aruba | Bonaire | Curac. |
|----------------------------|--------------------------------|----------|----------|----------|----------|----------|----------|----------|
| North Atlantic Right whale | <i>Eubalaena glacialis</i> | E | - | - | - | - | - | - |
| Unidentified baleen whale | <i>Mysticeti</i> | [-] | [-] | [-] | [-] | [s] | [-] | [-] |
| unidentified rorqual whale | <i>Balaenoptera spec.</i> | [V] |
| blue whale | <i>B. musculus</i> | X | - | - | - | - | - | - |
| fin whale | <i>B. physalus</i> | X | X | X | X | ? | ? | ? |
| sei whale | <i>B. borealis</i> | X | X | X | X | ? | ? | ? |
| Bryde's whale | <i>B. edeni</i> | X | X | X | X | ? | S | B |
| common minke | <i>B. acutorostrata</i> | P | P | P | - | - | - | - |
| humpback whale | <i>Megaptera novaeangliae</i> | P | P | X | X | ? | V | V |
| sperm whale | <i>Physeter macrocephalus</i> | P | P | P | X | S | ? | B |
| pygmy sperm whale | <i>Kogia breviceps</i> | P | P | P | ? | ? | ? | ? |
| dwarf sperm whale | <i>Kogia simus</i> | P | P | P | X | S | ? | S |
| Cuvier's beaked | <i>Ziphius cavirostris</i> | P | P | P | X | S | S | B |
| Blainville's beaked whale | <i>Mesoplodon densirostris</i> | P | P | P | ? | ? | ? | ? |
| Sowerby's beaked | <i>Mesoplodon bidens</i> | E | - | - | - | - | - | - |
| Gervais' beaked whale | <i>Mesoplodon europaeus</i> | P | P | P | ? | S | S | S |
| True's beaked whale | <i>Mesoplodon mirus</i> | ? | - | - | - | - | - | - |
| killer whale | <i>Orcinus orca</i> | P | P | X | X | V | V | V |
| long-finned pilot | <i>Globicephala melas</i> | ? | - | - | - | - | - | - |
| short-finned pilot | <i>G. macrorhynchus</i> | P | P | P | X | S | V | B |
| false killer whale | <i>Pseudorca crassidens</i> | P | P | P | X | V | ? | ? |
| pygmy killer whale | <i>Feresa attenuata</i> | P | P | P | X | ? | ? | ? |
| melon-headed whale | <i>Peponocephala electra</i> | P | P | P | X | ? | B | S |
| unidentified dolphin | | [V] |
| Tucuxi | <i>Sotalia fluviatilis</i> | X | X | X | P | - | - | - |
| Guiana dolphin | <i>Sotalia guianensis</i> | X | X | P | P | - | - | - |
| rough-toothed | <i>Steno bredanensis</i> | P | P | P | X | V | ? | V |
| Risso's dolphin | <i>Grampus griseus</i> | P | P | P | X | S | ? | ? |
| bottlenose dolphin | <i>Tursiops truncatus</i> | P | P | P | X | V | V | V |
| pantropical spotted | <i>Stenella attenuata</i> | P | P | P | X | V | V | B |

| Species | Scientific name | WCR | CAR | SCAR | Ven. | Aruba | Bonaire | Curac. |
|----------------------------------|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|
| Atlantic spotted spinner dolphin | <i>Stenella frontalis</i> | P | P | P | X | B | ? | ? |
| | <i>Stenella longirostris</i> | P | P | P | X | V | V | V |
| Clymene dolphin | <i>Stenella clymene</i> | P | P | P | X | ? | ? | ? |
| striped dolphin | <i>Stenella coeruleoalba</i> | P | P | P | X | S | S | B |
| short-beaked | <i>Delphinus delphis</i> | ? | - | - | - | - | - | - |
| long-beaked common | <i>Delphinus capensis</i> | X | X | X | X | ? | ? | ? |
| Fraser dolphin | <i>Lagenodelphis hosei</i> | P | P | P | ? | ? | S | ? |
| Boto | <i>Inia geoffrensis</i> | - | - | - | P | - | - | - |
| Antillean manatee | <i>Trichechus manatus manatus</i> | P | P | P | P | † | † | V |
| Caribbean monk seal | <i>Monachus tropicalis</i> | † | † | † | † | † | † | † |
| Californian sea lion | <i>Zalophus californianus</i> | Int | Int | - | - | - | - | - |
| Total native, extant: | | 33 | 30 | 29 | 25 | 15 | 12 | 15 |

WCR = Wider Caribbean Range, CAR = Caribbean, SCAR = southeaster Caribbean (all based on Ward and Moscrop 1999, Ward *et al.* 2001, Watkins *et al.* 1979), Ven. = Venezuela (based on Bolaños-Jiménez *et al.* 2009).

P= primary range; X = secondary range; Bold = believed to be resident, - = not occurring (as far as known); ? = possibly occurring but no sightings confirmed; † = extinct; Int. = Introduced/Escaped; E = extralimital.

For ABC-Islands only: S = stranded or found dead; V = (visual) sighted alive; B = both (stranded and sighted alive).

Table 2. Stomach contents of a sperm whale (*Physeter macrocephalus*) stranded in Curaçao, 26 December 2001.

| Prey species | Family | Total # lower beaks |
|---|------------------|---------------------|
| <i>Histioteuthis</i> "A" (<i>miranda</i> or <i>arcturi</i>) | Histioteuthidae | 48 |
| <i>Moroteuthis</i> ? <i>robsoni</i> | Onycoteuthidae | 22 |
| <i>Pholidoteuthis</i> ? <i>boschmai</i> | Pholidoteuthidae | 20 |
| <i>Onycoteuthis</i> sp. | Onycoteuthidae | 15 |
| <i>Taningia danae</i> | Onycoteuthidae | 13 |
| <i>Taonius pavo</i> | Cranchiidae | 7 |
| <i>Histioteuthis</i> "B" (<i>atlantica</i> ?) | Histioteuthidae | 6 |
| <i>Galiteuthis</i> sp. | Cranchiidae | 3 |
| <i>Phasmatopsis</i> sp. | Cranchiidae | 2 |
| <i>Octopoteuthis</i> sp. | Octopoteuthidae | 2 |
| <i>Lepidoteuthis grimaldii</i> | Lepidoteuthidae | 1 |
| <i>Teuthowena</i> sp. | Cranchiidae | 1 |
| ? <i>Cycloteuthis</i> sp. | Cycloteuthidae | 1 |
| Totals: | | |
| 13 | 6 | 141 |

Figure 1: Map of the Caribbean showing the location of the two sectors of the Dutch Caribbean EEZ. The shaded area indicates (roughly) the upwelling area.

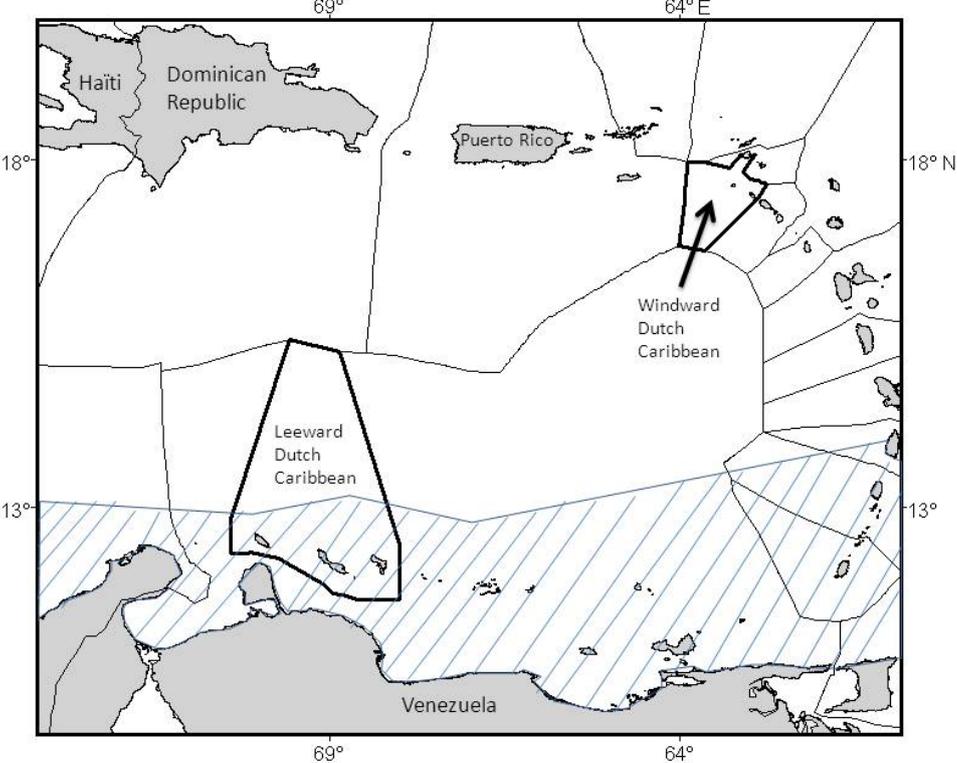


Figure 2: Number of strandings (black) and sightings (grey) for all cetacean species recorded for the Dutch leeward Caribbean Islands.

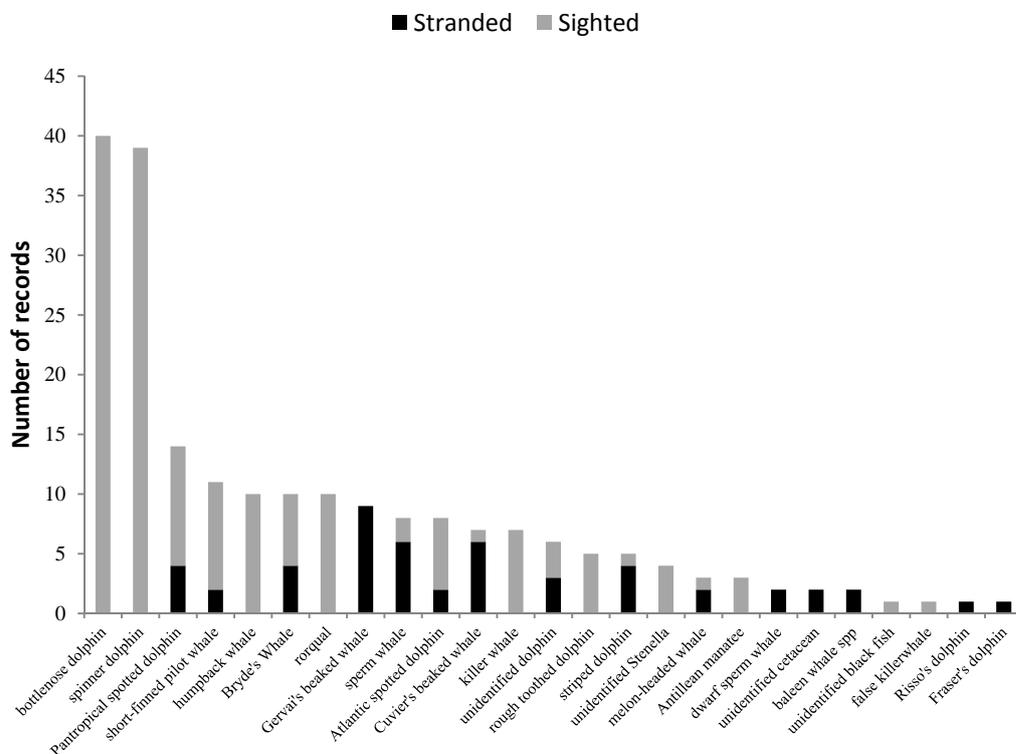


Figure 3: Monthly distribution of all species records (strandings: black, sightings: grey) for the Dutch leeward Caribbean Islands.

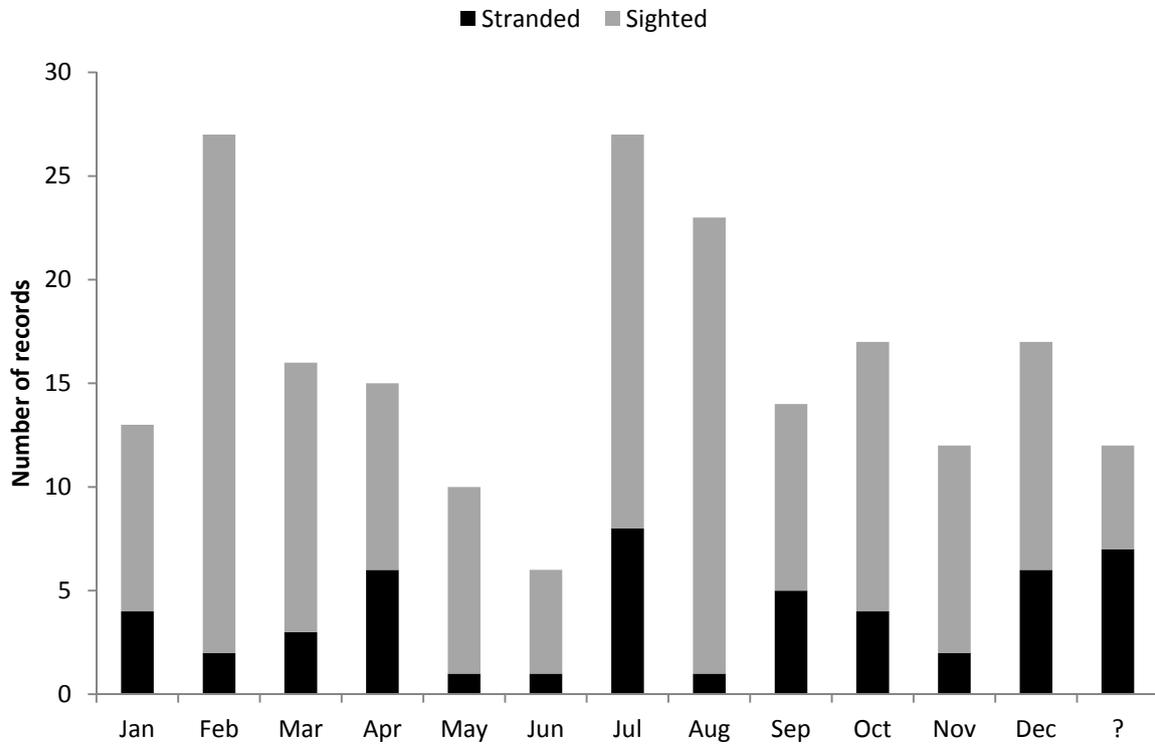


Figure 4: Number of recorded strandings in the Dutch leeward Caribbean islands, presented in five-year periods for the period 1960-2009 (black, n=43) followed by two years within the period 2010-2014 (grey, n=5). In addition one stranding dates from 1952.

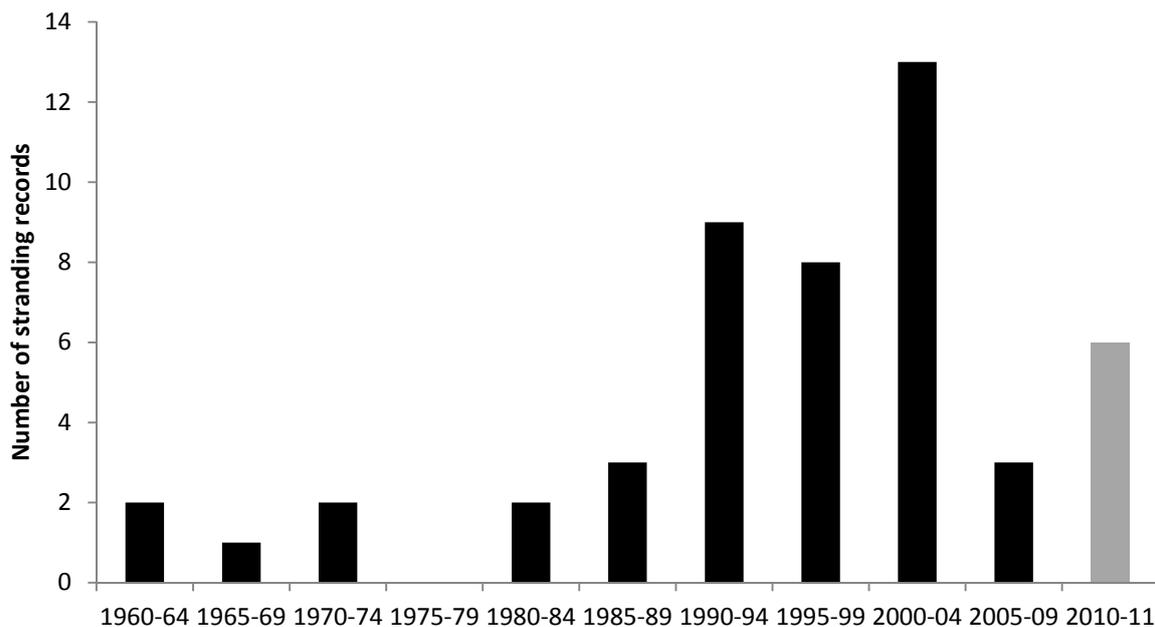
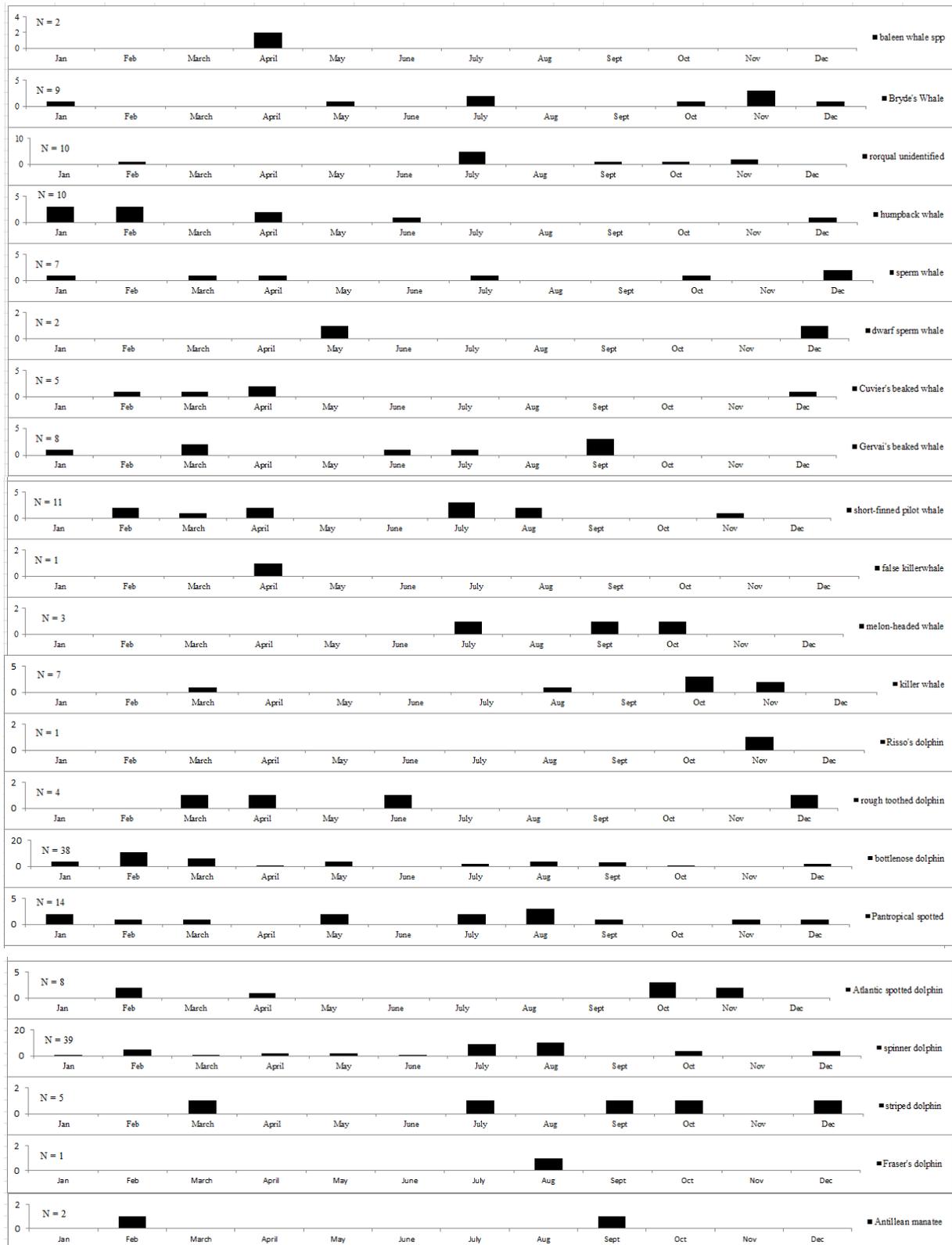


Figure 5: Numbers of records (both stranded or sighted) presented per month for all extant marine mammal species documented in the leeward Dutch Caribbean islands.



Annex C. Marine mammals of the Dutch Caribbean (paper presented to the IWC)

The marine mammals of the Dutch Caribbean: a comparison between EEZ sectors, contrasts and concerns

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ABSTRACT

We here provide a synoptic overview and preliminary update of the marine mammals of the Dutch Caribbean EEZ based on 279 cetacean sighting and stranding records. The Dutch Caribbean EEZ is composed of two distinct sectors. One is centered around the leeward Dutch islands of Aruba, Bonaire and Curaçao (71,000 km²) while the other is centered around the windward Dutch islands of Saba, St. Eustatius and St. Maarten (22,000 km²). The previous principal review (of cetaceans) dating from 1998, was based on only 70 records from the leeward sector and confirmed the occurrence of some 13 species for Dutch Kingdom waters. Now, with a 4-fold increase in number of records, 19 species can be documented for the Dutch Kingdom waters (18 species in the leeward sector and 8 species in the windward sector).

