Conservation Strategy for the West African Manatee

PRCM
PROGRAMME REGIONAL DE CONSERVATION DE LA ZONE COTIERE ET MARINE EN AFRIQUE DE L'OUEST

WETLANDS INTERNATIONAL
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Rescue of a West African manatee from the Wendu Kanel, Matam, for reintroduction to the main channel of the Senegal River. Photograph by Olivier Born (copyright holder).

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CONTENTS

ABBREVIATIONS

ABE	Agence Beninoise de l'Environnement
CBD	: Convention on Biological Diversity
CBDD	: Centre Béninois de Développement Durable
CCD	: Convention to Combat Desertification
CEDA	: Centre for Environment and Development in Africa
CENAGREF	: Centre National de Gestion des Réserves de Faune (Benin)
CERGET	: Centre de Recherche pour la Gestion de la Biodiversité et du Terroir (Benin)
CEROE	: Centre d'Études de Recherche Ornithologique et de l'Environnement (Benin)
CITES	: Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	: Convention on the Conservation of Migratory Species of Wild Animals
COP	: Conference of Parties
CSRP	: Sub-regional Fisheries Commission
DFPP	: Direction de la Faune, de la Pêche et de la Pisciculture (Niger)
ECOPAS	: Protected Ecosystems in Sahelian Africa
EEA	: Exclusive Economic Area
FIBA	: Fondation Internationale pour le Banc d'Arguin
GIS	: Geographic Information Systems
GEO	: Green Earth Organisation
GWS	: Ghana Wildlife Society
INDEFOR	: Instituto Nacional de Desarrollo Forestal y Manejo del Sistema de Areas Protegidas
INPE	: National Institute for Space Research (Brazil)
IPHC	: Hubert Curien Interdisciplinary Institute
IUCN	: World Conservation Union
MATA	: German Technical Assistance Mission
MPA	: Marine Protected Area
NBA	: Niger Basin Authority
NBI	: Niger Basin Initiative
NCF	: Nigerian Conservation Foundation
NEPAD	: New Partnership for Africa's Development
NGO	: Non Governmental Organization
OGM	: Observatoire de la Guinée Maritime
OMVS	: Organisation pour la Mise en Valeur du fleuve Sénégal
PRCM	: Regional Coastal and Marine Conservation Programme for West Africa
SIDA	: Swedish International Development Cooperation Agency
SINEPAD	: Interim Secretariat of the Environmental Component of NEPAD
SNAP	: Sistema Nacional de Áreas Protegidas
UNEP	: United Nations Environment Programme
UNESCO	: United Nations Educational, Scientific and Cultural Organisation
UNIBIO	: Biodiversity National Unit
USFWS	: United States Fish and Wildlife Services
WATCH	: Western African Talks on Cetaceans and their Habitat
WCS	: Wildlife Conservation Society
WWF	: World Wildlife Fund / World Wide Fund for Nature

Executive Summary

The West African Manatee *Trichechus senegalensis* is a large aquatic mammal of the order Sirenia found in coastal and inland wetlands of Western Africa between Mauritania and Angola, and inland as far as Mali, Niger and Chad. It is a threatened species, and included in the IUCN Red List of endangered species as Vulnerable. Trade in the West African manatee is restricted, as it is listed in Annex II of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES). The manatee is also listed in Annex II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

A vulnerable and inoffensive species, the pressures on the manatee are manifold, and manatee populations across the range are impacted by capture in fishing nets, hunting, trading, the modification of its habitat including the cutting of mangroves (for rice farming, timber, smoking, salt extraction and other purposes), and through the impacts of development works, such as dams. There is a growing body of evidence documenting the decline of the West African manatee, which has been precipitated by three main factors:

- Loss of habitat, resulting from both climate change and human pressures ;
- Incidental capture in fishing nets ;
- Traditional hunting and commercial poaching activities.

These main threats are exacerbated by increasing pressures on natural resources due largely to human population growth and resulting increased use and development of wetlands, along with the increased use of new technologies. Thus, fishing activities in the region are generally increasing, along with the demand for protein, whilst newer and more efficient nets replace more traditional methods.

Due to the threatened status of the West African manatee, increasing threats and an overall population decline, it is clear that conservation efforts are essential to safeguard the survival of the species across its range. Various national and local conservation efforts have taken place, and some important regional assessments compiled, notably by Powell (1996), but this document represents the first time that a wide range of stakeholders from across the manatee's range have been actively engaged in conservation planning for the manatee. It is based on recent field surveys, literature reviews and national and international meetings coordinated by Wetlands International through two main projects:

- The 'Conservation and Awareness of the West African Manatee *Trichechus senegalensis* along the West African Seaboard' project under the PRCM (Regional Coastal and Marine Conservation Programme for West Africa);
- A Memorandum of Understanding with the Abidjan Convention with support from the UNEP Regional Seas Programme and SIDA (the Swedish International Cooperation Agency).

This document serves as a key output from these two projects. It provides a current and comprehensive reference source for the status of the West African manatee in its natural range spanning from southern Mauritania southwards to Angola. The report further identifies the main threats to the species, highlights priority conservation actions and recommendations made by the countries of the sub-region. The document is divided into three main sections:

- Introductory sections: context and overview of the natural history and distribution of the West African Manatee ;
- Regional Status of the West African Manatee: 21 country profiles with information on the current status of the manatee within each territory ;
- Conservation Strategy for the West African Manatee: recommendations derived from a consensus building process building on the guidelines for strategy development set out at a

regional workshop held in December 2006. This meeting reviewed existing reports and information, and recommended strategic actions that were incorporated into a draft conservation strategy. The meeting also made recommendations on the measures required for the adoption and implementation of the