The windward sector stands out for its large number of humpback whale sightings (45% of records) and may form part of its former (or current) calving grounds. This species remains relatively rare in the leeward sector (5% of records) and continues to be targeted by aboriginal fishing in its destination wintering grounds to the east, where the relict breeding population is having difficulty to rebound. The species is of growing interest to tourism in the region and urgently needs full protection from all fishing in the southern Caribbean. The leeward EEZ sector further lies down-stream from seasonal upwelling areas off Venezuela that support the largest fishery of the Caribbean. This sector stands out for its high occurrence of beaked whales and the Bryde's whale. Marine mammal strandings are much more common here (26% of records) than in the northern sector (3% of records). Human induced mortalities (first suggested in 1974) and disturbance due to coastal tourism and recreation are key and growing concerns in the southern Dutch EEZ sector.

The marine mammal fauna of the Dutch Caribbean is evidently rich and varied but continues to suffer man-induced mortality and disturbance. Several nations, including the USA, the Dominican Republic and France, have recently established marine mammal sanctuaries in Caribbean waters. The Netherlands should consider doing the same.

KEYWORDS: CARIBBEAN, STRANDINGS, WHALE RECORDS, WHALE WATCHING, SHIP STRIKE, BYCATCH

INTRODUCTION

With the new constitutional changes that took place on 10 October, 2010, in the Dutch Kingdom, Saba, St. Eustatius and Bonaire have integrated into the Netherlands proper as special overseas municipalities, while Curaçao and St. Maarten have become new autonomous overseas entities within the Kingdom. The ultimate responsibility for the sustainable management and conservation of the marine biodiversity in the EEZ of Saba, St. Eustatius and Bonaire, as well as the territorial waters of these islands will come to lie with the Ministry Economic Affairs, Agriculture & Innovation of the Netherlands (EL&I). In preparation for this expanded responsibility, this ministry has been developing a management plan for the EEZ (Meesters *et al.* 2010).

The Dutch Caribbean Exclusive Economic Zone (EEZ) as established on June 10, 2010, falls principally in the pelagic zone of the Venezuela Basin, and concerns two discontinuous areas, separated by a minimum of some 550 km. One is based around the southern Caribbean island group of Aruba, Bonaire and Curaçao, and amounts to some 71,000 km² of sea surface (13°11'N 69°10'W). The other is based around the northeastern Caribbean islands of Saba, St. Eustatius and St. Maarten, and amounts to a total sea surface of some 22,000 km² (17°22'N 63°30'W) (Figure 1).

At least 33 native species of marine mammals have been documented from the Wider Caribbean Region (WCR): namely six species of baleen whales, 24 species of toothed whales, one sirenian (the West Indian manatee), and two pinnipeds (the extinct Caribbean monk seal, and the vagrant hooded seal) (Mignucci-Giannoni 1998, Ward and Moroscop 1999, Ward *et al.* 2001). Although some species have been studied extensively elsewhere, data concerning the biology, life history, distribution and behaviour of most marine mammal populations in the Caribbean Sea remain sparse.

Since 1998 a few new studies have become available which provide additional information on the marine mammal fauna of the leeward Dutch waters (e.g. Debrot 2000, Debrot *et al.* 2006, Maldani 2008, Luksenburg 2011). However, most records remained uncompiled and unassessed. To answer to this need, in current studies commissioned by the Ministry of EL&I (Debrot *et al.* in review and Witte *et al.* in prep.) we have assembled and assessed both published and previously unpublished records of marine mammals for both sectors of the Dutch Caribbean waters. Here we present a synoptic overview of those findings.

We compiled, documented and reviewed a large number of published and unpublished strandings, sightings by reliable observers identifying distinctive species, as well as sightings and strandings reported to us but not identified with certainty. In our assessment we also included voluminous documentation freely available in the public media of the islands, such as newspapers, websites and sightings published on Youtube. Most of this material was collected by amateurs and had to be thoroughly reassessed. We are aware of on-going directed studies in progress for Aruba and St. Maarten, but did not include them. Also, one large directed study documenting 135 records of bottlenose dolphin for Bonaire (Maldani 2008) was not included in this analysis of records.

RESULTS

Two-hundred-and-seventy-nine cetacean sighting and stranding records were compiled and assessed in this review. One hundred and eighty-seven (197) marine mammal records were compiled for the leeward Dutch Caribbean waters, comprising 96 previously published records and 101 new records (Witte *et al.* in prep.). Of these, 175 records could be confirmed to species level, while 22 remained unidentified. A total of 18 distinct extant species could be confirmed (Table 1). The most commonly recorded large whale belonged to the order *Balaenoptera* (mainly *B. edeni*) (21 records = 10%). Humpbacks were the second most common large whale and accounted for 9 records (5%). The most common dolphins were spinner and bottlenose dolphins (both at 19% of records).

Fifty-two of the 197 records (26%) concerned strandings. The principal species stranded were the deep-diving Gervais' beaked whale (9x), sperm whale (7x), and Cuvier's beaked whale (6x) and *Balaenoptera* spp. (6x) (incl. *B. edeni*). Since the year 2000 there have been 20 strandings, three of which concerned sperm whales entangled in fishing gear (total 4 animals) and one of which involved a lethal collision of a cruise ship with a Bryde's whale.

For the windward Dutch maritime sector, 82 marine mammal records were reviewed, comprising 8 previously published records and 74 new records (Debrot *et al.* in review). While 58 records could be confirmed to species level, 26 remain unidentified. Thirty-eight records (45%) concerned the humpback whale which was the most commonly identified species. A total of 8 distinct extant species were confirmed, one of which only to the family level (Table 1). Only three records (4%) involved strandings.

A combined total of 19 different marine mammals can now be documented for the Dutch Caribbean EEZ (including recent records of the manatee and an unidentified pinniped species). This represents an increase by 6 species over the 1998 review. While some 33 species of marine mammals are known from the Western Central Atlantic, 25 are known from the expansive neighbouring maritime areas of Venezuela (Romero *et al.* 2001). Three of the latter are principally limited to the freshwater and estuarine Amazon river basin and are unlikely to be encountered in the Dutch Caribbean.

DISCUSSION AND CONCLUSIONS

Faunal differences between the leeward and windward EEZ sectors

Based on our review, some basic faunal differences between the windward and leeward Dutch EEZ sectors appear eminent. Briefly, the most important contrasts appear to be a remarkably higher abundance of beaked whales and Bryde's whale around the leeward Dutch islands than around the windward Dutch islands, and a

much higher abundance of humpback whales around the windward Dutch islands than around the leeward Dutch islands.

Confirmed sightings of beaked whales are very rare and most of our insight is derived from strandings. For the leeward Dutch EEZ, strandings by beaked whales (15x) account for almost a third of all strandings. Strandings by beaked whales in this area are high in both absolute and relative terms which may reflect a high abundance of beaked whales in the southern Caribbean. These deep diving species feed mostly on squids which could be an abundant food source, based on the seasonal wind driven upwelling of the southern Caribbean (Sturm 1991).

Others have already suggested that the Bryde's whale is principally a southern Caribbean species (e.g. Watkins *et al.* 1979; Notarbartolo di Sciara 1983; Romero *et al.* 2001), and our results corroborate that view. While the Bryde's whale is well known from the Leeward Dutch EEZ (Debrot *et al.* 1998, Witte *et al.* in prep.) and the southeastern Caribbean in general (e.g. Mignucci-Giannoni 1998, Romero *et al.* 2001), it appears much less common in the northeastern Caribbean. The rarity of the Bryde's whale in the northeastern Caribbean (Mignucci-Giannoni 1996) as opposed to several reliable sightings of the minke whale, *B. acutorostrata*, give cause to suspect that the most common rorqual whale for the windward Dutch Caribbean will be the minke whale. However, as yet no records of this species can be confirmed for the windward Dutch EEZ.

Finally the higher sighting frequency of humpback whales in the windward as opposed to the leeward Dutch EEZ is striking. In the windward Dutch EEZ 45% of all records concerned the humpback whale, as opposed to only 5% in the leeward sector. The humpback whale uses the Caribbean principally as a wintering and calving area and the populations of the northeastern Caribbean are evidently in much better shape than those of the southeastern Caribbean which formerly supported large populations of baleen whales (incl. humpback) (Romero *et al.* 2000, Romero and Hayford 2000) but have not recovered.

Based on several crossings from the leeward to the windward Dutch islands, Poppe (1974) further suggests that the southern part of the Venezuela Basin has higher densities of cetaceans than the northern half. This would correlate with the higher density and species richness of seabirds observed in the southern half of the Venezuela Basin (north of the ABC islands) (Poppe 1974) and might be expected based either on the higher productivity caused by the seasonal upwelling phenomenon of the southern Caribbean (Sturm 1991). This idea would need further corroboration based on committed quantitative survey effort before being confirmed.

Strandings and man-related cetacean mortalities and disturbance

The southern Caribbean Dutch EEZ sector also stands out for its much higher stranding incidence and higher frequency of man-caused mortalities. Whereas only three records in the windward Dutch EEZ have so far concerned strandings, in the leeward sector strandings accounted for 26% of all analysed records. There are many potential causes which may underlie or contribute to this large difference between the two sectors. For instance, even the contrasting difference in island size and general accessibility of the coastline between the windward and leeward Dutch islands could play a role. However the potentially more serious possibility may be a regional difference cetacean mortality rates, either due to natural or anthropogenic causes, such as the intensive and possibly still questionable fishery practices taking place in the southern Caribbean (Sturm 1991, Romero *et al.* 1997).

Debrot *et al.* (1998) pointed out an apparent increase in stranding incidences in the leeward Dutch EEZ after 1989, the causes whereof remained unknown. Since then, strandings (category includes all incidences of dead cetaceans) have continued to remain high (20 documented strandings since 2000). Van Bree and Kristensen (1974) were the first authors to suggest possible mortalities caused by man (Dutch naval operations) for the stranding of beaked whales in Bonaire. Debrot and Barros (1994) documented a head of *Stenella attenuata* obviously severed by man, but also point out that marine mammals are not taken or used as bait by fishermen in the Dutch Caribbean. This was in contrast to the situation at that time upstream in bordering Venezuela (Romero *et al.* 1997). Debrot (1998) documented ingestion of man-made materials by a beaked whale stranded in Curaçao. Evidence compiled indicate that in any case until recently, fishing-related mortality of marine mammals in Venezuela has been frequent and persistent, as well as an obviously sensitive matter leading to human rights violations and persecution of environmentalists (Agudo 1991, Romero *et al.* 1997, IAC 2000). Our documentation of numerous recent cases of man-related mortality (two cases involving sperm whales entangled in fishing gear adrift in Aruban waters) and a lethal ship strike to a juvenile Bryde's whale (near Bonaire), show that this issue remains a serious point of concern.

The last decade has further seen an explosive increase in touristic and recreational use of coastal zones of the leeward Dutch islands of Aruba, Bonaire and Curaçao. The concomitant massive growth in the number of fast

pleasure and recreational vessels along the coast today, means that when cetaceans approach the coasts of these islands during daylight hours they are more easily detected and followed than ever before by the curious and interested public. Increasingly often, this generally well-intentioned and genuine interest in these unique animals takes place in an irresponsible way (Debrot, pers. observ.). Marine mammals are often followed closely and persistently for long distances whereby enthusiasts will swim with these animals and interact at close quarters. No guidelines have been established for human conduct around marine mammals. As public and touristic interest in these animals continues to grow, as well as both their detectability and vulnerability to disturbance (fast vessels), the need for protective measures and guidelines is urgent.

Economic significance

Marine mammals are spectacular species that are of growing significance to recreation and tourism throughout the region as well as in the Dutch Caribbean. Their economic value is no longer as a fisheries resource but in terms of recreational and touristic value as they provide visitors of the coastal zone with memories that last a life long. They even open possibilities for whale watching as a distinct product once a minimum dependable density of cetaceans is reached. Live cetaceans bring economic and ecosystem advantages to many island nations year after year. Therefore, they are certainly worth more to man alive than dead, but many in the eastern Caribbean apparently still do not appreciate this.

While whale watching in the Caribbean has grown in recent years to an important new 10+ million dollar a year industry, it continues to have additional potential. To achieve this, first adequate protection and recovery are needed. Such has been the case in Curaçao with sea turtles. Until the 1990's sea turtles were so rare that they were only sporadically seen. However, since their legal protection by the island government in 1996, numbers have rebounded to the extent that sea turtle sighting can today be offered as a major attraction in various areas of the island (e.g. Debrot *et al.* 2005). The same is the case in Bonaire and Aruba. Likewise, for the leeward Dutch islands to truly benefit from the potential of marine mammals, protection must come first.

The most spectacular species without question for sighting purposes is the humpback whale. The results of our study show that marine mammals, particularly the endangered and targeted humpback whale make notably regular and consistent use of the windward Dutch EEZ, but remain rare in the leeward sector. However, this species, along with others, continue to be hunted on artisanal scale in the eastern Caribbean. This activity is based in St. Vincent and the Grenadines which have a IWC regulated quota for 20 humpback whales for the period 2002-2007. While as of 2010, Dominica has decided to abandon its formerly pro-whaling stance, and choose to instead use marine mammals to bolster their tourism industry, five other eastern Caribbean nations continue to vote pro-whaling in the IWC. These are Antigua and Barbuda, Grenada, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines. As a consequence, the future of whaling remains contended and the protection of the severely depleted humpback stocks of the eastern Caribbean (Stevick *et al.* 1999, Swartz *et al.* 2003) remains critical. Therefore, the possibility for these islands to benefit economically from humpback whale watching also remains seriously curtailed. The islands that still have aboriginal whaling should consider whale watching as an economic alternative to hunting.

Marine Mammal Sanctuaries

To effectively protect whales, protection of their habitat is also essential. To this end, several nearby nations have already established marine mammal sanctuaries in Caribbean waters. These include the USA (adjoining waters of Puerto Rico and the U.S. Virgin Islands to the west of the windward Dutch EEZ) and the Dominican Republic, even further west. In September 2010, the French followed suit and declared the AGOA Marine Mammal Sanctuary for their Caribbean overseas waters. These sanctuaries are all clustered in the eastern Caribbean. The concepts of habitat size and connectivity are critical to conservation ecology and signify that purely on these criteria alone, the designation of the Dutch EEZ as a marine mammal sanctuary can help bolster these other related conservation initiatives and form a sound basis for cooperation. The present and potential future increased importance of the Dutch EEZ for cetaceans as well as their growing significance to recreation and the tourist industry, argues for the Netherlands to follow suit and declare the Dutch EEZ too as a marine mammal sanctuary.

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Figure 1. Map of the Caribbean showing the location of the two sectors of the Dutch Caribbean EEZ.

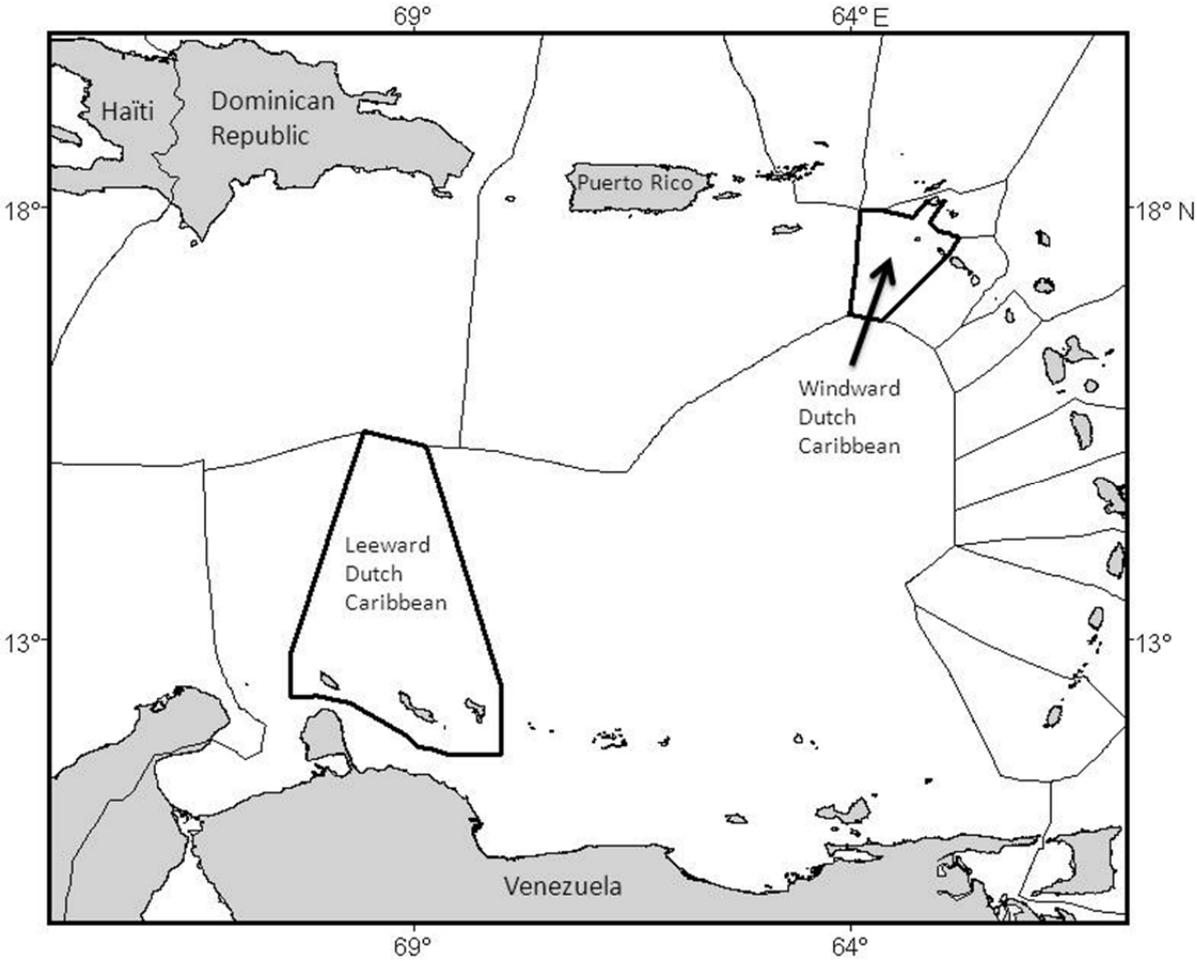


Table 1. Overview of extant marine mammal occurrences in the Dutch Caribbean as based on 279 incidental sighting records and strandings

(from: Witte *et al.* in prep. and Debrot *et al.* in review).

| Species | Scientific name | | | | | | | | | | |
|------------------|-------------------------|-----|-----|------|------|------------------|---------------|-------------|-------|---------|--------|
| | | WCR | CAR | SCAR | Ven. | Saba / Saba bank | St. Eustatius | St. Maarten | Aruba | Bonaire | Curac. |
| North Atlantic | <i>Eubalaena</i> | E | - | - | - | - | - | - | - | - | - |
| Unidentified | <i>Balaenoptera</i> | [-] | [-] | [-] | [-] | [-] | [-] | [-] | [s] | [-] | [-] |
| Blue Whale | <i>B. musculus</i> | X | - | - | - | - | - | - | - | - | - |
| Fin Whale | <i>B. physalus</i> | X | X | X | X | ? | ? | ? | ? | ? | ? |
| Sei Whale | <i>B. borealis</i> | X | X | X | X | ? | ? | ? | ? | ? | ? |
| Bryde's Whale | <i>B. edeni</i> | X | X | X | X | ? | ? | ? | ? | S | V |
| Common Minke | <i>B. acutorostrata</i> | P | P | P | - | - | - | - | - | - | - |
| Humpback | <i>Megaptera</i> | P | P | X | X | V | V | V | ? | V | V |
| Sperm Whale | <i>Physeter</i> | P | P | P | X | V | ? | V | S | ? | V |
| Pygmy Sperm | <i>Kogia breviceps</i> | P | P | P | ? | ? | ? | ? | ? | ? | ? |
| Dwarf Sperm | <i>Kogia simus</i> | P | P | P | X | ? | ? | ? | S | ? | S |
| Cuvier's | <i>Ziphius</i> | P | P | P | X | - | - | S | S | S | S |
| Blainville's | <i>Mesoplodon</i> | P | P | P | ? | ? | ? | ? | ? | ? | ? |
| Sowerby's | <i>Mesoplodon</i> | E | - | - | - | - | - | - | - | - | - |
| Gervais' | <i>Mesoplodon</i> | P | P | P | ? | ? | ? | ? | S | S | S |
| True's Beaked | <i>Mesoplodon</i> | ? | - | - | - | - | - | - | - | - | - |
| Killer Whale | <i>Orcinus orca</i> | P | P | X | X | ? | ? | ? | V | V | V |
| Long-finned | <i>Globicephala</i> | ? | - | - | - | - | - | - | - | - | - |
| Short-finned | <i>G.</i> | P | P | P | X | V | ? | S | S | ? | V |
| False Killer | <i>Pseudorca</i> | P | P | P | X | ? | ? | ? | V | ? | - |
| Pygmy Killer | <i>Feresa</i> | P | P | P | X | ? | ? | ? | ? | ? | ? |
| Melon Headed | <i>Peponocephala</i> | P | P | P | X | ? | ? | ? | ? | S | S |
| Unidentified | | V | V | V | V | V | V | V | V | V | V |
| Tucuxi | <i>Sotalia</i> | X | X | X | P | - | - | - | - | - | - |
| Guiana Dolphin | <i>Sotalia</i> | X | X | P | P | - | - | - | - | - | - |
| Rough Toothed | <i>Steno</i> | P | P | P | X | ? | ? | ? | V | ? | V |
| Risso's Dolphin | <i>Grampus</i> | P | P | P | X | ? | ? | ? | S | ? | ? |
| Bottlenose | <i>Tursiops</i> | P | P | P | X | V | V | V | V | V | V |
| Pantropical | <i>Stenella</i> | P | P | P | X | ? | ? | ? | V | V | S |
| Atlantic Spotted | <i>Stenella</i> | P | P | P | X | ? | ? | ? | V | ? | ? |
| Spinner Dolphin | <i>Stenella</i> | P | P | P | X | ? | V | V | V | V | V |
| Clymene | <i>Stenella</i> | P | P | P | X | ? | ? | ? | ? | ? | ? |
| Striped Dolphin | <i>Stenella</i> | P | P | P | X | ? | ? | ? | V | ? | S |
| Short Beaked | <i>Delphinus</i> | ? | - | - | - | - | - | - | - | - | - |
| Long Beaked | <i>Delphinus</i> | X | X | X | X | ? | ? | ? | ? | ? | ? |
| Fraser Dolphin | <i>Lagenodelphis</i> | P | P | P | ? | ? | ? | ? | ? | ? | ? |
| Boto | <i>Inia geoffrensis</i> | - | - | - | P | - | - | - | - | - | - |

| Species | Scientific name | | | | | | | | | | |
|-----------------|-----------------------|------------|------------|----------|----------|------------------|---------------|-------------|-------|---------|--------|
| | | WCR | CAR | SCAR | Ven. | Saba / Saba bank | St. Eustatius | St. Maarten | Aruba | Bonaire | Curac. |
| Antillean | <i>Trichechus</i> | P | P | P | P | - | - | V | † | † | V |
| Hooded seal | <i>Cystophora</i> | E | E | - | - | - | - | - | - | - | - |
| Unidentified | <i>Pinnipedia sp.</i> | X | X | X | - | - | - | V | - | - | - |
| Californian Sea | <i>Zalophus</i> | Int | Int | - | - | - | - | ? | - | - | - |
| Total native, | | 33 | 30 | 29 | 25 | 4 | 3 | 8 | 14 | 9 | 15 |

WCR = Wider Caribbean Range, CAR = Caribbean, SCAR = southeaster Caribbean, Ven. = Venezuela, P= primary range; X =

Secondary range; - = absent; ? = possibly present; † = extinct; S = stranded or found dead; V = (visual) sighted alive; bold = resident;

Int. = Introduced/Escaped; E = extralimital

Annex D. Key national legislation frameworks

a) Caribbean Netherlands

Wet grondslagen natuurbeheer- en bescherming BES

Hoofdstuk 1. Algemene bepalingen

Artikel 1

1. In deze wet en de daarop berustende bepalingen wordt verstaan onder:

- a. *Onze minister*: minister van Landbouw, Natuur en Voedselkwaliteit;
 - b. *bestuurscollege*: bestuurscollege van het openbaar lichaam Bonaire, Sint Eustatius of Saba;
 - c. *eilandsraad*: eilandsraad van het openbaar lichaam Bonaire, Sint Eustatius of Saba;
 - d. *commissie*: de commissie, genoemd in [artikel 3](#);
 - e. *beheersinstantie*: de instantie bedoeld in [artikel 5](#);
 - f. *wetenschappelijke autoriteit*: autoriteit, bedoeld in [artikel 6](#);
 - g. *inheemse fauna en flora*: de op de openbare lichamen Bonaire, Sint Eustatius en Saba of in de wateren van de genoemde openbare lichamen van nature voorkomende dieren en planten;
 - h. *soort*: elke soort, ondersoort of een geografisch geïsoleerde populatie van flora of fauna;
 - i. *Verdrag van Ramsar*: de op 2 februari 1971 te Ramsar tot stand gekomen Overeenkomst inzake watergebieden van internationale betekenis, in het bijzonder als verblijfplaats van watervogels (Trb. 1975, 84);
 - j. *CITES-verdrag*: de op 3 maart 1973 te Washington gesloten Overeenkomst inzake de internationale handel in bedreigde in het wild levende dier- en plantsoorten, met bijlagen (Trb. 1975, 23) alsmede de Resoluties van de Conferentie van Partijen behorende bij dit verdrag;
 - k. *Bonn-conventie*: het op 23 juni 1979 te Bonn tot stand gekomen Verdrag inzake de bescherming van trekkende wilde diersoorten, met bijlagen (Trb. 1981, 6);
 - l. *SPAW-protocol*: het op 18 januari 1990 te Kingston getekende protocol betreffende de bijzondere beschermde gebieden en de in de natuur levende dieren en planten, met bijlagen (Trb. 1990, 115), behorende bij het op 24 maart 1983 te Cartagena de Indias gesloten Verdrag inzake de bescherming en ontwikkeling van het mariene milieu in het Caraïbisch gebied (Trb. 1983, 152);
 - m. *Biodiversiteitsverdrag*: het op 5 juni 1992 te Rio de Janeiro tot stand gekomen verdrag inzake de biologische diversiteit (Trb. 1992, 164);
 - n. *Zeeschildpaddenverdrag*: Inter-Amerikaans Verdrag inzake de bescherming en het behoud van zeeschildpadden, met Bijlagen; Caracas, 1 december 1996 (Trb. 1999, 45).
2. De geldende tekst van de in het eerste lid, onderdelen i tot en met n, genoemde verdragen liggen voor een ieder ter inzage bij de beheersinstantie en de commissie.

Hoofdstuk II. Taken en bevoegdheden van de Minister

Artikel 2

1. De Minister stelt een maal per vijf jaren een natuurbeleidsplan voor de openbare lichamen Bonaire, Sint Eustatius en Saba vast, waarin mede uitvoering wordt gegeven aan de terzake aangegane internationale verplichtingen.
2. De Minister bereidt het natuurbeleidsplan voor in nauw overleg met het bestuurscollege.

3. Het natuurbeleidsplan bevat in elk geval:
 - a. de doelstellingen inzake de natuur en het landschap die in de planperiode moeten worden verwezenlijkt;
 - b. een overzicht van prioriteiten op het gebied van de natuur en het landschap, die binnen de planperiode dienen te worden aangepakt;
 - c. de bij de uitvoering van het beleid in aanmerking te nemen natuurbeschermingswaarden;
 - d. een lijst van nationale parken, zowel terrestrisch als marien, die bestaan uit bij eilandsverordening of besluit van Onze minister ingestelde natuurparken.
4. Bij het opstellen van het natuurbeleidsplan houdt de Minister rekening met de ruimtelijke ontwikkelingsplannen van de openbare lichamen Bonaire, Sint Eustatius en Saba
5. Het natuurbeleidsplan strekt tot algemeen kader voor het natuurbeleid.
6. Jaarlijks doet de Minister vóór 1 september verslag van de stand van zaken met betrekking tot de uitvoering van het natuurbeleidsplan aan de Staten-Generaal. Afschrift van dit verslag wordt mede aangeboden aan het bestuurscollege.

Artikel 2a

1. Onze minister kan natuurparken instellen ten uitvoering van het Verdrag van Ramsar, het SPAW-protocol of het Biodiversiteitsverdrag.
2. Onze minister bereidt de instelling van een natuurpark voor in nauw overleg met het bestuurscollege.
3. Onze minister draagt de gemelde natuurparken voor bij het desbetreffende uitvoerende bureau dat bij deze verdragen is ingesteld, met het verzoek tot opname in de bij het verdrag horende lijst van beschermde soorten.

Artikel 3

1. Onze minister kan een Commissie natuurbeheer en bescherming instellen.
2. De commissie heeft tot taak Onze minister en het bestuurscollege desgevraagd of uit eigen beweging van advies te dienen over maatregelen ter uitvoering van deze wet.
3. Bij ministeriële regeling kunnen nadere regels worden gesteld over de samenstelling, werkwijze en wijze van bezoldiging van de leden van de commissie.

Artikel 4

Onze minister is bevoegd tot het verstrekken van vergunningen en certificaten krachtens de artikelen III, IV en V van het CITES-verdrag, het toestaan van de uitzondering, bedoeld in artikel VII, zevende lid, van het CITES-verdrag.

Artikel 5

1. De Minister wijst een beheersinstantie aan.
2. De beheersinstantie:
 - a. is belast met de werkzaamheden, bedoeld in artikel III, tweede lid, onderdelen b, en c, derde lid, onderdeel c, vierde lid, onderdeel b, vijfde lid, onderdelen b en c, artikel IV, tweede lid, onderdelen b en c, vijfde lid, onderdelen a en b, zesde lid, onderdeel b, artikel V, tweede lid, onderdelen a en b, vierde lid, artikel VI, zesde en zevende lid, artikel VII, tweede, derde, vijfde en zesde lid, en artikel 8, zevende lid, van het CITES-verdrag, overeenkomstig de desbetreffende of overige voorschriften terzake;
 - b. heeft tot taak het bijhouden van de volgende registers:

- 1°. een register van in de openbare lichamen Bonaire, Sint Eustatius en Saba gehouden of in bezit zijnde soorten, opgenomen in bijlage 1 van het CITES-verdrag en de Bonn-conventie en bijlagen 1 en 2 van het SPAW-protocol;
 - 2°. een register in de openbare lichamen Bonaire, Sint Eustatius en Saba overeenkomstig het voorschrift, bedoeld in Artikel VIII, zesde lid, onderdelen a en b, van het CITES-verdrag;
 - 3°. een register van personen die diersoorten of plantensoorten, opgenomen in de bijlagen van het CITES-verdrag, in gevangenschap doen voorttellen onderscheidenlijk kweken.
3. De beheersinstantie verstrekt van elke registratie in de registers, bedoeld in het tweede lid, onderdeel b, ten 1, een bewijs.
 4. Bij ministeriële regeling worden voor de registers bedoeld in het tweede lid, regels gesteld met betrekking tot de inhoud, de vorm en het beheer, alsmede met betrekking tot de gegevens en bescheiden die bij de aanmelding voor opname in de registers dienen te worden verstrekt.
 5. De beheersinstantie is bevoegd voor haar taken, bedoeld in het tweede en derde lid, vergoedingen in rekening te brengen die bij ministeriële regeling worden vastgesteld.

Artikel 6

1. De Minister wijst één of meer deskundigen of instanties aan als wetenschappelijke autoriteit.
2. De wetenschappelijke autoriteit heeft de volgende taken:
 - 1) het afgeven van de verklaringen, bedoeld in artikel III, tweede lid, onderdeel a, derde lid, onderdeel a, en vijfde lid, onderdeel a, alsmede artikel IV, tweede lid, onderdeel a en zesde lid, onderdeel a, van het CITES-verdrag;
 - 2) het houden van voortdurend toezicht en de in kennisstelling, bedoeld in artikel IV, derde lid, van het CITES-verdrag;
 - 3) het geven van advies als bedoeld in artikel VIII, vierde lid, onderdeel c, van het CITES-verdrag;
 - 4) het desgevraagd adviseren van de Minister, het bestuurscollege, de beheersinstantie alsmede de ambtenaren, bedoeld in de [artikelen 16, eerste lid](#), en [18, eerste lid](#), over:
 - a. de identificatie van specimen als bedoeld in [artikel 7](#), of soorten als bedoeld in [artikel 8](#);
en
 - b. alle andere aangelegenheden betrekking hebbende op het natuurbeheer en de natuurbescherming die hem om advies worden voorgelegd.
3. De wetenschappelijke autoriteit is bevoegd voor haar taken als bedoeld in het tweede lid, vergoedingen in rekening te brengen die bij ministeriële regeling worden vastgesteld.

Artikel 7

In de [artikelen 7A, 7B, 11, 15](#) en [35](#), alsmede de daarop berustende bepaling wordt verstaan onder:

- a. *specimen*: specimen als bedoeld in artikel I, onderdeel b, van het CITES-verdrag;
- b. *invoer*: iedere handeling die kennelijk rechtstreeks is gericht op het bewerkstelligen van het binnen het grondgebied van de openbare lichamen Bonaire, Sint Eustatius of Saba.
- c. *uitvoer*: iedere handeling die kennelijk rechtstreeks is gericht op het bewerkstelligen van het buiten het grondgebied van de openbare lichamen Bonaire, Sint Eustatius of Saba.
- d. *wederuitvoer*: de uitvoer van hetgeen tevoren is ingevoerd;

- e. *handel*: de uitvoer, de wederuitvoer, de invoer en het inbrengen vanuit de zee voortkomende dieren en planten;
- f. *aanvoer van uit de zee voortkomen de planten en dieren*: het tot binnen de grenzen van de openbare lichamen Bonaire, Sint Eustatius of Saba vervoeren van specimens van soorten, opgenomen in de bijlagen van het CITES-verdrag, die zijn gehaald uit zeegebied dat niet tot het rechtsgebied van de openbare lichamen Bonaire, Sint Eustatius of Saba;
- g. *doorvoer*: de uitvoer van elk tevoren ingevoerd specimen zonder dat dit in het vrije verkeer is gebracht.

Artikel 7a

1. Handel in specimens, opgenomen in Bijlage I, II of III van het CITES-verdrag, moet in overeenstemming zijn met de bepalingen van onderscheidenlijk artikel III, IV of V van dit verdrag, onverminderd de uitzonderingsgevallen van artikel VII, tweede, derde, vijfde en zesde lid, van het CITES-verdrag.
2. Bij doorvoer of overlading als bedoeld in artikel VII van het CITES-verdrag, moet een specimen voorzien zijn van een uitvoer-, wederuitvoer- of aanvoervergunning of -certificaat die in overeenstemming met de bepalingen van artikel VI van het CITES-verdrag is afgegeven.
3. Bij ministeriele regeling kunnen regels worden gegeven ter uitvoering van het CITES-verdrag.

Artikel 7b

1. Bij handel als bedoeld in [artikel 7A](#), [eerste lid](#), moeten de krachtens de bepalingen van de artikelen III, IV en V van het CITES-verdrag verstrekte vergunningen en certificaten in overeenstemming zijn met de bepalingen van artikel VI van dit verdrag.
2. Vergunningen of certificaten kunnen worden ingetrokken, indien:
 - a. de daaraan verbonden voorschriften of beperkingen waaronder deze zijn verleend, niet worden nageleefd;
 - b. de gegevens, verstrekt ter verkrijging van de vergunning of het certificaat, zodanig onjuist of onvolledig blijken te zijn dat op de aanvraag afwijzend of anderszins zou zijn beschikt, indien bij de beoordeling daarvan de juiste of volledige gegevens bekend waren geweest.
3. Het model, bedoeld in Bijlage IV van het CITES-verdrag, betreffende vergunningen en certificaten wordt bij ministeriële regeling vastgesteld.
4. De regels opgenomen in de Resoluties van het CITES-verdrag met betrekking tot vergunningen en certificaten bedoeld in de artikelen van dit verdrag zijn van toepassing.

Artikel 8

In de [artikelen 8A](#), [8B](#), [10](#), [tweede lid](#), [13](#) en [15](#), alsmede de daarop berustende bepalingen wordt verstaan onder:

- a. *uitstervende soorten*: soorten als bedoeld in artikel 1, onderdeel f, van het SPAW-protocol;
- b. *bedreigde soorten*: soorten als bedoeld in artikel 1, onderdeel g, van het SPAW-protocol;
- c. *beschermde soorten*: soorten als bedoeld in artikel 1, onderdeel h, van het SPAW-protocol;
- d. *endemische soorten*: soorten als bedoeld in artikel 1, onderdeel i, van het SPAW-protocol;
- e. *Wetenschappelijke en Technische Raadgevende Commissie*: als bedoeld in artikel 20 van het SPAW-protocol.

Artikel 8a

1. Het is verboden handelingen of activiteiten te verrichten als bedoeld in artikel 11, eerste lid, onderdeel a, van het SPAW-protocol, ter zake van plantensoorten, opgenomen in Bijlage I van dat protocol, en zaden, delen of produkten van deze plantensoorten.
2. Het is verboden handelingen of activiteiten te verrichten als bedoeld in artikel 11, eerste lid, onderdeel b, van het SPAW-protocol, ter zake van diersoorten, opgenomen in Bijlage II van dat protocol, en eieren, delen of produkten van deze diersoorten.
3. Bij of krachtens algemene maatregel van bestuur kunnen regels worden gegeven ter zake van:
 - a. de planten- of diersoorten, opgenomen in Bijlage III van het SPAW-protocol, met inachtneming van het bepaalde in artikel 11, onderdeel c, van dat protocol; en
 - b. andere aangelegenheden ter uitvoering van het SPAW-protocol, onverminderd het bepaalde in [artikel 13, eerste lid](#), jo. [artikel 15, derde lid](#), van deze wet.

Artikel 8b

Bij ministeriële regeling kunnen ten aanzien van de verboden, bedoeld in artikel 11, eerste lid, van het SPAW-protocol, vrijstellingen worden verleend als bedoeld in artikel 11, tweede lid, en artikel 14 van dat protocol, nadat de Wetenschappelijke en Technische Raadgevende Commissie in evengenoemd artikel 11, tweede lid, de gegrondheid van de te verlenen vrijstellingen positief heeft beoordeeld.

Artikel 8c

1. Onverminderd het bepaalde in [artikel 15, derde lid](#), van deze wet kunnen bij of krachtens algemene maatregel van bestuur regels worden gegeven ter uitvoering van het Verdrag van Ramsar, de Bonn-conventie, het Biodiversiteitsverdrag en het Zeeschildpaddenverdrag.
2. Bij of krachtens algemene maatregel van bestuur als bedoeld in het eerste lid kan worden bepaald dat de eilandsraad zorgdraagt voor aangelegenheden vermeld in de in het eerste lid bedoelde verdragen onder opneming van een voorziening, bedoeld in [artikel 15, derde lid](#), van deze wet.

Artikel 8d

1. Buiten de territoriale wateren, doch binnen de exclusieve economische zone, heeft Onze Minister' dezelfde taken en bevoegdheden als die, welke voor de openbare lichamen Bonaire, Sint Eustatius of Saba zijn vastgesteld in de [artikelen 10 tot en met 14](#).
2. Bij of krachtens algemene maatregel van bestuur kunnen aanvullende beheersregels worden vastgesteld ter behoud van de natuur en het milieu van het gebied, bedoeld in het eerste lid.
3. Indien Onze minister in de uitoefening van de taken en bevoegdheden, bedoeld in het eerste lid, beperkingen of verboden aan de vaart oplegt, doet zij dit in overeenstemming met Onze minister van Verkeer en Waterstaat.

Hoofdstuk III. Taken en bevoegdheden van de openbare lichamen Bonaire, Sint Eustatius en Saba

Artikel 9

1. Het bestuurscollege stelt een maal per vijf jaren een natuurplan vast.
2. Het natuurplan behoeft de goedkeuring van de eilandsraad.

3. Het natuurplan bevat in ieder geval:
 - a. de uitgangspunten van het natuurbeleid van het desbetreffende openbare lichaam voor de planperiode, met inachtneming van de verplichtingen die voortvloeien uit internationale verdragen op het gebied van het natuurbeheer en bescherming alsmede uit het natuurbeleidsplan, bedoeld in [artikel 2, eerste lid](#);
 - b. een overzicht van de actiepunten die in de planperiode zullen worden verwezenlijkt, alsmede de termijn waarbinnen dit zal plaatsvinden.
4. Jaarlijks doet het bestuurscollege vóór 1 juni verslag van de stand van zaken met betrekking tot de uitvoering van het natuurplan aan de eilandsraad en de Minister.
5. Bij het opstellen van het natuurplan draagt het bestuurscollege zorg dat dit is afgestemd op het natuurbeleidsplan.

Artikel 10

1. De eilandsraad stelt, voor zover mogelijk, natuurparken in.
2. Op natuurparken als bedoeld in het Verdrag van Ramsar, het SPAW-protocol of het Biodiversiteitsverdrag, zijn de hieraan in deze verdragen gestelde eisen van toepassing.
3. De eilandsraad die een zodanig natuurpark heeft ingesteld, geeft hiervan kennis aan de Minister met vermelding van de ter zake relevante informatie.
4. De Minister draagt de gemelde natuurparken voor bij het desbetreffende uitvoerende bureau dat bij deze verdragen is ingesteld, met het verzoek tot opname in de bij dat verdrag horende lijst van beschermde gebieden.

Artikel 11

De eilandsraad draagt zorg voor de beheersmaatregelen voor en de bescherming van soorten die vermeld zijn in de bijlagen van het Zeeschildpaddenverdrag.
De eisen die hiervoor krachtens het in het eerste lid genoemde verdrag gelden, zijn van toepassing.

Artikel 12

1. De eilandsraad draagt zorg voor de bescherming van en de beheersmaatregelen voor soorten die vermeld zijn in de bijlagen van de Bonn-conventie.
2. De eisen die hiervoor krachtens het in het eerste lid genoemde verdrag gelden, zijn van toepassing.

Artikel 13

1. De eilandsraad draagt zorg voor de bescherming van en de beheersmaatregelen voor soorten die vermeld zijn in de bijlagen van het SPAW-protocol.
2. De eisen die hieraan krachtens het in het eerste lid genoemde verdrag gesteld worden, zijn van toepassing.

Artikel 14

1. De eilandsraad draagt zorg voor de bescherming van de biologische diversiteit, het verantwoord gebruik van haar componenten en de eerlijke en billijke verdeling van de voordelen die uit het gebruik van genetische bronnen voortvloeien.
2. De eisen die hiervoor krachtens het Biodiversiteitsverdrag gelden, zijn van toepassing.

Artikel 15

1. De eilandsraad stelt uiterlijk twee jaren na inwerkingtreding van deze wet voorschriften vast ter uitvoering van de verplichtingen die voor de openbare lichamen Bonaire, Sint Eustatius en Saba voortvloeien uit deze wet.
2. Op verzoek van een bestuurscollege kan de Minister geheel of gedeeltelijk voorzien in faciliteiten, middelen en bijstand, die noodzakelijk zijn voor de uitvoering van deze wet en de daaruit voortvloeiende regelgeving in het desbetreffende openbare lichaam.
3. Voorzover de eilandsraad nalaat de in het eerste lid genoemde voorschriften binnen de aldaar genoemde termijn vast te stellen, kan daarin bij of krachtens algemene maatregel van bestuur, gehoord het desbetreffende bestuurscollege, worden voorzien.

Hoofdstuk 5. Toezicht en opsporing

Artikel 16

1. Met het toezicht op de naleving van het bij of krachtens deze wet bepaalde zijn belast de daartoe bij besluit van Onze minister aangewezen ambtenaren of personen. Een zodanige aanwijzing wordt bekendgemaakt in de Staatscourant.
2. Voor zover het in het eerste lid bedoelde toezicht betrekking heeft op de naleving van door de openbare lichamen Bonaire, Sint Eustatius en Saba ter uitvoering van deze wet gestelde voorschriften, wordt dit toezicht mede uitgeoefend door ambtenaren of personen die daartoe door het bestuurscollege worden aangewezen. Een zodanige aanwijzing wordt bekendgemaakt in het blad waarin door het desbetreffende openbare lichaam gebruikelijk officiële berichten worden bekendgemaakt.
3. De krachtens het eerste en het tweede lid aangewezen personen zijn, uitsluitend voor zover dat voor de vervulling van hun taak redelijkerwijze noodzakelijk is, bevoegd:
 - a. alle inlichtingen te vragen;
 - b. inzage te verlangen van alle boeken, bescheiden en andere informatiedragers en daarvan afschrift te nemen of deze daartoe tijdelijk mee te nemen;
 - c. goederen aan opneming en onderzoek te onderwerpen, deze daartoe tijdelijk mee te nemen en daarvan monsters te nemen;
 - d. alle plaatsen, met uitzondering van woningen zonder de uitdrukkelijke toestemming van de bewoner, te betreden, vergezeld van door hen aangewezen personen;
 - e. vaartuigen, stilstaande voertuigen en de lading daarvan te onderzoeken;
 - f. woningen of tot woning bestemde gedeelten van vaartuigen zonder de uitdrukkelijke toestemming van de bewoner binnen te treden.
4. Zo nodig, wordt de toegang tot een plaats als bedoeld in het derde lid, onderdeel d, verschaft met behulp van de sterke arm.
5. Op het binnentreden van woningen of van tot woning bestemde gedeelten van vaartuigen als bedoeld in het derde lid, onderdeel f, is Titel X van het Derde Boek van het Wetboek van Strafvordering BES van overeenkomstige toepassing, met uitzondering van de artikelen 155, vierde lid, 156, tweede lid, 157, tweede en derde lid, 158, eerste lid, laatste zinsnede, en 160, eerste lid, en met dien verstande dat de machtiging, indien het betreft de krachtens het eerste lid aangewezen personen, wordt verleend door de procureur-generaal en, indien het betreft de krachtens het tweede lid aangewezen personen, de gezaghebber.
6. Bij ministeriële regeling kunnen regels worden gesteld met betrekking tot de wijze van taakuitoefening van de krachtens het eerste en het tweede lid aangewezen personen.

Artikel 17

1. Een ieder is verplicht aan toezichthouders alle medewerking te verlenen die deze redelijkerwijs kunnen verlangen ter uitoefening van hun bevoegdheden.
2. Zij die uit hoofde van ambt, beroep of wettelijk voorschrift verplicht zijn tot geheimhouding, kunnen het verlenen van medewerking weigeren, voor zover hun geheimhoudingsplicht zich daartoe uitstrekt.

Artikel 18

1. Met de opsporing van de bij of krachtens deze wet strafbaar gestelde feiten zijn, naast de in artikel 184 van het Wetboek van Strafvordering BES bedoelde personen, belast de daartoe bij besluit van Onze minister van Justitie, in overeenstemming met Onze Minister aangewezen ambtenaren of personen. Een zodanige aanwijzing wordt bekendgemaakt in de Staatscourant.
2. Voor zover de in het eerste lid bedoelde opsporing betrekking heeft op feiten die zijn strafbaar gesteld in de door de openbare lichamen Bonaire, Sint Eustatius en Saba ter uitvoering van deze wet gestelde voorschriften, wordt de opsporing mede uitgeoefend door ambtenaren of personen die daartoe door het bestuurscollege worden aangewezen. Een zodanige aanwijzing wordt bekendgemaakt in het blad waarin door het desbetreffende openbare lichaam gebruikelijk officiële berichten worden bekendgemaakt.
3. Bij of krachtens algemene maatregel van bestuur kunnen regels worden gesteld omtrent de vereisten waaraan de krachtens het eerste en het tweede lid aangewezen ambtenaren of personen dienen te voldoen.

Artikel 18a

1. De ambtenaren of personen, bedoeld in [artikel 18, eerste lid](#), hebben de beschikking over de bevoegdheden, bedoeld in de artikelen 53 en 55 tot en met 61 van de Wet maritiem beheer BES.
2. Het eerste lid is alleen van toepassing waar het betreft de opsporing van overtredingen van beperkingen of verboden opgelegd aan de vaart overeenkomstig [artikel 8D, eerste en derde lid](#).

Artikel 19

Een ieder die betrokken is bij de uitvoering van deze wet en daarbij de beschikking krijgt over gegevens waarvan hij het vertrouwelijke karakter kent of redelijkerwijs moet vermoeden, en voor wie niet reeds uit hoofde van ambt, beroep of wettelijk voorschrift ter zake van die gegevens een geheimhoudingsplicht geldt, is verplicht tot geheimhouding daarvan, behoudens voor zover enig wettelijk voorschrift hem tot bekendmaking verplicht of uit zijn taak bij de uitvoering van deze wet de noodzaak tot bekendmaking voortvloeit.

Hoofdstuk 6. Sancties

§ 1. Bestuursdwang

Artikel 20

De Minister en het bestuurscollege, voor zover het betreft overtreding van voorschriften van de openbare lichamen, zijn bevoegd tot het doen wegnemen, ontruimen, beletten, in de vorige toestand herstellen of het verrichten van hetgeen in strijd met de in deze wet en de daarop berustende bepalingen gestelde verplichtingen is of wordt gedaan, gehouden of nagelaten.

Artikel 21

1. Een beslissing tot toepassing van bestuursdwang wordt op schrift gesteld en geldt als een beschikking.
2. De bekendmaking ervan geschiedt aan de overtreder en eventuele andere belanghebbenden.
3. In de beschikking wordt een termijn gesteld waarbinnen de belanghebbenden de tenuitvoerlegging kunnen voorkomen door zelf maatregelen te treffen. De te nemen maatregelen worden in de beschikking vermeld.
4. Geen termijn behoeft te worden gegund, indien de vereiste spoed zich daartegen verzet.
5. Indien de situatie dermate spoedeisend is dat de Minister of het bestuurscollege de beslissing tot toepassing van bestuursdwang niet van te voren op schrift kan zetten, zorgt deze alsnog zo spoedig mogelijk voor de opschriftstelling en de bekendmaking.

Artikel 22

1. De overtreder is de kosten verbonden aan de toepassing van bestuursdwang verschuldigd, tenzij deze kosten redelijkerwijze niet of niet geheel te zijnen laste behoren te komen.
2. De beschikking vermeldt dat de toepassing van de bestuursdwang op kosten van de overtreder plaatsvindt.
3. Indien de kosten geheel of gedeeltelijk niet ten laste van de overtreder zullen worden gebracht, wordt zulks in de beschikking vermeld.
4. Onder de kosten, bedoeld in het eerste lid, worden begrepen de kosten verbonden aan de voorbereiding van bestuursdwang, voor zover deze kosten zijn gemaakt na het tijdstip waarop de termijn, bedoeld in [artikel 21, derde lid](#), is verstreken.
5. De kosten zijn ook verschuldigd indien de bestuursdwang door opheffing van de onwettige situatie niet of niet volledig is uitgevoerd.

Artikel 23

1. De Minister of het bestuurscollege, voor zover het betreft overtreding van voorschriften van de openbare lichamen, kan van de overtreder bij dwangbevel de verschuldigde kosten, verhoogd met de op de invordering vallende kosten invorderen.
2. Het dwangbevel wordt op kosten van de overtreder bij deurwaardersexploot betekend en levert een executoriale titel op in de zin van het Tweede Boek van het Wetboek van Burgerlijke Rechtsvordering BES.
3. Gedurende zes weken na de dag van betekening staat verzet tegen het dwangbevel open door dagvaarding van Staat der Nederlanden of het desbetreffende openbare lichaam.
4. Het verzet schorst de tenuitvoerlegging. Op verzoek van de Staat der Nederlanden of het desbetreffende openbare lichaam kan de rechter in eerste aanleg de schorsing van de tenuitvoerlegging opheffen.

Artikel 24

De kosten verbonden aan de toepassing van bestuursdwang, zijn bevoorrecht op de zaak ten aanzien waarvan zij zijn besteed en worden na de kosten, bedoeld in artikel 1165, onderdeel 4° van het Burgerlijk Wetboek BES uit de opbrengst van de zaak betaald.

Artikel 25

Om aan een besluit tot toepassing van bestuursdwang uitvoering te geven, zijn de [artikelen 16, derde tot en met vijfde lid](#) en [17](#) van overeenkomstige toepassing op door de Minister of

het bestuurscollege, voor zover het betreft overtreding van voorschriften van de openbare lichamen, aan te wijzen personen.

Artikel 26

De Minister of het bestuurscollege, voor zover het betreft overtreding van voorschriften van de openbare lichamen, zijn bevoegd gebouwen, terreinen en hetgeen zich daarop bevindt, te verzegelen.

Artikel 27

1. Tot de bevoegdheid tot toepassing van bestuursdwang behoort het meevoeren en opslaan van daarvoor vatbare zaken voor zover de toepassing van bestuursdwang dit vereist.
2. Indien zaken zijn meegevoerd en opgeslagen, doen de Minister of het desbetreffende bestuurscollege daarvan proces-verbaal opmaken, waarvan afschrift wordt verstrekt aan de belanghebbende.
3. De Minister en het desbetreffende bestuurscollege dragen zorg voor de bewaring van de opgeslagen zaken en geeft deze zaken terug aan de rechthebbende.
4. De Minister en het desbetreffende bestuurscollege zijn bevoegd de afgifte op te schorten totdat de verschuldigde kosten zijn voldaan. Indien de rechthebbende niet tevens de overtreder is, zijn de Minister en het bestuurscollege bevoegd de afgifte op te schorten totdat de kosten van bewaring zijn voldaan.

Artikel 28

1. De Minister en het bestuurscollege, indien het betreft overtreding van voorschriften van de openbare lichamen, zijn bevoegd, indien een opgeslagen zaak niet binnen drie maanden na de opslag kan worden teruggegeven, deze te verkopen of, indien verkoop naar hun oordeel niet mogelijk is, de zaak om niet aan een derde in eigendom over te dragen of te laten vernietigen.
2. Gelijke bevoegdheid hebben de Minister en het desbetreffende bestuurscollege ook binnen die termijn, zodra de aan de toepassing van bestuursdwang verbonden kosten, vermeerderd met de voor de verkoop, de eigendomsoverdracht om niet of de vernietiging geraamde kosten, in verhouding tot de waarde van de zaak onevenredig hoog worden.
3. Verkoop, eigendomsoverdracht of vernietiging vinden niet plaats binnen twee weken na de verstrekking van het afschrift van het proces-verbaal betreffende het meevoeren en opslaan, tenzij het gevaarlijke stoffen of eerder aan bederf onderhevige stoffen betreft.
4. Gedurende drie jaren na het tijdstip van verkoop heeft degene die op dat tijdstip eigenaar was, recht op de opbrengst van het goed onder aftrek van de aan de toepassing van bestuursdwang verbonden kosten van de verkoop.

§ 2. Dwangsom

Artikel 29

1. De Minister en het bestuurscollege, indien het betreft overtreding van voorschriften van de openbare lichamen, kunnen in plaats van bestuursdwang toe te passen aan de overtreder een last onder dwangsom opleggen. Voor het opleggen van een last onder dwangsom wordt niet gekozen, indien het belang dat het overtreden voorschrift beoogt te beschermen, zich daartegen verzet.
2. De Minister of het desbetreffende bestuurscollege stelt de dwangsom vast hetzij op een bedrag ineens hetzij op een bedrag per tijdseenheid waarin de last niet is uitgevoerd of op een

bedrag per overtreding van de last. Zij stellen tevens een bedrag vast waarboven geen dwangsom meer wordt verbeurd. Het vastgestelde bedrag dient in redelijke verhouding te staan tot de zwaarte van het geschonden belang en de beoogde werking van de dwangsomoplegging.

3. In de beschikking tot oplegging van een last onder dwangsom die strekt tot het ongedaan maken of het beëindigen van een overtreding, wordt een termijn gesteld gedurende welke de overtreder de last kan uitvoeren zonder dat een dwangsom wordt verbeurd.

Artikel 30

1. Verbeurde dwangsommen komen toe aan de Staat der Nederlanden of het desbetreffende openbare lichaam.

2. De Minister en het desbetreffende bestuurscollege kunnen bij dwangbevel het verschuldigde bedrag, verhoogd met de op de invordering vallende kosten, invorderen.

[Artikel 22, tweede, derde en vierde lid](#), zijn van overeenkomstige toepassing.

Artikel 31

1. De Minister of het desbetreffende bestuurscollege kunnen op verzoek van de overtreder de dwangsom opheffen of de looptijd ervan opschorten voor een bepaalde termijn ingeval van blijvende of tijdelijke gehele of gedeeltelijke onmogelijkheid voor de overtreder om aan zijn verplichtingen te voldoen.

2. De Minister of het desbetreffende bestuurscollege kunnen op verzoek van de overtreder de dwangsom opheffen indien de beschikking een jaar van kracht is geweest zonder dat de dwangsom is verbeurd.

Artikel 32

1. De bevoegdheid tot invordering van verbeurde bedragen verjaart door verloop van één jaar na de dag waarop zij zijn verbeurd.

2. De verjaring wordt geschorst door faillissement en ieder wettelijk beletsel voor invordering van de dwangsom.

§ 3. Strafbepalingen

Artikel 33

1. Handelen in strijd met de voorschriften gegeven bij of krachtens de [artikelen 7A, 7B, 8A, 8B, 8C en 8D, eerste en tweede lid](#), of krachtens [artikel 15](#), en overtreding van de verboden gegeven bij of krachtens de artikelen 7A, 7B, 8A, 8B, 8C en 8D, eerste en tweede lid, of krachtens [artikel 15](#), wordt, voor zover opzettelijk begaan, gestraft met hetzij gevangenisstraf van ten hoogste vier jaren, hetzij geldboete van ten hoogste de zesde categorie van het Wetboek van Strafrecht BES, hetzij beide straffen.

2. Handelen in strijd met de voorschriften gegeven bij of krachtens de [artikelen 7A, 7B, 8A, 8B, 8C en 8D, eerste en tweede lid](#), of krachtens [artikel 15](#), en overtreding van de verboden gegeven bij of krachtens de artikelen 7A, 7B, 8A, 8B, 8C en 8D, eerste en tweede lid, of krachtens [artikel 15](#), wordt, voor zover niet opzettelijk begaan, gestraft met hetzij gevangenisstraf van ten hoogste een jaar, hetzij geldboete van ten hoogste de vijfde categorie van het Wetboek van Strafrecht BES, hetzij beide straffen.

3. Handelen in strijd met de bij de [artikelen 17, eerste lid](#), en [19](#) gegeven voorschriften wordt gestraft met hetzij hechtenis van ten hoogste zes maanden, hetzij een geldboete van de vierde categorie van het Wetboek van Strafrecht BES, hetzij beide straffen.

Artikel 34

De in [artikel 33, eerste en derde lid](#), strafbaar gestelde feiten zijn misdrijven; de overige in dit artikel strafbaar gestelde feiten zijn overtredingen.

Artikel 35

1. Onverminderd het bepaalde in de artikelen 35, 36 en 38b tot en met 38d van het Wetboek van Strafrecht BES worden alle, onverschillig waar, ongeoorloofd aanwezig bevonden specimens, verbeurd verklaard of aan het verkeer onttrokken.
2. Verbeurd verklaarde of aan het verkeer onttrokken specimens worden, met inachtneming van de door de Minister gestelde regels, in beheer gegeven aan een daarbij aan te wijzen persoon of instelling.
3. Verbeurd verklaarde of aan het verkeer onttrokken levende specimens als bedoeld in het eerste lid worden met inachtneming van door de Minister te stellen regels teruggezet in de natuur.
4. Verbeurd verklaarde of aan het verkeer onttrokken levende specimens die afkomstig zijn uit een lidstaat, worden op kosten van de eigenaar, de vervoerder, de importeur of diens gemachtigde hetzij teruggezonden naar die lidstaat, hetzij verzonden naar een andere lidstaat indien naar het oordeel van de Minister aldaar een passender omgeving voor het specimen is gewaarborgd.
5. Verbeurd verklaarde of aan het verkeer onttrokken levende specimens die afkomstig zijn uit een niet-lidstaat, worden op kosten van de eigenaar, de vervoerder, de importeur of diens gemachtigde hetzij in de op Bonaire, Sint Eustatius of Saba in een door de Minister te bepalen passende omgeving ondergebracht, hetzij verzonden naar een lidstaat waar naar het oordeel van de Minister een passender omgeving voor het specimen is gewaarborgd.
6. In het uiterste geval kan de Minister gelasten dat verbeurd verklaarde of aan het verkeer onttrokken levende specimens op kosten van de eigenaar, de vervoerder, de importeur of diens gemachtigde, worden vernietigd met inachtneming van door de Minister te stellen regels.
7. Verbeurd verklaarde of aan het verkeer onttrokken dode specimens worden op kosten van de eigenaar, de vervoerder, de importeur of diens gemachtigde vernietigd. In bijzondere gevallen kan de Minister afwijken van de eerste volzin, mits verzekerd is, dat het desbetreffende goed nimmer in het economisch verkeer kan komen.
8. Ten aanzien van hetgeen krachtens het vierde, vijfde, zesde of zevende lid, verschuldigd is, zijn de [artikelen 22](#) en [23](#) van overeenkomstige toepassing.

Hoofdstuk 7. Beroep

[vervallen]

Hoofdstuk 8. Overgangs- en slotbepalingen

Artikel 38

1. Het natuurbeleidsplan, bedoeld in [artikel 2, eerste lid](#), wordt voor de eerste keer vastgesteld uiterlijk één jaar na het in werking treden van deze wet.

2. Het natuurplan, bedoeld in [artikel 9, eerste lid](#), wordt voor de eerste keer vastgesteld uiterlijk twee jaren na het in werking treden van deze wet.
3. Indien het bestuurscollege nalaat binnen de in het tweede lid genoemde termijn het natuurplan vast te stellen, stelt de gezaghebber dit vast.

Artikel 39

1. Ingetrokken worden:
 - a. de landsverordening van den 11den april 1942, houdende verbod tot uitvoer van aloëplanten (P.B. 1942, no.84);
 - b. de landsverordening van de 19den juli 1976 tot bescherming van mariene gebieden (P.B. 1976, no. 157);
 - c. het Landsbesluit in- en uitvoerverbod bedreigde dieren en planten (P.B. 1992, no. 1).
2. Artikel 1, onderdeel b, van het Landsbesluit, houdende algemene maatregelen, van de 3den maart 1960 (P.B. 1960, no. 25) ter uitvoering van de artikelen 1 en 6 van de Uitvoerverbodenverordening 1944 (P.B. 1944, no. 117) vervalt.
3. De landsverordening van de 20sten juli 1926, tot bescherming van diersoorten, nuttig voor land- en ooftbouw of die langzamerhand uitsterven en op welker voortbestaan prijs wordt gesteld (P.B. 1926, no. 60), wordt met ingang van het tijdstip waarop voor een eilandgebied de in artikel 15 van deze landsverordening bedoelde eilandsverordening van kracht is geworden voor dat eilandgebied ingetrokken.

Artikel 40

1. De verboden in [artikel 8a, eerste en tweede lid](#), of krachtens het derde lid, onderdeel a, gelden niet voor het onder zich hebben van soorten, opgenomen in de Bijlagen I en II van het SPAW-protocol die men onder zich had op het tijdstip van inwerkingtreding van de Landsverordening grondslagen natuurbeheer en -bescherming.
2. Het bepaalde in het eerste lid is slechts van toepassing in geval soorten, opgenomen in Bijlage I van het CITES-verdrag en in de Bijlagen I en II van het SPAW-protocol binnen zes maanden na inwerkingtreding van de Landsverordening grondslagen natuurbeheer en -bescherming zijn geregistreerd in het register, bedoeld in [artikel 5, tweede lid, onderdeel b, subonderdeel 1°](#).

Artikel 41

[Vervallen]

Artikel 42

Deze regeling wordt aangehaald als: Wet grondslagen natuurbeheer- en bescherming BES.

b) Bonaire

ISLAND RESOLUTION MARINE PARK BONAIRE

NOTE: This translation of the Island Resolution Marine Park Bonaire has been prepared to assist interested parties to understand the content of this resolution. ONLY the original Dutch Resolution should be used to resolve legal matters.

Island Resolution, containing general measures, of [date implementing Articles 4, 8, 9, 10, 11, 16, and 17 of the Island Ordinance Nature Management Bonaire (A.B. 2008 nr. 23) and revoking the Island Resolutions, containing general measures, of June 28, 1991, nr. 8 (A.B. 1991 nr. 10), of December 13, 1991, nr. 1 (A.B. 1991 nr. 21), of December 22, 1993 nr.1 (A.B. 1993 nr 18), of March 20, 1996, nr. 9 (A.B. 1996 nr. 3), of August 18, 1999 nr. 5 (A.B. 1999 nr 11), of August 18, 1999 no. 6 (A.B. 1999 nr. 12), of September 5, 2003 (A.B. 2003 nr. 10), of January 27, 2005, nr. 3 (A.B. 2005 nr. 2), and of December 21 2007 (A.B. 2007 nr. 17); (Island Resolution Marine Park Bonaire) THE EXECUTIVE COUNCIL OF THE BONAIRE ISLAND TERRITORY; Considering that it is necessary and advisable to enact more specific rules regarding the management of the Marine Park; In view of: Articles 4, 8, 9, 10, 11, 16, and 17 of the Island Ordinance Nature Management Bonaire (A.B. 2008 nr. 23) Taking into account: the joint proposal by the Department of Spatial Development and Management, the Department of Agriculture, Animal Husbandry and Fisheries, the Department of Legal and General Affairs and the National Parks Foundation of [date] (archive nr. ...); the proposal by the Marine Environment Commission of [date] (archive nr. ...); HAS RESOLVED:

To enact the following Island Resolution containing general measures: Section I
DEFINITIONS Article 1

1. In this Island Resolution containing general measures, the terms below are defined as follows:

manager: the National Parks Foundation (STINAPA Bonaire) established on Bonaire;
building: any construction of wood, stone, metal or other material, which directly or indirectly is connected to the ground, or

2 directly or indirectly receives support from the ground at its intended site ; carapace length: the length from the front of the head between the eyes to the bow of the tail of a lobster; dive center: a business that offers facilities to divers who use the marine park; diver: a person who, equipped with air or other breathing gasses under pressure, enters the water, or has the clear intent to enter the water, or is under water, or leaves the water shortly after being under water; harbor master: the person, or his designate, appointed as such by the Executive Council; Marine Park: the nature park created by the Ordinance Marine Environment (A.B. 1991, nr. 8) or created as a protected area by virtue of Article 4 of the Island Ordinance Nature Management Bonaire; traditional fishing gear: fishing lines (liña), rods and casting nets (tarai), dragnets (reda) approved and certified as such by the manager; and fish reserve: the area in the Marine Park designated by the Executive Council where it is forbidden to catch any marine life in any manner under any circumstances.

2. The definitions in Article 1 of the Island Ordinance Nature Management Bonaire are of corresponding enforcement.

Section II ARTICLES CONCERNING ENTRY INTO THE MARINE PARK

Article 2

1. Users will be charged a fee as set forth in Appendix I of this Resolution To enter and to use the Marine Park.

2. No fee will be imposed on international and/or inter-insular shipping traffic that use the Marine Park.

3. No fee will be charged to the following persons who enter the Marine Park:

a. persons under 12 years of age;

b. persons who, according to documents, are either residents of the Netherlands Antilles or Aruba; and

c. persons who can prove that they are on Bonaire for a period of 24 hours or less.

4. The exclusions in paragraph 3 do not apply to divers.

Section III GENERAL MANAGEMENT MEASURES

Article 3 1. The following areas within the Marine Park are designated as reserves:

a. the area between Boka Slagbaai and Playa Frans (GPS-coordinates); and

b. the area between the Karpata land house and the longitudinal levee in front of the entrance to the Gotomeer (GPS-coordinates).

Article 3.2. Except for boat traffic through the reserves, and/or when fishing with traditional fishing gear, it is forbidden, without a permit from the Executive Council, to be in a reserve as such term is defined in paragraph 1. 3. Except for sites that the Manager specifically authorizes, it is forbidden to move, leashed to a kite or any object of this kind, on or above the waters of the Marine Park that are within 75 meters from the coast.

Article 4 It is forbidden, without a permit from the Executive Council, to dump or discharge waste or biological and chemical agents that are harmful to the environment into the waters of the Bonaire Island Territory.

Article 5

1. It is forbidden to anchor in the waters of the Marine Park.

2. The prohibition set forth in paragraph 1 does not apply to boats with a full length no greater than four meters as these boats are used for fishing and a stone is used as an anchor.

3. The prohibition set forth in paragraph 1 also does not apply to the area of the Kralendijk bay that is between the pier located across from the building at 12 Kaya J. N.E. Craane and the southern harbor pier (GPS-coordinates).

4. Anchoring in the area referenced in paragraph 3 is only permitted after obtaining written authorization from the harbor master.

5. The harbor master immediately will inform the manager of each authorization that he has granted pursuant to paragraph 4.

Article 6

It is forbidden, without a permit by the Executive Council, to remove or recover objects fastened to the bottom or bottom overgrowth of the Marine Park. Article 7 It is forbidden, without a permit from the Executive Council, to sink boats or other objects in the Marine Park that are not found there naturally. Article 8 It is forbidden for divers to use gloves except when diving a wreck at a depth of 50 meters or more. Section IV ARTICLES CONCERNING

FISHING

Article 9

1. It is forbidden to use mechanical gear or explosives for hunting marine life or to hunt or catch marine life with hand spears or hooks.
2. It is forbidden to transport, to offer for sale, to transfer, or to deliver marine life that has been caught by mechanical marine hunting gear, explosives, hand spears or hand hooks.
3. It is forbidden to transport mechanical marine hunting gear over public ground or public water.
4. It is forbidden to offer for sale, to sell, or to have in stock for sale in a shop or accompanying space, mechanical marine hunting gear complete or in parts.
5. mechanical marine hunting gear means any guns and pistols that are under the scope of the Island Ordinance Nature Management Bonaire Fire Guns 1931 (P.B. 1931 nr. 2) as amended, as well as any guns or pistols either through air or gas under pressure, or through other means, can shoot short missiles under water.

Article 10

1. It is forbidden to use traps (kanasters) to gather marine life in the Marine Park.
2. Without the approval and certification by the Manager, it is forbidden to use casting nets (tarai) or dragnets (reda) in the Marine Park to gather marine life.
3. It is forbidden to gather marine life with dragnets (reda) in the waters either under the Kralendijk piers and/or within a 20 meter radius from the outer skirts from these piers.
4. It is forbidden to use a snorkel or a diving mask when fishing with lines (liña).

Article 11

1. It is forbidden to catch, kill and carry, keep in stock for sale or for delivery, offer for sale, trade in, give as a present or transport lobsters (*Panulirus*, kref) under 35 cm when measured from the front of the head between the eyes to the bow of the tail, as well as lobsters with eggs.
2. From May 1st to September 30th, it is forbidden to catch lobsters from the western coast of Bonaire between Malmok and Willemstoren (Lighthouse) and from the waters surrounding Klein Bonaire (GPS-coordinates).

Article 12

1. It is forbidden, without a permit by the Executive Council, to gather karkò (*Strombus gigas*, conch).
2. The Executive Council will grant a permit as referenced in paragraph 1, only after consultation with the Nature Management Commission Bonaire and then only in compliance with the conditions set by the Commission.

Article 13

1. The following fish reserves are established within the Marine Park:
 - a. the part of the Marine Park between Punt'i Waya (Hato Gate) (GPS-coordinates: 12°10'53.81"N 68°17'38.50"W and 12°10'52.20"N 68°17'41.98"W) and the marina entrance at Harbour Village Beach Resort (GPS-coordinates: 12°09'46.92"N 68°17'46.92"W and 12°09'47.22"N 68°17'17.29"W);
 - b. the part of the Marine Park between the pier at "Playa Chachacha" (GPS-coordinates: 12°08'46.16"N 68°16'35.46"W and 12°08'44.92"N 68°16'41.21"W) and the marina entrance at Plaza Resort (GPS-coordinates: 12°08'07.62"N 68°16'42.53"W and 12°08'13.70"N 68°16'47.15"W).
2. It is forbidden to gather marine life in any manner of any kind within the areas set forth in paragraph 1.

3. The prohibition set forth in paragraph 2 does not apply to gathering bait fish if these are caught for immediate personal use and are caught during the period of sunrise to 9 o'clock in the morning.

Bait fish means:

- Masbangu (*Selar crumenophthalmus*), bigger than 8 centimeters, when measured from the front of the head to the rear end of the tail;
- Boka Langu (*Hemiramphus balao*) bigger than 20 centimeters, when measured from the tip of the under jaw to the rear end of the tail; and
- Moulou (*Decapterus punctatus*) bigger than 15 centimeters, when measured from the front of the head to the rear end of the tail.

Section V ARTICLES CONCERNING DIVE CENTERS

Article 14

1. It is forbidden, without a permit from the Executive Council, to operate a dive center or to transport or guide, divers in the Marine Park.
2. The permit holder of a dive center will be charged a fee for using the Marine Park in accordance with Appendix I of this Resolution.
3. The permit holder will be charged a fee in accordance with Appendix I of this Resolution when they are, for profit, transporting or guiding divers in the Marine Park.
4. It is forbidden, without a permit from the Executive Council, to possess a compressor that refills diving tanks.
5. The prohibition set forth in paragraph 4 does not apply to passengers and crew members of visiting yachts provided that the compressor is for private use only.
6. The fee referenced in paragraph 3 will not be charged to a dive center that has paid the fee referenced in paragraph 2.

Article 15

1. As referenced in paragraph 3 of this Article, twice annually, the Manager will provide training regarding the introduction program including the orientation dive to those employees at the dive center who are responsible for providing this instruction to divers. There may be a charge for this training.
2. Within 6 months after hire, dive center employees must successfully complete this training and receive a certificate.
3. Visiting divers must participate in an introduction program about the Marine Park, including an orientation dive, where possible, from the location of the dive center where they obtain their dive tanks before diving at other locations in the Marine Park.

Article 16

1. Compressors that fill diving tanks should be maintained in a manner that insures that the quality of the air under pressure, or other breathing gasses, at all times complies with the standards set forth in paragraph 2.
2. Air under pressure, or other breathing gasses, may not contain a higher pollution than:
 - carbon dioxide: 0.5 part per percent
 - carbon monoxide: 0.01 part per percent
 - oil: 1 mg/m³
 - odor: none
 - water: 0.07 percent
3. Only diving tanks with a valid hallmark provided by or on behalf of the Stoomwezen in Curaçao, or recognized by the Stoomwezen, should be refilled with air under pressure or

other breathing gasses. Diving tanks with a hallmark provided by or on behalf of the U.S. Department of Trade also are acceptable.

Article 17

1. Vessels transporting divers should have on board, and at hand, life-saving and security devices, including a first aid kit, as required by the harbor master when the vessel is registered.
2. If, for the safety of the vessel or the crew and passengers, the vessel must anchor for any reason, such as clearing a screw propeller, no divers, except for the crew members, should go into the water.

Article 18

A permit-holder, as referenced in Article 14, paragraph 1, must keep diving gear that it rents to Marine Park visitors in good order and service it at least once a year. Section VI

ARTICLES CONCERNING MOORING BUOYS

Article 19

1. It is forbidden, without a permit from the Executive Council, to place a mooring buoy in the Marine Park.
2. The prohibition in paragraph 1 does not apply to the manager and/or to persons acting on the manager's behalf.
3. The Executive Council will only issue a permit as referenced in paragraph 1 when there is compliance with the following conditions:
 - a. If the permit is for non-commercial purposes, the applicant must be registered at the Bonaire municipal registry;
 - b. If the permit is for commercial purposes, the applicant must have a business license and must be registered at the Chamber of Commerce;
 - c. the vessel that will use the buoy should be the property of the applicant and registered at the harbor master, and have a NB register number.
4. Permits referenced in paragraph 1 will be granted only for mooring buoys located on the western coast of Bonaire between Barcadera and Punt Vierkant (GPS-coordinates).

Article 20

The only mooring buoys that may be placed are those which the manager has approved and then only if placed by the manager or a person under the manager's supervision. Article 21 A fee, as established in Appendix I, will be charged for the use of a mooring buoy. Article 22 Article 21 does not apply to mooring buoys in the Marine Park that are controlled and managed by the manager and are designated for public use, and that are used for a period no longer than 2 hours, by boats that are no longer than 13 meters. Article 23 It is forbidden for boats longer than 18 meters to use mooring buoys. Article 247 1. It is forbidden for more than three vessels, each of which is longer than four meters, to use at the same time, mooring buoys as defined in Article 22.

2. It is forbidden for vessels with a mast or structure height of more than four meters to use mooring buoys located at the diving sites Windsock (GPS-coordinates) and North Belnem (GPS-coordinates).

Article 25

1. It is forbidden to directly attach the floating line of a mooring buoy to a vessel.
2. At least 6 meters of the boat's own line must be used when mooring at a mooring site. The manager can designate those mooring sites at which boats can use a shorter line.

Article 26

Persons who fish professionally will not be required to pay a fee when applying for the placement of a mooring buoy if the application pertains to a boat that is no longer than 7 meters and uses a motor not stronger than 25 HP. Section VII ARTICLES CONCERNING PIERS AND SIMILAR STRUCTURES

Article 27

It is forbidden, without a permit from the Executive Council, to construct piers, stairs, ladders, overhanging structures, platforms, floating piers or other structures in, at, or above the Marine Park.

Article 28 The prohibition in Article 27 also applies to extensions, renovations and major repairs of the structures referenced in Article 27.

Article 29 No permit will be granted for the construction of filled piers.

Article 30 Permits, as referenced in Article 27, will only be granted for piers on Bonaire's western coast between Punt'i Waya (Hato Gate) and Punt Vierkant (GPS-coordinates).

Article 31 No construction of piers will be allowed unless it is necessary for the operation of a registered dive center or a ship yard company.

Article 32 A permit-holder or his legal successor will be charged a user's fee in accordance with Appendix I for the structures set forth in Article 27. Section VIII ARTICLES CONCERNING BEACHES

Article 33 It is forbidden, without a permit from the Executive Council, to create or restore a beach adjacent to the Marine Park. Article 34 A permit, as referenced in Article 33, will only be granted after consultation with the Nature Management Commission Bonaire and then only in compliance with the following conditions: a. the creation of the beach is in the public interest; b. the beach will, at all times, be accessible to everyone; c. there is no alternative for a beach in the immediate vicinity. Article 35 A permit-holder will be charged a user's fee in accordance with Appendix I of this Resolution for use of a created beach.

Section IX

PARTICULAR ARTICLES CONCERNING LAC

Article 36

1. When outside the Cai-Sorobon channel, it is forbidden for boats having a motor stronger than six HP at the screw propeller to navigate in the waters of Lac at a speed faster than two nautical miles. When within this channel, no boat can navigate at a speed faster than 4 nautical miles per hour.

2. The prohibition set forth in paragraph 1 does not apply to law enforcement or marine rescue vessels.

Article 37

It is forbidden to navigate on jet skis in the waters of Lac. Article 38 It is forbidden to move forward, leashed to a kite or any object of this kind, on or above the waters of Lac. Section X

FINAL ARTICLES Article 39 The Island Resolutions containing general measures, of June 28, 1991, nr. 8 (A.B. 1991 nr. 10), of December 13 1991, nr. 1 (A.B. 1991 nr. 21), of December 22, 1993 nr.1 (A.B 1993 nr 18), of March 20, 1996, nr. 9 (A.B. 1996 nr. 3), of August 18, 1999 nr. 5 (A.B. 1999 nr 11), August 18, 1999 nr. 6 (A.B. 1999 nr. 12), of September 5, 2003 (A.B. 2003 nr. 10), January 27, 2005, nr. 3 (A.B. 2005 nr. 2) and of December 21 2007 (A.B. 2007 nr. 17 are repealed. Article 40 This island Resolution, containing general measures, can be referred to as: Island Resolution Marine Park.9

Article 41 This Island Resolution, containing general measures takes effect on the day following its publication. Thus decided in the meeting of [date] The Executive Council of the Bonaire Island Territory, the Governor, the Secretary, This Island Resolution, containing general measures is proclaimed by me on [date] the Governor,

Ao. 2010

No. 15

30011984



AFKONDIGINGSBLAD BONAIRE

EILANDBESLUIT HOUDENDE ALGEMENE MAATREGELEN van AUG 25 2010 no. 3
ter uitvoering van de artikelen 8, 9, 10, 11, 16, 17 en 19 van de Eilandsverordening Natuurbeheer (A.B. 2008, no. 23) en tot intrekking van het eilandsbesluit, houdende algemene maatregelen van 31 maart 2005 no. 6 (A.B. 2005, no. 10), (Eilandsbesluit natuurbeheer Bonaire);

HET BESTUURSCOLLEGE VAN HET EILANDGEBIED BONAIRE;

Overwegende:

dat het noodzakelijk en wenselijk is nadere regels te stellen ten aanzien van de bescherming en het beheer van de natuur en de daarin voorkomende dier- en plantensoorten van het Eilandgebied Bonaire;

Gelet op:

de artikelen 8, 9, 10, 11, 16, 17 en 19 van de Eilandsverordening Natuurbeheer Bonaire (A.B. 2008, no. 23)

Gelezen:

het gezamenlijke advies van de Dienst Ruimtelijke Ontwikkeling en Beheer, de Dienst Landbouw, Veeteelt en Visserij, de Afdeling Juridische en Algemene Zaken en de Commissie natuurbeheer Bonaire van 3 augustus 2010 (archiefnr.30011042);

HEEFT BESLOTEN:

Vast te stellen het navolgende eilandsbesluit, houdende algemene maatregelen:

Paragraaf I BEGRIJPSBEPALINGEN

Artikel 1

1. In dit Eilandsbesluit, houdende algemene maatregelen, wordt verstaan onder:
- | | |
|---------------------|--|
| beheerder: | de ingevolge artikel 8, eerste lid, van de eilandsverordening j° artikel 23 van dit eilandsbesluit aangewezen organisatie die is belast met het beheer van de natuurparken van het eilandgebied Bonaire; |
| bouwwerk: | elke constructie van hout, steen, metaal of ander materiaal, die op de plaats waarvoor zij is bedoeld, hetzij direct of indirect met de grond verbonden is, hetzij direct of indirect steun vindt in of op de grond; |
| eilandsverordening: | de Eilandsverordening natuurbeheer Bonaire (A.B. 2008, no. 23); |
| natuurpark: | natuurpark als bedoeld in artikel 4 van de eilandsverordening; |

- onderwaterpark: natuurpark ingesteld bij de Verordening marien milieu (A.B. 1991, no. 8) dan wel als natuurpark ingesteld krachtens artikel 4 van de eilandsverordening;
- vellen: het kappen, verwijderen, snoeien, vernielen en rooien van planten;
- Washington Slagbaai natuurpark dat door het Eilandgebied Bonaire aan STINAPA Bonaire in
- Park: beheer is gegeven bij overeenkomst van 9 oktober 1990 (archiefr. 3499) dan wel als natuurpark is ingesteld krachtens artikel 4 van de eilandsverordening.
2. De begripsbepalingen in artikel 1 van de eilandsverordening zijn van overeenkomstige toepassing.

Paragraaf II
BESCHERMING VAN GEBIEDEN

Artikel 2

Het is verboden gebruik te maken van een natuurpark zonder dat de daarvoor verschuldigde gebruiksvergoeding is voldaan.

Artikel 3

Voor de toegang tot een natuurpark wordt een vergoeding geheven als vermeld in Annex III van dit besluit.

Artikel 4

1. De beheerder is belast met de inning van de vergoedingen.
2. Dat de vergoeding is voldaan dient te blijken uit een door of namens de beheerder te verstrekken betalingsbewijs.
3. Gebruiksvergoedingen kunnen worden voldaan bij:
 - a. het kantoor van de beheerder; of
 - b. bij personen of bedrijven die faciliteiten aanbieden ten behoeve van het gebruik van het natuurpark; of
 - c. op andere door de beheerder te bepalen plaatsen.
4. De in het derde lid, onder b, bedoelde personen of bedrijven dienen bij hun cliënten de door hen verschuldigde gebruiksvergoedingen te innen dan wel hen op het bezit van een geldig betalingsbewijs te controleren.

Artikel 5

1. Personen of bedrijven als bedoeld in artikel 4, derde lid onder b, dienen per keer ten minste een voorraad betalingsbewijzen bij de beheerder tegen betaling af te nemen overeenkomstig het aantal gebruikers dat in een week wordt verwacht.
2. Betalingsbewijzen welke onjuist zijn ingevuld of welke niet zullen worden verstrekt aan gebruikers kunnen, met toestemming van de beheerder, tegen nieuwe betalingsbewijzen worden ingewisseld.

Artikel 6

1. Betalingsbewijzen bestaan uit hetzij een kwitantie hetzij een penning, welke beiden zijn voorzien van een gelijk nummer en die gelijktijdig aan de gebruiker worden verstrekt.
2. Betalingsbewijzen zijn niet overdraagbaar.
3. Indien de geldigheid van het betalingsbewijs is beperkt tot één dag wordt slechts een kwitantie verstrekt.

4. De duplicaten van de kwitanties worden door degene die de betalingsbewijzen verstrekt overhandigd aan de beheerder, zo dikwijls als deze daarom vraagt.
5. De penning dient door de gebruiker op een zodanige wijze te worden gedragen of aan kleding of uitrusting bevestigd dat deze goed zichtbaar is.
6. De gebruiker is verplicht de penning en kwitantie, of ingeval een penning niet verstrekt is de kwitantie, op eerste verzoek te tonen aan de personen belast met het beheer van het natuurpark.

Artikel 7

1. Het is verboden zonder vergunning van het bestuurscollege specimens van dieren of planten uit een natuurpark te verwijderen.
2. Het verbod in het eerste lid is niet van toepassing op het verzamelen met de hand of met traditioneel visgerei van vissen, schaaldieren en weekdieren, voor zover dit overigens is toegelaten.
3. Onder traditioneel visgerei wordt uitsluitend verstaan vislijnen, hengels en door de beheerder goedgekeurde en als zodanig gewaarmerkte werpnetten (tarai) en treknetten (reda).
4. Het verbod in het eerste lid is niet van toepassing op verzamelen en verwijderen van in artikel 19, eerste lid, genoemde dier- en plantensoorten door de beheerder en door de beheerder aangewezen personen.

Artikel 8

Het is verboden zonder vergunning van het bestuurscollege in een natuurpark de volgende handelingen te verrichten:

- a. het ontginnen, verlagen, afgraven, ophogen of egaliseren van gronden;
- b. het beschadigen, verwijderen of vernietigen van natuurlijke vegetatie;
- c. het verwijderen van zand of stenen;
- d. het aanleggen van wegen, kaden, pieren, aanlegplaatsen, kanalen, dammen of andere bouwwerken;
- e. het gebruiken van voertuigen buiten de daarvoor opgestelde wegen en paden;
- f. het gebruiken van modelvliegtuigen en modelmotorvoertuigen;
- g. het storten van afval;
- h. het lozen van ongezuiverd afvalwater of chemische en biologische stoffen die schade kunnen toebrengen aan het milieu;
- i. het gebruiken van bestrijdingsmiddelen of kunstmest;
- j. het verstoren van de waterhuishouding;
- k. het aanleggen van open vuren;
- l. het veroorzaken van geluidshinder;
- m. het binnen het park brengen van dieren of planten met uitzondering van huisdieren op door de beheerder daartoe aangewezen plaatsen;
- n. het binnengaan van als zodanig aangegeven broedgebieden of bijzondere reservaten;
- o. het voeren van dieren.

Artikel 9

Het is verboden zonder vergunning van het bestuurscollege in bufferzones als bedoeld in artikel 4, derde lid, van de eilandsverordening de volgende handelingen te verrichten:

- a. het ontginnen, verlagen, afgraven, ophogen of egaliseren van gronden;
- b. het beschadigen, verwijderen of vernietigen van natuurlijke vegetatie anders dan ten hoeve van het onderhoud van wegen en paden of de uitoefening van traditionele landbouw;
- c. het aanleggen van wegen, kaden, kanalen, dammen of andere bouwwerken;
- d. het storten van afval;

- e. het lozen van ongezuiverd afvalwater of chemische en biologische stoffen die schade kunnen toebrengen aan het milieu;
- f. het gebruiken van bestrijdingsmiddelen of kunstmest;
- g. het verstoren van de waterhuishouding;
- h. het aanleggen van open vuren voor zover dit een gevaar kan opleveren voor de natuurlijke vegetatie van het natuurpark.

Artikel 10

1. Het is verboden in een natuurpark geweren, pistolen, katapults, strikken of andere jachtmiddelen onder zich te hebben.
2. Het verbod in het eerste lid is niet van toepassing ten aanzien van jachtmiddelen voor zover deze worden gebruikt voor het beheer van het park.

Paragraaf III

BESCHERMING VAN DIER- EN PLANTENSOORTEN

Artikel 11

1. Als beschermde dier- en plantensoorten in de zin van artikel 11, tweede lid, van de eilandsverordening worden aangewezen de soorten vermeld in Annex I van dit besluit.
2. De geldende tekst van de annex bedoeld in het eerste lid ligt voor een ieder ter inzage op een door het bestuurscollege aangewezen plaats.

Artikel 12

Ten behoeve van het beheer van beschermde vogelsoorten kan het bestuurscollege de eigenaar of beheerder van masten, hoogspanningsleidingen of andere constructies die zich bevinden in de vliegrouete van de vogels, gelasten deze constructies op de door het eilandsbestuur aangewezen plaatsen te voorzien van waarschuwingsbollen of soortgelijke voorwerpen.

Artikel 13

(Gereserveerd)

Artikel 14

1. Het is verboden zonder vergunning van het bestuurscollege bomen of cactussen met een omtrek van de stam van minimaal 65 centimeter, gemeten op 1.30 meter hoogte boven het maaiveld, te vellen.
2. Het is verboden zonder vergunning bomen of cactussen te vellen die geplant zijn in het kader van de herplantplicht of anderszins aangegane verplichtingen.
3. Het is verboden bomen of cactussen te vellen die opgenomen zijn in de lijst "waardevolle bomen" van het eilandgebied Bonaire.
4. Het in het eerste en derde lid bedoelde verbod geldt niet voor het vellen van bomen of cactussen bedoeld in artikel 19 of artikel 20 en indien naar het oordeel van het bestuurscollege er sprake is van ernstige bedreiging van de openbare veiligheid of noodtoestand of andere uitzonderlijke situaties.

Artikel 15

1. Het bestuurscollege is bevoegd de vergunning te verlenen onder de voorwaarde dat de vergunninghouder een geldelijke bijdrage verschuldigd is die bestemd is voor aanplantingen.
2. De in het eerste lid bedoelde bijdrage wordt voldaan aan en beheerd door de organisatie als bedoeld in artikel 23. Bij het afleggen van de rekening en verantwoording als bedoeld in artikel 9, vierde lid van de eilandsverordening wordt een overzicht verstrekt van aangeplante bomen per locatie.
3. De geldelijke bijdrage bedraagt:
 - a. \$ 85,00 (Naf 152,00) bij een stamomtrek van 65 tot 79 centimeter;
 - b. \$ 140,00 (Naf 250,00) bij een stamomtrek van 80 tot 94 centimeter, en
 - c. \$ 195,00 (Naf 349,00) bij een stamomtrek van 95 centimeter of meer.

Artikel 16

1. Het bestuurscollege kan de vergunning weigeren dan wel onder voorschriften verlenen in het belang van onder andere:
 - a. natuur- en milieuwaarden;
 - b. landschappelijke waarden;
 - c. cultuurhistorische waarden;
 - d. waarden van stads- en dorpschoon;
 - e. waarden voor recreatie en leefbaarheid;
 - f. beeldbepalende waarde van de houtopstand;
 - g. één of meerdere van de bovengenoemde waarden die de beplanting in de toekomst kan vertegenwoordigen.
2. Indien er sprake is van bouw- of aanlegplannen, kan een vergunning worden geweigerd op de enkele grond dat de plannen nog niet definitief zijn.

Artikel 17

1. Het bestuurscollege wijst bomen of cactussen aan die behouden dienen te blijven vanwege hun:
 - a. natuur- en milieuwaarden;
 - b. landschappelijke waarden;
 - c. cultuurhistorische waarden;
 - d. waarden van stads- en dorpschoon, en
 - e. waarden voor recreatie en leefbaarheid.
2. De in het eerste lid bedoelde bomen of cactussen worden vermeld op een daartoe door het bestuurscollege opgestelde lijst, die voor een ieder ter inzage ligt op een door het bestuurscollege aangewezen plaats.

Artikel 18

1. Het is verboden zonder vergunning van het bestuurscollege mangroven, pokhout en bolcactussen in de natuur uit te steken, te verzamelen, af te snijden, te ontwortelen, te beschadigen of te vernielen. Het verbod is niet van toepassing op handelingen verricht op een perceel waarop werkzaamheden zullen worden verricht waarvoor op grond van de Bouw- en woningverordening (A.B. 1961, no. 17) of hiervoor in de plaatstredende verordening een bouwvergunning is verleend.
2. Onder mangroven, pokhout en bolcactussen als bedoeld in het eerste lid worden verstaan:
 - a. witte mangrove (*Avicennia germinans*, mangel blanku);
 - b. grijze mangrove (*Conocarpus erectus*, mangel blanku);
 - c. mangrove (*Laguncularia racemosa*, mangel blanku);

- d. rode mangrove (*Rhizophora mangle*, mangel tan);
- e. pokhout (*Guaiacum officinale*, wayaká) en (*Guaiacum sanctum*, wayaká shimaron);
- f. bolcactus (*Melocactus macracanthus*, bushi, kabes di indjan, melon di seru).

Paragraaf IV
OVERIGE REGELS TER BESCHERMING VAN DE NATUUR

Artikel 19

1. Als schadelijk voor de natuur of de natuurwaarden van het eilandgebied Bonaire wordt aangemerkt de volgende dier- en plantensoorten:
 - a. *Cryptostegia grandiflora* (rubberliaan, palu di lechi);
 - b. *Pterois spp.* (koraalduivel);
 - c. *Boa constrictor* (afgodslang).
2. Het bestuurscollege kan de rechthebbende op land of wateren alsmede de hoofdgebruiker gelasten dieren of planten behorende tot een in het eerste lid aangewezen soort te verwijderen of passende maatregelen te treffen teneinde te voorkomen dat deze soort zich vermeerderd of verspreidt.
3. De verwijdering dient in eerste instantie mechanisch te geschieden. Verwijdering met chemische middelen mag slechts worden toegepast nadat het bestuurscollege daartoe een vergunning heeft verleend.

Artikel 20

1. Als mogelijk schadelijk voor de natuur of de natuurwaarden van het eilandgebied Bonaire wordt aangemerkt de volgende plantensoort:
 - *Azadirachta indica* (neem boom; palu di neem).
2. Het bestuurscollege kan de rechthebbende op land alsmede de hoofdgebruiker gelasten passende maatregelen te treffen teneinde te voorkomen dat de op zijn land voorkomende dieren of planten behorende tot een in het eerste lid aangewezen soort zich vermeerderen of verspreiden.

Artikel 21

1. Als activiteiten zoals bedoeld in artikel 16, eerste lid, van de eilandsverordening worden aangemerkt:
 - a. de aanleg, wijziging of uitbreiding van een luchtvaartterrein;
 - b. de wijziging in de ligging van een start- of landingsbaan of de verlenging of verbreding daarvan;
 - c. de aanleg, wijziging of uitbreiding van een zeehaven;
 - d. de aanleg, wijziging of uitbreiding van met land verbonden en buiten een haven gelegen pier voor het lossen en laden van schepen groter dan 500 gross tons (GT);
 - e. de aanleg, wijziging of uitbreiding van een kunstmatig strand;
 - f. de aanleg, wijziging of uitbreiding van een jachthaven;
 - g. de aanleg, wijziging of uitbreiding van een uitwatering in zee;
 - h. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor het ontzilten van zeewater of voor het onttrekken van warmte of koude aan zeewater waarbij de activiteit betrekking heeft op een hoeveelheid water van 70 m³ per dag of meer;
 - i. de winning dan wel wijziging of uitbreiding van de winning van oppervlaktedelfstoffen, de ophoging of ander gebruik van de zeebodem over een oppervlakte van 0,25 hectare of meer;
 - j. de aanleg, wijziging of uitbreiding van een inrichting voor aquacultuur;

- k. de infiltratie van water in de bodem of onttrekking van grondwater aan de bodem alsmede de wijziging of uitbreiding van bestaande infiltraties of onttrekkingen waarbij de activiteit betrekking heeft op een hoeveelheid water van 100 m³ per dag of meer;
 - l. de winning van aardolie, aardgas of andere delfstoffen;
 - m. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor de opslag van aardolie, aardgas, petrochemische of chemische producten met een opslagcapaciteit van 2.000 ton of meer;
 - n. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor de raffinage van aardolie;
 - o. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor de fabricage van chemische producten en de aanleg van de daarbij behorende infrastructuur;
 - p. de aanleg, wijziging of uitbreiding van een buisleiding met een diameter van meer dan 20 centimeter voor het transport van gas, olie of chemicaliën over een lengte van meer dan 500 meter;
 - q. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor de productie van elektriciteit, stoom of warmte met een vermogen van 5 megawatt of meer;
 - r. de oprichting, wijziging of uitbreiding van één of meer met elkaar samenhangende installaties voor het opwekken van elektriciteit door middel van windenergie, waarbij de activiteit betrekking heeft op een gezamenlijk vermogen van 10 megawatt of meer of 10 windturbines of meer;
 - s. de aanleg, wijziging of uitbreiding van het tracé van een bovengrondse hoogspanningsleiding met een spanning van 30 kilovolt of meer en over een lengte van 3 kilometer of meer;
 - t. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor het verbranden, verwerken of storten van afvalstoffen met een capaciteit van 2.000 ton per jaar of meer;
 - u. de oprichting, wijziging of uitbreiding van een inrichting bestemd voor het reinigen van afvalwater met een capaciteit van 1.000 inwonerequivalenten of meer;
 - v. de ontgronding dan wel wijziging of uitbreiding van de ontgronding over een oppervlakte van 1 hectare of meer;
 - w. de winning dan wel wijziging of uitbreiding van de winning van oppervlakedelfstoffen op een winplaats van 5 hectare of meer of een aantal winplaatsen die in elkaars nabijheid liggen met een gezamenlijke oppervlakte van 5 hectare of meer;
 - x. de aanleg, wijziging of uitbreiding van een golfbaan en andere recreatieve of toeristische voorzieningen met een oppervlakte van 8 hectare of meer;
 - y. de aanleg, wijziging of uitbreiding van terreinen en bouwwerken voor verblijfsaccommodatie van 10 kamers of meer in bufferzones van natuurparken en in gebieden die bij of krachtens de Eilandsverordening ruimtelijke ontwikkelingsplanning Bonaire of een hiervoor in de plaatsstredende verordening, voor doeleinden van landschaps- of natuurbehoud of ecologische en milieuhygiënische doeleinden bestemd zijn.
2. Een aanvraag voor een vergunning als bedoeld in artikel 16, eerste lid, van de eilandsverordening gaat vergezeld van een milieu-effectrapport dat voldoet aan de eisen zoals vermeld in annex II van dit besluit.
 3. Geen milieu-effectrapport behoeft te worden overgelegd indien:
 - a. voor de voorgenomen activiteit of een activiteit waarvan de voorgenomen activiteit een herhaling of voortzetting is reeds eerder een milieu-effectrapport is opgesteld en een nieuw milieu-effectrapport redelijkerwijs geen nieuwe gegevens kan bevatten over de mogelijke nadelige gevolgen van de voorgenomen activiteit voor het milieu;

- b. als gevolg van een gebeurtenis waarbij ernstige verstoring van de openbare orde is of dreigt te ontstaan, waarbij het leven, het welzijn van vele personen, het milieu of grote materiële belangen in ernstige mate worden bedreigd of worden geschaad, de voorgenomen activiteit onverwijld moet worden uitgevoerd, of
 - c. de voorbereiding van de voorgenomen activiteit op het tijdstip waarop deze bepaling van kracht wordt reeds zover is gevorderd dat het opstellen van een zodanig rapport naar het oordeel van het bestuurscollege redelijkerwijs niet meer kan worden verlangd.
4. Indien op een aanvraag voor een vergunning als bedoeld in artikel 16, eerste lid, van de eilandsverordening positief wordt beslist, bepaalt het bestuurscollege bij de vaststelling van haar besluit tevens een datum voor de evaluatie van dat besluit.
 5. Na verloop van de in het vierde lid bedoelde termijn voert het bestuurscollege met medewerking van de vergunninghouder een evaluatie uit van haar besluit met inachtneming van de werkelijk opgetreden gevolgen van de ondernomen activiteit voor het milieu.
 6. Het bestuurscollege neemt, na hiertoe de eilandelijke commissie gehoord te hebben, zonodig aanvullende maatregelen om nadelige gevolgen van de ondernomen activiteit voor het milieu te beperken.

Artikel 22

Het bepaalde in artikel 19, derde tot en met vijfde lid, van de eilandsverordening is niet van toepassing op de volgende categorieën vergunnings- of ontheffingsaanvragen:

- a. aanvragen voor een vergunning als bedoeld in artikel 8 onder n, tot het binnengaan van als zodanig aangegeven broedgebieden en reservaten;
- b. aanvragen voor een vergunning als bedoeld in artikel 19, derde lid, tot het verwijderen van schadelijke planten met chemische middelen, en
- c. aanvragen voor een vergunning of ontheffing ten behoeve van wetenschappelijk onderzoek.

Paragraaf V

BEHEER VAN DE NATUURPARKEN

Artikel 23

Als beheerder van de natuurparken van Bonaire wordt aangesteld de Stichting Nationale Parken Bonaire (STINAPA Bonaire) gevestigd te Bonaire.

Artikel 24

Het beheer van de natuurparken wordt bij overeenkomst geregeld tussen het Bestuurscollege en de in artikel 23 genoemde beheerder.

Paragraaf VI

SLOTBEPALINGEN

Artikel 25

Het eilandsbesluit, houdende algemene maatregelen, van 31 maart 2005 (A.B. 2005, no. 10) wordt ingetrokken.

Artikel 26

Dit eilandsbesluit, houdende algemene maatregelen, wordt aangehaald als: Eilandsbesluit natuurbeheer Bonaire.

Artikel 27

Dit eilandsbesluit, houdende algemene maatregelen, treedt in werking op 1 september 2010 met uitzondering van de artikelen 14 en 15 die in werking treden op 1 januari 2011.

Aldus vastgesteld in de vergadering van **AUG 25 2010**

Het bestuurscollege van het eilandgebied Bonaire,
de gezaghebber,
mr. dr. G. A. E. Thodé

de secretaris,
mr. N. M. Gonzalez.

Dit eilandsbesluit, houdende algemene maatregelen, is door mij afgekondigd op
de gezaghebber,
mr. dr. G. A. E. Thodé.

Annex I als bedoeld in artikel 11, eerste lid, van het Eilandsbesluit natuurbeheer Bonaire**Eilandelijk beschermde dier- en plantensoorten**

Op grond van artikel 11, tweede lid, van de Eilandsverordening natuurbeheer Bonaire (Beschermde dier- en plantsoorten op grond van verdragen (artikel 11, eerste lid Eilandsverordening natuurbeheer Bonaire) worden niet vermeld).

| Latijnse naam | Papiamentse naam | Nederlandse naam | Engelse naam | |
|---|-----------------------------------|-----------------------------------|--------------------------|-----|
| Haaichtigen | | | | |
| Aetobatus narinari | chuchu águila | gevleete adelaarsrog | spotted eagle ray | ● |
| Dasyatis Americana | chuchu ròk | Amerikaanse pijlstaartrog | southern stingray | ● |
| Manta birostris | manta | mantarog | manta ray | ● |
| Selachimorpha (Euselachii) | tribon | haaien | sharks | ● |
| Zeevissen | | | | |
| Balistes vetula | pishiporko rabu di gai | koningstrekkerkervis | queen triggerfish | ● |
| Dermatolepis inermis | olitu | | marbled grouper | ● |
| Epinephelus itajara | djukvis | itajara | Goliath grouper, jewfish | ● |
| Epinephelus striatus | jakupepu | Nassau tandbaars | nassau grouper | ● |
| Lachnolaimus maximus | hokfis | everlipvis | hogfish | ● |
| Lutjanus analis | kapitán | snapper | mutton snapper | ● |
| Lutjanus cyanopterus | karaña pretu | cupera snapper | cupera snapper | ● |
| Pagrus pagrus | djent'i maishi | rode zeebrasem | red porgy | ● |
| Scaridae | gutu | papegaaivissen | parrotfishes | ● |
| Thunnus obesus | buni wowo grandi | grootoogtonijn | bigeye tuna | ● |
| Ongewervelde zeedieren | | | | |
| Panulirus argus | kref | kreeft | Caribbean spiny lobster | ■ |
| Panulirus guttatus | kref | gevleete kreeft | spotted spiny lobster | ■ |
| Panulirus laevicauda | kref | kreeft | smoothtail spiny lobster | ■ |
| Koraalachtigen | | | | |
| Antipatharia | koral pretu | zwarte koralen | black corals | ●○ |
| Gorgoniacea | | waaierkoralen | gorgonians | ● |
| Milleporidae | | brandkoralen | fire corals | ●○ |
| Scleractinia | | steenkoralen | stony corals | ●○ |
| Stylasteridae | | kantkoralen | lace corals | ●○ |
| Zeeschelpdieren | | | | |
| Strombus gigas | karkó | roze vleugelhoorn grote kroonslak | queen conch | ●■○ |
| Zeegrassen | | | | |
| Syringodium filiforme (Cymodocea manitorum) | | zeegras | manatee grass | ● |
| Thalassia testudinum | yerba di kaña | zeegras | turtle grass | ● |
| Zoogdieren | | | | |
| Chiroptera | raton di anochi | vleermuizen | bats | ● |
| Vogels | | | | |
| Aratinga pertinax xanthogenius | prikichi | West Indische parkiet | brown-throated parakeet | ●○ |
| Buteo albicaudatus | gabilan di seru, falki | witstaartbuizerd | white tailed hawk | ●○ |
| Margarops fuscates bonairensis | chuchubi Spaño palabrua boka duru | witoogetpotlijster | pearly eyed thrasher | ● |
| Pandion haliaetus | gabilan piskadó | visarend | osprey | ●○ |
| Phoenicopterus ruber | chogogo | Caribische flamingo | Caribbean flamingo | ●○ |
| Tyto alba | palabrua | kerkuil | barn owl | ●○ |
| Reptielen | | | | |
| Iguana iguana | yuana | groene leguaan | green iguana | ○ |
| Zoetwaterdieren | | | | |
| Typhlatya monae | | blinde garnaal | Mona cave shrimp | ● |

| Latijnse naam | Papiamentse naam | Nederlandse naam | Engelse naam | |
|---|---------------------------------------|------------------|------------------------|-----|
| Mangrovesoorten | | | | |
| <i>Avicennia germinans</i> | mangel blanku | witte mangrove | black mangrove | ■ |
| <i>Conocarpus erectus</i> | mangel, mangel blanku | grije mangrove | buttonwood | ■ |
| <i>Laguncularia racemosa</i> | mangel blanku | mangrove | white mangrove | ■ |
| <i>Rhizophora mangle</i> | mangel tan | rode mangrove | mangrove | ■ |
| Bomen | | | | |
| <i>Amyris ignea</i> (A. simplicifolia) | | | | • |
| <i>Capparis tenuisiliqua</i> | | | | • |
| <i>Celtis iguanaea</i> | | | | • |
| <i>Clusia</i> sp. | tam machu | | | • |
| <i>Cratogeomys</i> | ishiri | | | • |
| <i>Euphorbia cotinifolia</i> | manzaliña bobo | | | • |
| <i>Ficus brittonii</i> | palu di mahawa, mahòk di mondi | | | • |
| <i>Geoffroea spinosa</i> (G. superba) | palu di taki | | | • |
| <i>Guaiacum officinale</i> | wayaká | pokhout | lignum-vitae | ••○ |
| <i>Guaiacum sanctum</i> | wayaká shimaron | pokhout | roughbark lignum-vitae | ••○ |
| <i>Guapira fragrans</i> (<i>Pisonia fragrans</i>) | | | | • |
| <i>Guapira pacurero</i> (<i>Pisonia bonairensis</i>) | mafobari, mushi bari | | | • |
| <i>Krugiodendron ferreum</i> | kaobati | | | • |
| <i>Manihot carthaginensis</i> | marihuri | | | • |
| <i>Maytenus tetragona</i> (M. sieberiana) | palu di kolebra (A) | | | • |
| <i>Maytenus versluisii</i> | bèshi di yuana | | | • |
| <i>Phoradendron trinervium</i> | | | | • |
| <i>Sabal cf. causerianum</i> (<i>Sabal</i> sp.) | kabana | sabalpalm | sabal palm | • |
| <i>Salicornia perennis</i> | | | | • |
| <i>Schoepfia schreberi</i> | mata combles (A) | | | • |
| <i>Spondias mombin</i> | hoba | | | • |
| <i>Strumpfia maritima</i> | | | | • |
| <i>Ximelia americana</i> | kashu di mondi | | | • |
| <i>Zanthoxylum flavum</i> (<i>Fagara flava</i>) | kalabari | | West Indian satinwood | • |
| <i>Zanthoxylum monophyllum</i> (<i>Fagara monophylla</i>) | bosúa, koubati | | | • |
| Planten | | | | |
| <i>Bromelia humilis</i> (B. lasiantha) | teku | bromelia | bromeliad | • |
| <i>Cereus repandus</i> (<i>Subpilocereus repandus</i>) | kadushi | boomcactus | candle cactus | ○ |
| <i>Melocactus macracanthus</i> | bushi, kabes di indjan, melon di seru | bolcactus | Turk's cap cactus | ••○ |
| <i>Opuntia caracasana</i> (<i>Opuntia wentiana</i>) | infrou, tuna | Spaanse juffer | prickly pear | ○ |
| Orchidaceae | | | | |
| <i>Pilosocereus lanuginosus</i> (<i>Cephalocereus lanuginosus</i>) | kadushi di pushi, kadushi spaño | zuilcactus | candle cactus | ○ |
| <i>Stenocereus griseus</i> (<i>Lemaireocereus griseus</i> , <i>Ritterocereus griseus</i>) | yatu, datu | zuilcactus | candle cactus | ○ |
| <i>Tillandsia flexuosa</i> | teku di palu | bromelia | bromeliad | • |
| <i>Varnes</i> | varens | varens | ferns | • |

Legenda

- = Beschermde dier- of plantsoort aangewezen op grond van artikel 11, tweede lid, van de Eilandsverordening natuurbeheer Bonaire.
- = Beschermde dier- of plantsoort aangewezen op grond van artikel 11, tweede lid, van de Eilandsverordening natuurbeheer Bonaire waarvoor ook beheersmaatregelen gelden op grond van artikel 11, derde lid van de Eilandsverordening natuurbeheer Bonaire.
- = Beschermde dier- of plantsoort op bijlage 2 van het CITES-Verdrag (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Specimens van soorten op deze lijst die worden geëxporteerd, behoeven een uitvoervergunning.

Toelichting op Annex I

Eilandelijk beschermde dier- en plantensoorten

Verplicht beschermd door verdragen

De bescherming van dier- en plantensoorten is geregeld in Paragraaf III van de Eilandsverordening natuurbeheer Bonaire. Volgens artikel 11, eerste lid, worden alle dier- en plantensoorten beschermd die zijn genoemd in:

- bijlage 1 van het CITES-Verdrag;
- bijlage 1 van de Bonn-Convention;
- bijlagen 1 en 2 van het SPAW-Protocol en
- bijlage 1 van het Zeeschildpaddenverdrag.

De soorten die op grond van deze verdragen verplicht zijn beschermd, zijn niet in Annex I aangegeven.

Beschermd door het eilandgebied Bonaire

Volgens artikel 11, tweede lid, van de Eilandsverordening natuurbeheer Bonaire kunnen bij eilandsbesluit houdende algemene maatregelen ook andere dier- en plantensoorten, die tot de inheemse flora en fauna behoren, worden aangewezen als beschermde soorten. Naast ecologische criteria zijn het draagvlak onder de bevolking en de handhaafbaarheid van de wettelijke bescherming belangrijke voorwaarden voor soortbescherming op eilandsniveau. Met het oog hierop dient de lijst kort te zijn.

Voor het samenstellen van de lijst zijn de volgende criteria gehanteerd. De soorten op de lijst dienen aan één of meer criteria te voldoen.

- Vermelding op de rode lijst van bedreigde soorten van de World Conservation Union, IUCN, categorie CR (*critically endangered*), categorie EN (*endangered*) of categorie VU (*vulnerable*). Dit geldt bijvoorbeeld voor een aantal mariene vissoorten.
- Endemisch en daarnaast zeldzaam, bedreigd of andere overwegingen. Dit geldt bijvoorbeeld voor de sabal palm (kabana), de parkiet (prikichi) en de witoogspotlijster (chuchubi Spaño).
- Lokaal bedreigd of zeldzaam. Dit geldt bijvoorbeeld voor haaien, vleermuizen, varens, orchideeën en een aantal boomsoorten.
- Ecologisch belang (sleutelsoorten). Dit geldt bijvoorbeeld voor koralen, haaien, papegaaivissen, vleermuizen, mangroven en zeegras.
- Onderhevig aan grote exploitatie druk. Een voorbeeld hiervan is de karkó.
- Toeristische waarde (vlaggeschip soorten). Voor Bonaire valt de flamingo onder dit criterium, maar ook haaiachtigen.
- (Potentieel) verzamelobject. Voorbeelden hiervan zijn karkó's, orchideeën en bolcactussen (bushi).

- Handhavingsoverwegingen. De verschillende soorten zijn door leken niet uit elkaar te houden, daarom wordt de hele groep beschermd. Dit geldt bijvoorbeeld voor koralen, haaien en vleermuizen.

c) Saba

SABA MARINE ENVIRONMENT ORDINANCE

ISLAND ORDINANCE of June 25th, 1987 containing measures concerning the management of the marine environment of the Island Territory of Saba (Saba Marine Environment Ordinance), (A.B. 1987 no. 10.).

THE EXECUTIVE COMMITTEE OF THE ISLAND TERRITORY OF SABA:

Considering:

That it is desirable to establish regulations for managing the marine environment of the Island Territory Saba, in order to preserve the natural resources of that environment for commercial as well as educational, recreational and scientific purposes.

Has decided:

To decree the following Island Ordinance:

SECTION I: DEFINITIONS

ARTICLE 1

This ordinance defines the terms below as follows:

- (a) The Saba National Marine Park: the sea floor and the overlying waters around and adjacent to the island Saba, with the high water tidemark as the upper limit and the 60m depth contour as the lower limit, and also including two undersea mountains, situated at 17 37.94 N, 63 16.43 W and 17 38.70 N, 63 15.91 W respectively, and the overlying waters, with the sea surface as upper limit and the 60m depth contour as lower limit
- (b) Coral: the organisms or skeletons of those organisms, pertaining to the Orders of the *Milleporina*, *Stylasterina*, *Gorgonacea*, *Scleractinia* and *Antipatharia* (fire corals, lace corals, soft corals, stony corals and black corals respectively)
- (c) Saban: a person who was born on Saba and/or born from Saban parents
- (d) Invertebrates: all marine animals without a spinal chord, insofar not already mentioned under (b)
- (e) Spear fishing: the hunting or killing of marine animals using spears, harpoons and spear guns, either mechanically or pneumatically powered, and including spear guns which would fall under the law on firearms.
- (f) Trolling: to fish by trolling a hook from a boat to catch pelagic species.

- (g) SCUBA (Self-Contained Underwater Breathing Apparatus): diving equipment that allows the user to remain submerged for a prolonged period of time without surface air supply
- (h) Hookah: diving equipment which allows the user to remain submerged for a prolonged period of time with surface air supply
- (i) Conch: marine snails of the species *Strombus gigas*
- (j) Turtles: marine reptiles of the species *Chelonia mydas* (Green turtle, Greenback), *Eretmochylus imbricata* (Hawksbill turtle) and *Caretta caretta* (Loggerhead turtle).

SECTION II: REGULATIONS FOR THE USE OF THE MARINE RESOURCES

ARTICLE 2

Any and all acts which conflict with the rules of the zoning plan for the Saba National Marine Park as determined by the General Island Resolution are unlawful.

ARTICLE 3

Spearg fishing in the Saba Marine Park is prohibited.

ARTICLE 4

The use of poisons, chemicals or explosives for fishing is prohibited.

ARTICLE 5

It is prohibited to take turtles.

ARTICLE 6

The collecting of conch in the Saba Marine Park is subject to the following restrictions:

- (a) the collecting of conch while using SCUBA or Hookah is not allowed,
- (b) it is prohibited to take conch which is smaller than 19 cm (7.5 inches), or which does not have a well developed lip,
- (c) it is prohibited to take more than 20 conch per person per year,
- (d) the collecting of conch is only for private use and consumption,
- (e) non-residents who are not Sabans are not allowed to take conch,
- (f) persons who collect conch must report their catch at once to the Saba Marine Park manager.

ARTICLE 7

Additional regulations for catching or collecting of marine organisms in the Saba Marine Park, such as minimum size, quota, closed seasons or gear limits, may be issued by a General Island Resolution if and when the need for this presents itself on the basis of new experience.

ARTICLE 8

1. Activities which are harmful to the marine environment are not permitted in the Saba Marine Park.
2. It is prohibited to intentionally destroy the marine environment in the Saba Marine Park.
3. It is prohibited to kill, break, catch or collect corals or other bottom-dwelling invertebrates and plants on or in the sea floor.
4. Paragraph 3 of this Article does not apply to residents of Saba and non-residents who are Sabans who are allowed to take, for personal consumption, snails, squids and

octopus, and crustaceans, insofar the provisions of Article 3, paragraph 1 and Article 6 as well as the regulations of the zoning plan as meant in Article 2 are observed.

ARTICLE 9

1. Anchoring in coral in the Saba Marine Park is not permitted.
2. The prohibition to anchor does not apply if the safety of the vessel and its crew requires anchoring.
3. The prohibition to anchor does not apply in those zones of the Saba Marine Park which have been designated as anchorages according to the zoning plan as meant in Article 2.

ARTICLE 10

1. It is prohibited to intentionally destroy or damage the moorings which are placed in the Saba Marine Park by or on behalf of the Island Council of Saba or to remove moorings without the written permission from the Island Council.
2. It is not permitted to place moorings in the Saba Marine Park without written permission issued by or on behalf of the Island Council.
3. Vessels longer than 15m are not allowed to use the moorings.
4. It is not permitted to occupy a mooring longer than the period that is necessary to make a dive.

ARTICLE 11

It is prohibited to discharge any substance in or flowing out into the Saba Marine Park with the exception of fish, fish parts, chumming material, cooling effluent and effluent of marine sanitation devices of vessels.

ARTICLE 12

Developments or modifications to the coastal zone which may influence the marine environment of the Saba Marine Park must be preceded by an independent environmental impact assessment.

SECTION III: CLOSING ARTICLES, PERMITS AND PENALTIES

ARTICLE 13

1. Whoever transports persons commercially to destinations within the Saba Marine Park must have a written permit issued by or on behalf of the Island Council.
2. Conditions may be attached to such a permit.
3. Paragraph one of this Article does not apply insofar it concerns passage of persons through the Saba Marine Park.
4. The permit holder must pay the visitor's fees as determined by General Island Resolution to the manager of the Saba Marine Park. The fees for each calendar month must be paid prior to the 10th of the following month and must be accompanied by a signed tally sheet provided by the manager of the Saba Marine Park.
5. If the fees are not paid on time the manager of the Saba Marine Park can impose a new provisional taxation for that month which is due immediately. This new taxation includes an increase of the fees due.
6. Persons diving or snorkelling individually in the Saba Marine Park are also required to pay the visitor's fees as mentioned in paragraph four.
7. Persons who are diving on their own in the Saba Marine Park are also obliged to pay the visitor's fee referred to in the fourth paragraph to the manager of the Saba Marine Park.

ARTICLE 14

1. The Island Council may grant exemptions from one or more of the prohibitions in this Ordinance for scientific or commercial or educational purposes.
2. The Island Council may, in certain instances, grant exemptions from the prohibitions of paragraph 3 of Article 8 for commercial purposes.
3. Conditions may be attached to such exemptions.
4. Prior to granting exemptions the Island Council will seek expert advice.

ARTICLE 15

Users of the Saba Marine Park must follow the instructions given by the persons charged with managing the Saba Marine Park.

ARTICLE 16

1. The director of a legal entity must ensure that the legal entity does not violate any regulations of this Ordinance.
2. The director who fails to prevent such violations will be punished with imprisonment of up to one month.

ARTICLE 17

Violations of the regulations of this Ordinance will be punished with imprisonment of up to one month or monetary fines of up to ANG 5,000.

ARTICLE 18

Violations of the prohibitions of this Ordinance are considered to be misdemeanors.

ARTICLE 19

Except those who are law enforcement officers in accordance with the Civil Code, the following persons are also charged with law enforcement:

- (a) the persons in charge of managing the Saba Marine Park,
- (b) other persons appointed as such by General Island Resolution.

ARTICLE 20

Objects acquired by violating any of the prohibitions of this Ordinance, or objects used in committing the violation, may be seized and can be confiscated by a Court of Law.

ARTICLE 21

1. This Ordinance, which may be cited as the "Saba Marine Environment Ordinance", comes into effect on the day after its proclamation.
2. As of the date mentioned in paragraph one, the Lobster Ordinance 1966 (A.B. Saba, 1966 no.1) is revoked.

Thus decided in the public meeting of June 25th, 1987.

d) St. Eustatius

St. Eustatius Marine Environment Ordinance AB1996, No. 03

THE ISLAND COUNCIL OF SINT EUSTATIUS:

Considering:

That it is desirable to establish regulations concerning the management of the marine environment of the Island Territory of St. Eustatius for the protection of the nature as well as regulations for commercial, educative, recreational and research activities;

Has decided:

To decree the Island Ordinance Marine Environment.

SECTION I: GENERAL PROVISIONS

ARTICLE 1

This ordinance defines the terms below as follows:

- (a) Underwater Park: also known as the marine park, the sea floor and the overlying waters around and adjacent to the island St. Eustatius, from the high water tidemark to the 30m depth contour,
- (b) Coral: live organisms or the calcified casings (skeletons) of those organisms,
- (c) Statian: a person who was born on St. Eustatius or born from Statian parents
- (d) Diver: A person who, outfitted with scuba equipment, enters the water with definite intentions to be under water, is in the water, exits the water after being in the water for a short time.
- (e) Dive Sport: the activity as a diver, recreational as well as commercial;
- (f) Dive Site: the place of position where diving is practiced, where it is started and where it is finished;
- (g) Spear Fishing: the hunting or killing of marine animals using spears, harpoons and spear guns, either mechanically or pneumatically powered, and including spear guns which would fall under the law on firearms.
- (h) Dragnet Fishing: dragging of fish lines behind a boat with intentions to catch fish in open water
- (i) SCUBA (Self-Contained Underwater Breathing Apparatus): underwater equipment that allows the user by means of compressed air in bottles to remain submerged for a prolonged period of time
- (j) Hookah: underwater equipment which allows the user to remain submerged for a prolonged period of time by means of surface air supply
- (i) Conch: shell creatures/snails that live in the ocean and belong to the species *Strombus gigas*
- (j) Turtles: marine reptiles of the species in the broadest sense of the term that live in the sea.
- (k) Fill Station: location where bottles for diving are filled

ARTICLE 2

1. There is an underwater park St. Eustatius which is commonly referred to as St. Eustatius Marine Park.

2. Within the Marine Park there are reserves that cover:

- (a) From Gallows Bay, 17 28'.5 coordinate along the high waterline to the point of white wall, south outward in the sea for ½ nautical mile, to the west following the 30 meters depth limit of ½ nautical mile outward in the sea, measured from the coastline to the crossing with the 17 27'.7 coordinate, to the north 17 28'.5 coordinate and back to Gallows Bay,
- (b) Jenkins Bay, 17 30'.5 coordinate along the high water line to its most northern point of the island, to the north to the 30 meter depth limit, to the west and south along the 30 meter depth limit until these lines pass the coordinate 17 30'.5 and back to Jenkins Bay,
- (c) The parts of the underwater park as designated by General Island Resolution. Such designations can also be for a limited period of time.

SECTION II: INSTRUCTIONS PROTECTION UNDERWATER FAUNA AND FLORA

ARTICLE 3

It is prohibited to commit acts that conflict with this Ordinance and damage the interests of the nature and environment within the underwater park of the Island Territory St. Eustatius as defined in Section I General Provisions.

ARTICLE 4

Spear fishing is not allowed if use is made of scuba or Hookah equipment .

ARTICLE 5

It is forbidden to fish in the marine park using poison, poisoned bait and/or other materials as well as chemicals and explosives.

ARTICLE 6

In divergence to the provisions of Articles 3 and 4, the catching of sea turtles within the marine park is only allowed in accordance with the following instructions:

- (a) it is forbidden to catch more than two sea turtles per person per year,
- (b) it is forbidden to catch female sea turtles from April 1st up to and including November 30th,
- (c) persons who have caught sea turtles must report every catch to the manager of the Statia Marine Park before killing it ,
- (d) it is forbidden to disturb sea turtles' nests, steal eggs or have sea turtle eggs in one's possession

ARTICLE 7

The collection of sea snails (conch) in the marine park is only allowed in accordance with the following provisions:

- (a) it is forbidden to catch sea snails using scuba or Hookah equipment,
- (b) it is forbidden to catch sea snails smaller than 19 cm (7,5 inches) or sea snails which do not have a well developed lip,
- (c) it is prohibited to take more than 20 conch per person per year,
- (d) the collecting of conch is only for private use and consumption,
- (e) deleted,
- (f) persons who collect conch must report their catch at once to the manager of the Statia Marine Park.

ARTICLE 8

The Executive Committee can – upon advice from the manager of the Statia Marine Park – by means of a General Island Resolution establish additional regulations for catching or collecting of animals and plants in the marine park regarding minimum size of the animals and plants, the amount, changing the fishing season and the expansion or limitation of the regulations allowing the catching of fish.

ARTICLE 9

1. It is forbidden to commit acts within the Statia Marine Park that damage or can damage the underwater environment.
2. It is forbidden to commit acts intentionally that can destroy the underwater environment of the marine park.
3. It is forbidden to collect coral, or other bottom-dwelling invertebrate animals or plants that live on the sea floor or to pick, break-off or kill them.

ARTICLE 10

1. It is forbidden to anchor on the sea bottom in the Statia Marine Park.
2. The first paragraph does not apply if the safety of the boat and/or its crew is in danger.
3. The first paragraph does not apply within the indicated anchoring zones in the Statia Marine Park. These zones are established by the manager and are marked as such.

ARTICLE 11

1. It is forbidden to intentionally damage or destroy mooring buoys that are placed in the Statia Marine Park by or on behalf of the Executive Committee of St. Eustatius or to remove the buoys without written permission from or on behalf of the Executive Committee.

2. It is forbidden to place mooring buoys in the Statia Marine Park without written permission from or on behalf of the Executive Committee.
3. The Executive Committee will establish regulations by means of a General Island Resolution regarding the use of mooring buoys.

ARTICLE 12

It is prohibited to discharge any substance in or flowing out into the Statia Marine Park with the exception of fish, fish parts, chumming material, cooling effluent and effluent of marine sanitation devices of vessels.

ARTICLE 13

Changes and amendments to the coastal area that can influence the underwater environment of the Statia Marine Park must be established ahead of time by means of an Environment Impact Assessment.

SECTION III: VISITOR'S FEE, PERMITS AND FEES

ARTICLE 14

1. Conditions can be attached to permits granted on the basis of this Ordinance in the interest of protecting the marine environment, to ensure compliance with this Ordinance and in the interests of the safety of visitors to the park.
2. A fee is charged for the permit; the amount thereof is established by General Island Resolution.
3. A written request must be submitted to the Executive Committee for a permit or an exemption as meant in this Ordinance, accompanied by relevant documentation.
4. The Executive Committee can establish further regulations regarding the accompanying documentation.
5. A permit or exemption granted on the basis of this Ordinance is only valid if it is in writing.

ARTICLE 15

1. Visitors to the Statia Marine Park must obtain an entry ticket for the underwater park from the manager of the Statia Marine Park. A visitor's fee of ANG 17,50 is charged for the entry ticket to the underwater park to those who are going to scuba dive or snorkel.
2. The visitor's fee is a fixed amount per person per year. The amount thereof can be changed by a General Island Resolution, which can also fix another amount to be charged for groups as described in the Resolution.
3. A General Island Resolution can establish visitor's fees for other users of the underwater park.
4. The proceeds of the visitor's fee is only spent on the upkeep of the underwater park St. Eustatius. This also includes maintenance, upholding the law, providing information and research.
5. The management body provides the Executive Committee before April 1st with an accounting of the proceeds from the previous year.

ARTICLE 16

Visitors to the Marine Park are charged a visitor's fee of ANF 3,60 (USD 2.00) per scuba diver per dive or ANG 3,60 (USD 2.00) per visitor that comes to St. Eustatius to snorkel in the Marine Park.

ARTICLE 17

1. The person that transports people to a location within the Statia Marine Park in exchange for payment must have a written permit granted by or on behalf of the Executive Committee.
2. Conditions can be attached to the permit.
3. The provision of paragraph one of this Article does not apply if it concerns passing through the area of the Statia Marine Park.

ARTICLE 18

1. The owner and/or operator of a boat that anchors in the designated anchor zones within the Statia Marine Park or makes use of the mooring buoys that are installed there must pay an anchor fee.
2. Permission to anchor must be gotten from the manager of the Statia Marine Park.
3. The anchor fee entitles to use anchors in the designated zones in the Marine Park or to use that mooring buoys for a maximum of one week.
4. The St. Eustatius General Port Fee Ordinance does not apply to the anchor zones within the Statia Marine Park and the mooring buoys installed.
5. Establishing and changing the amount of the anchor fee within the Statia Marine Park takes place by means of a General Island Resolution.

ARTICLE 19

1. It is forbidden to have a fill station in use or to possess a compressor used to fill diving bottles without a permit from the Executive Committee.
2. The prohibition in paragraph one does not apply to those on visiting boats in as far as the filling of bottles is done for their own use and serves no commercial purpose.

ARTICLE 20

1. Those that conduct commercial diving activities within the underwater park must have written permission from the Executive Committee to do so.
2. The Executive Committee can establish further regulations regarding such a permit in a General Island Resolution.

SECTION IV: CONCLUDING AND CRIMINAL PROVISIONS

ARTICLE 21

1. The Executive Committee can grant an exemption from the provisions of this Ordinance on request for scientific research and educational purposes.
2. The Executive Committee can in certain cases and on request grant an exemption from the provision of Article 9, paragraph three of this Ordinance for commercial purposes.
3. Conditions can be attached to exemptions.
4. Before granting an exemption the Executive Committee will seek the advice of an expert .

ARTICLE 22

Users of the Stata Marine Park must strictly follow the instructions of the manager of the underwater park and/or his co-workers.

ARTICLE 23

1. A General Island Resolution arranges for the management of the Stata Marine Park by a non-governmental legal entity.
2. The manager of the legal entity that is in charge of managing the Stata Marine Park is obliged to not commit any acts that conflict with the provisions of this Ordinance.
3. Violation by the manager of provisions by or pursuant to this Island Ordinance will be punishable with imprisonment for a maximum of one month.

ARTICLE 24

Violation of the provisions in or pursuant to this Ordinance is punishable with imprisonment for a maximum of one month or a monetary fine for a maximum of ANG 5,000.

ARTICLE 25

Criminal acts in this Ordinance are deemed to be misdemeanours.
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ARTICLE 26

Besides the persons indicated in the Criminal Code, the persons responsible for tracking and tracing the criminal acts in this Ordinance are:

- (a) the persons responsible for the management of the Marine Park,
- (b) other persons so indicated in a General Island Resolution.

ARTICLE 27

Objects acquired by violating any of the prohibitions of this Ordinance, or objects used in committing the violation, may be seized and can be confiscated by a Court of Law.

ARTICLE 28

This Ordinance comes into effect on the day following the day it is proclaimed.

ARTICLE 29

It can be cited as: "St. Eustatius Marine Environment Ordinance".

Established in the public meeting of the Island Council of the Island Territory of St. Eustatius March 25th, 1996

The Island Secretary, The Lieutenant-Governor,

D.C. Berkel JD E.R. Locadia
This Island Ordinance was proclaimed by me on March 28, 1996.
The Lieutenant-Governor,
E.R. Locadia

Announced (Publication Board): March 28th, 1996
Announcement in GIB: April 9th, 1996
Date of Commencement: March 29th, 1996

This version of the MEO is revised according to the GOVERNOR OF THE NETHERLANDS ANTILLES and is transcribed from its original Dutch language.

Treaties implemented by the National (Netherlands Antilles) Nature Conservation Ordinance such as CITES, SPAW protocol of the Cartagena Convention, Bonn Convention on migratory species, Inter-American sea turtle convention, Biodiversity convention and the Ramsar convention overrule regulations stipulated within this island ordinance. Therefore, Article 6 of this MEO, is null and void, as all species of Sea Turtle and their nesting areas are protected.

e) St. Maarten

NATURE CONSERVATION ORDINANCE ST. MAARTEN

AB2003, No. 25

ISLAND ORDINANCE from September 1ST, 2003 concerning regulations pertaining to the management and protection of flora and fauna and nature parks in the Island Territory of Sint Maarten (Island Ordinance Nature Conservation and protection Sint Maarten)

THE ISLAND COUNCIL OF THE ISLAND TERRITORY OF SINT MAARTEN

Considering:

That it is desirable to set rules and regulations for the benefit of the conservation and protection of the flora and fauna and nature parks of the Island Territory of Sint Maarten,

Having regard to various treaties concerning the conservation and protection of the flora and fauna, the conservation of the biological diversity and the protection and the management of ecosystems,

Having regard to Article 15, paragraph one, of the National Ordinance Fundamentals Nature Conservation and Protection (P.B. 1998,49),

Has decided:

To decree the following Island Ordinance:

SECTION I: GENERAL

ARTICLE 1

In this ordinance and the provisions based thereon, the following definitions apply:

- (a) National Ordinance: National Ordinance Nature Conservation Framework (P.B. 1998,49);
- (b) indigenous flora en fauna: animals and plants found in the Island Territory Sint Maarten;
- (c) nature park: a protected area with an ecological, geological, historical, cultural and aesthetic value, foreseen by management;
- (d) manager: manager as described in Article 7.

ARTICLE 2

Each person has a duty, as far as can be reasonably expected from him, to avoid, or, if this is unavoidable, to minimize any negative effects caused to nature by his actions or negligence.

SECTION II: CONSERVATION IN GENERAL

ARTICLE 3

1. A local nature plan, as meant by Article 9 of the National Ordinance, indicates the decisions to be made in the first five years with respect to the conservation and protection of the flora and fauna and nature parks in the Island Territory.
2. The nature plan will contain the topics as mentioned in Article 9, paragraph three of the National Ordinance, an overview of the action points for the nature parks to be realized in the planning period and the term within this will occur.
3. The Executive Committee will report to the Island Council before June 1st annually on the status of the implementation of the nature plan during the previous calendar year.

ARTICLE 4

1. The Executive Committee involves the administrative bodies, institutions and organizations it determines to be the most relevant in the preparation of the nature plan.
2. The draft nature plan will be made available for public inspection for a period of four weeks at the Government Administration Office.
3. The submission for public inspection will be made known in the Dutch and English language in one or more local daily newspapers and in the usual manner of publication of official announcements.
4. During the term as mentioned in the second paragraph any person can bring forth his opinion on the draft nature plan.

ARTICLE 5

1. Within four weeks after the term as mentioned in Article 4, second paragraph, the Executive Committee establishes the nature plan, including an overview of the opinions brought forth about it and the modifications to the draft nature plan on the basis of these opinions.
2. The Island Council decides on the approval of the nature plan within eight weeks of it being offered.

ARTICLE 6

The Executive Committee is in charge of seeing to the effective conservation and the effective protection of the flora and fauna as well as of the nature parks in the Island Territory of Sint Maarten.

ARTICLE 7

1. By General Island Resolution, one or more managers can be appointed who wholly or partially exercise duties and authorities awarded or assigned by this Ordinance to the Executive Committee. Said resolution shall state the duties and authorities to be awarded or assigned to the manager, if necessary with specific instructions, conditions and restrictions.
2. The position of a manager is exclusively designated to a civil servant, service or company in the Island Territory of Sint Maarten and/or a legal entity incorporated in accordance with the laws of the Netherlands Antilles and established in the Island Territory of Sint Maarten.

SECTION III: NATURE PARKS

ARTICLE 8

1. The establishment of a nature park as meant in Article 10 of the National Ordinance shall occur by Island Ordinance, in which the following is included:
 - (a) a map, on which the boundaries of the area are accurately indicated,
 - (b) an explanation, containing in any case the manner in which the continuation of the nature values of the area in question will be realized;
 - (c) regulations concerning accessibility and use;
 - (d) regulations concerning the establishment of fees and duties to cover management expenses.
2. A reservation that entails a smaller demarcated area within a nature park with strict regulations for its use or entry and that serves to protect a nesting or breeding area or the special biodiversity of an area in the nature park can be designated by means of an Island Ordinance.
3. If a reservation as meant in the second paragraph is designated, paragraph one, sub-paragraphs (a), (b) and (c) apply.
4. The designation of a reservation as meant in the second paragraph can be for a definite or indefinite period of time.

ARTICLE 9

1. The Executive Committee and/or if applicable the manager as meant in Article 7, drafts a management plan in agreement with those who can exercise a real right on one or more areas of the nature park.
2. The management plan will indicate in which manner the conservation and preservation of the nature park will be realized, whereby the preservation of the essential characteristics of the nature park is given special attention.
3. If there are costs related to the execution of the management plan for those who can exercise a real right with regards to areas of the nature park that in all reasonableness in whole or in part should not be for their account, the Executive Committee can grant them compensation.

ARTICLE 10

1. The Executive Committee shall, at its own discretion, involve administrative bodies, institutions and organizations in the preparation of an ordinance for a nature park.
2. The draft ordinance as meant in paragraph one will be made available for public inspection for a period of four weeks at the Government Administration Office.
3. Prior to any public inspection, the Executive Committee will organize a public hearing in which the draft of the ordinance will be presented and those present are given the opportunity to bring forth their opinions on the draft. The Executive Committee can be assisted by experts on the subject.
4. The public inspection, as meant in paragraph two, as well as the place and time of the public hearing will be made public in the Dutch and English language in one or more local daily newspapers and in the usual manner of publication of official announcements.

5. Persons who can exercise real rights on one or more areas described by the Ordinance as meant in paragraph one will be personally notified of the public inspection and the place and date of the public hearing.
6. During the term as mentioned in the second paragraph any person can bring forth his opinion in writing on the ordinance as meant in paragraph one.

ARTICLE 11

1. Within four weeks after the term as mentioned in Article 10, second paragraph, the Executive Committee will offer the draft of the Ordinance for the establishment of a nature park to the Island Council, including an overview of the opinions brought forth about it and the modifications to the draft on the basis of these opinions.
2. The proposal to establish the Ordinance will be dealt with in a meeting of the Island Council within eight weeks after its offering.

ARTICLE 12

By or on the basis of an ordinance for the establishment of a nature park, access, use or acts within a nature park can be prohibited or subject to regulations and conditions.

ARTICLE 13

1. By virtue of an ordinance to establish a nature park, fees can be imposed to which the users of a nature park are subjected.
2. By an ordinance as meant in the first paragraph, it can be determined that the amount of the collected fees as meant in the first paragraph can be allotted to the management and protection of the nature park.
3. The ordinance as meant in the first paragraph can, under the stipulated instructions, conditions and limitations, determine that a manager as meant in Article 7 is designated as the entitled party to the received and collected fees.
4. If the imposing and the collection of the fees as meant in the first paragraph is transferred to a manager not falling under the Island Territory, the Articles 5, 6 first and second paragraph, Articles 7, 9 and 11 first paragraph of the National Collection Ordinance 1970 (AB 1970,3) are applicable in the understanding that, instead of "collector" and "tax assessment" must be read "manager" respectively "notice"
5. The second and third paragraphs are not applicable if a civil servant or a civil service is appointed as manager.

ARTICLE 14

1. The nature park can be wholly or partially cancelled by an Island Ordinance if the general interest supercedes the preservation of the nature park or a specific area thereof.
2. Articles 10 and 11 are applicable with regards to an Ordinance as meant in the first paragraph.
3. In as far as this is reasonably possible, one or more areas shall be designated by means of an Ordinance as mentioned in the first paragraph as a nature park to compensate this cancellation.

ARTICLE 15

1. It is prohibited to commit, to have committed or to allow acts that can cause damage to or compromise the natural beauty or natural scientific value of a nature park or that mar a nature park.

2. Acts that can affect the essential characteristics of a nature park as mentioned at its inception will in any case be considered as acts that cause damage.

SECTION IV: PROTECTION OF ANIMAL AND PLANT SPECIES

ARTICLE 16

1. All animal and plant species that belong to the indigenous flora and fauna and that are mentioned in addendum I of the Bonn Convention, addendums I and II of the SPAW-protocol, addendum I of the CITES Treaty and addendums I and II of the Sea Turtle Treaty are designated as protected animal and plant species.
2. Animal and plant species that are not named in the treaties mentioned in the first paragraph can be designated as protected animal and plant species by means of a General Island Resolution.
3. Conservation regulations can be set for species named in addendum III of the SPAW-protocol by means of a General Island Resolution.

ARTICLE 17

1. It is forbidden to kill, wound, capture, pick-up, have animals that belong to a protected animal species, to directly or indirectly disturb their environment resulting in a physical threat or damage to the fauna or to commit other acts which result in disturbance of the animal.
2. It is forbidden to upset an animal belonging to a protected species, to disturb, damage or destroy its nest, lair, or breeding place, as well as to take the nest of such an animal.
3. It is forbidden to pick-up or to destroy the eggs of animals belonging to a protected species.

ARTICLE 18

It is forbidden to dig-up, pick, collect, cut-off, uproot, transplant, destroy or damage a plant belonging to a protected species or to otherwise commit acts with such a plant that result in its disturbance.

ARTICLE 19

In the interests of the protection of indigenous flora and fauna, the transplantation of non-indigenous or genetically altered animal or plant species is prohibited.

ARTICLE 20

1. Exemption from the prohibitions of Articles 17 through 19 can be granted by means of a General Island Resolution.
2. Dispensation from the prohibitions of Articles 15 and 17 through 19 can be granted upon request.
3. An exemption or dispensation can only be granted if the use of the exemption or dispensation does not form a threat for the continued existence of the protected animal or plant species and if:
 - (a) the granting of exemption or dispensation is necessary from the viewpoint of serving scientific, training, or management purposes, or

- (b) the granting of exemption or dispensation is desirable from the viewpoint of existing traditional life forms on St. Maarten or cultural needs.
- 4. An exemption or dispensation can be bound by certain requirements.
- 5. An exemption or dispensation can be granted under certain restrictions.

ARTICLE 21

1. The request for a dispensation is submitted in writing to the Executive Committee.
2. The applicant provides all the information and submits all the details that are necessary to decide on the request.
3. Regulations regarding the manner in which the request for dispensation is made and what details are submitted with the request are determined by means of a General Island Resolution.
4. A fee is due for the processing of a request for dispensation. The amount of the fee and the manner of payment are determined by means of a General Island Resolution.
5. The request is not processed if the regulations of the resolution meant in the third paragraph are not adhered to or if the fee has not been paid. The applicant is informed thereof in writing.

ARTICLE 22

1. The Executive Committee decides about the request within two months of receiving it. Its decision is in writing and includes its reasons.
2. The Executive Committee can extend this term once for a maximum of thirty days, at the same time notifying the applicant accordingly.

ARTICLE 23

1. A dispensation can - in its entirety or in part - be revoked or officially amended by the Executive Committee if:
 - (a) the details provided at the time the dispensation was requested turn-out to be incorrect or incomplete to the extent that the request would have been denied or another decision would have been made if the correct or complete details had been known at that time;
 - (b) the requirements or restrictions regarding the dispensation are not abided by, or there is otherwise not being acted in keeping with the dispensation;
 - (c) after the granting new circumstances or perceptions have arisen that would have led to the request being denied or being granted with other requirements or restrictions.
2. At the request of the person entitled to it, a dispensation can be amended if the provisions of Article 20, paragraph three, sub-paragraphs (a) and (b) do not oppose such.
3. The first and second paragraphs apply to amendments of the requirements or the restrictions by which a dispensation is bound.
4. Paragraph one, sub-paragraphs (b) and (c), and paragraph two also apply to an exemption as meant in Article 20, paragraph one.

SECTION V: OTHER AND FINAL PROVISIONS

ARTICLE 25

The proclamation of this Ordinance is publicized by announcement thereof in one or more local newspapers.

ARTICLE 26

This Ordinance comes into effect at the start of the day following the day of its proclamation.

ARTICLE 27

This Ordinance is referred to as "St. Maarten Nature Conservation Ordinance".

As decided in the public meeting of September 1, 2003

The Secretary,
A.O. Muller

The Chairman,
F.E. Richards

I proclaim this Island Ordinance on this day, September 12, 2003.

The Lieutenant Governor,
F.E. Richards

f) Curaçao

01 sèptèmber 2010 - INTRODUKSHON DI MEDIDANAN GENERAL RELASHONÁ KU LEI DI PESKA DEN NOS AWANAN TERITORIAL (A.B. 2009, NO. 48)

Kolegio Ehekutivo a akordá un kantidat di medidanan ku ta regla e piskamentu den e awanan teritorial di Kòrsou. E medidanan nobo aki ta konsistí di reglanan pa uso di awanan teritorial di Kòrsou i Klein Kòrsou na un manera duradero. Ademas e medidanan nobo aki lo protehá e medioambiente marino i biodiversidat dor di konservá i protehá e piskánan den nos awanan.

Departamentu di Peska di Servisio di Agrikultura, Krio di Bestia & Peska (L.V.V.) a prepará e medidanan den kolaborashon estrecho ku representantenan di e piskadónan, CDOA (Curaçao Diving Operators Association), Ministerio di Salubridat Públiko -Departamentu di Naturalesa i Medioambiente - i otronan (e.o. AJZ). E medidanan ta medidanan ku ta evitá òf redusí e posibilidat ku piskadónan ta saka piskánan demasiado chikí for di laman i kapturanan aksidental ('by-catch') lokual lo benefisiá a largo plaso henter komunidad.

Dor ku Gobièrnu ta haña hopi siñalnan for di e aktornan mas importante ku ta hasi uso di nos laman ku e kantidat di piskánan den laman a baha den un forma supstansial durante e último dékadanan, ta inevitabel ku e piskamentu den nos awanan teritorial mester wòrdu reglá adekuadamente.

E medidanan mas importante ku e EBHAM ta preskribi ta:

Artíkulo 2

Ta prohibí pa piska ku kanaster ku tin wowonan di ménos ku 38 milimeter hanchu.

Ademas e kanasternan mester ta ekipá ku un entrada (15x15 cm) di un material bio-degradabel (un material di un orígen natural ku ta putri bai). Asina en kaso ku un kanaster ta bai pèrdí e material bio-degradabel ta putri den un temporada relativamente kòrtiku i e piskánan por sali i e kanaster no ta sigui piska p'e bira un kanaster zumbi ('ghost trap').

E kanaster tambe mester ta ekipá ku un splet habrí di 2,5 cm x 20 cm na un di e banda nan di e kanaster. E splet aki ta sòru ku piskánan di ref ku un forma haltu i delegá ku no ta wòrdu komé hopi, manera kleinfeshi, sheu i ladronchi, por sali, miéntras ku piskánan mas gordo manera mero, snèper i robèki ta keda tras den e kanaster.

Kanaster tradishonal (i awor ilegal) na Lagun aña 2008 ku 23 butterflyfish, 6 surgeonfish, 6 grunts, 3 damselfish, 2 green moray eels.

Piskadónan di kanaster ta hana maksimalmente un periodo di 6 luna pa adaptá nan kanasternan. Lo tin un ehèmpel di un kanaster legal na LVV p'asina tur hende por mira kiko ta e eksigensianan di e lei nobo.

Ta prohibí tambe di piska ku kimikonan i eksploivos

No tin mag di piska ku as di mamífero. (Den pasado el a yega di sosodé ku piskadónan na Venezuela a usa e karni di toniu (dölfein) pa as p'e peska di 'long-line'. Por rekonosé e karni aki fásilmente dor ku e ta kontené 'myoglobine' i p'esei tin un koló kòrá skur).

Artíkulo 3

Turtuganan di laman i kref

No tin mag di piska turtuga den e awanan teritorial di Kòrsou. 'Visserijbesluit' (PB 1992, no 108) ya kaba ta prohibí kaptura di turtuga den e Zona Eksklusivo di Piskamentu di Antia Ulandes.

Tin mag di piska riba krefnan i esakinan no mester tin un largura mínimo manera ta e kaso den hopi pais den nos region. Pero no tin mag di kue krefnan ku ta kaskando òf tin keit.

Artíkulo 4

No tin mag di kita e keit for di e krefnan en kestion.

Artíkulo 6

Reda di Horka

Trammelnet (reda di horka ku pènel dòbel) ta prohibí instantaniamente.

Un otro aspekto ku e lei nobo aki ta regla ta e uso di reda di horka. E ta prohibí pa usa reda di horka denter di e zona ku ta kore for di kosta te ku 60 meter profundidat i ku reda ku tin wowo ku ta ménos ku 2 inch. Ademas ta prohibí pa laga e reda di horka atras sin vigilansia i e reda no tin mag di ta mas largu ku 150 meter.

Hefe di servisio di LVV ta outorisá pa duna 'ontheffing' pa esnan ku promé ku e lei nobo aki a drenta na vigor ya tabata pertenesé un reda di horka, bou di kondishon ku nan a registrá na Servisio di LVV denter di 2 luna despues ku e lei aki a drenta na vigor.

Por medio di e komunikado di prensa aki nos ke pidi tur doño di reda di horka pa bini registrá na Servisio LVV mas pronto ku ta posibel i maksimalmente denter di un periodo di 2 luna.

Aunke tin masha hopi kritika den komunidad riba uso di reda di horka, e problemanan no ta relashoná ku e método mes, pero ku e manera ku sa usa e reda di horka. Si ta usa e reda pa piska un mancha di piská den e awanan ganchu riba por ehèmpel buladó e ta un peska hopi selektivo. E uso di reda di horka riba ref di koral, un ekosistema ku tin un diversidat di piskánan hopi grandi, e ta un método hopi destruktivo. No tin kontròl riba e tipo di piská ku ta kue i konsekuentemente ta haña un nivel di kapturanan aksidental inaseptabelmente haltu.

Dor ku e uso de e reda di horka ta hopi dañino riba ref di koral despues di 5 aña ku e lei aki drenta na vigor lo prohibí e uso di reda di horka kompletamente for di e ref di koral, es ke desir 29 mei 2014. durante e periodo transitorio solamente esnan ku ya kaba tabata pertenesé un reda por usa esaki basta ku nan tin 'ontheffing' te ku e fecha menshoná.

Artíkulo 7

Ta prohibí pa piska pafó di e zona ku ta kore for di kosta te ku 60 meter profundidat i pafó di bénewater, pero denter e awanan teritorial ku ta sobra ku reda di horka ku ta mas largu ku 500 meter. Ta prohibí pa laga e reda di horka atras sin vigilansia.

Artíkulo 8

Peska di Bottomlonglines

Ta prohibí pa piska ku 'bottomlonglines' den e awanan teritorial di Kòrsou na kosta Sùit for di Watamula pa Kabes di Kòrsou (Oostpunt) i rondó di Klein Kòrsou i den tur bénewater di Teritorio Insular di Kòrsou.

Artíkulo 9

Peska riba mamífero di laman

Ta prohibí pa piska riba mamífero di laman sin pèrmit di Kolegio Ehekutivo den e awanan teritorial di Kòrsou.

Artíkulo 10

Reda

No tin mag di piska ku un reda sin pèrmit di Kolegio Ehekutivo. Kolegio Ehekutivo por mara kondishonnan na e pèrmit aki. E ta hopi importante ku tur doño di reda ta bini registrá mas pronto ku ta posibel na Dienst LVV p'asina nan por bini na remarke pa por haña un pèrmit pa trèk masbangu. Mester pidi e pèrmit pa usa reda aki por eskrito.

Nan mester bini ku prueba di kuantu reda nan tin, e hanchura di e wowo di e reda, e largura di e reda i profundidat i deklará den kual área nan ta usa e reda.

Por medio di e medidanan nobo aki Gobièrnu ke logra ku e piskánan den laman por rende mas mihó i eventualmente nos piskadónan por eksplotá e piskánan den nos awanan riba un nivel duradero, miéntras ku Wardakosta di Antia Hulandes i Aruba lo keda responsabel pa kontrolá e medidanan aki.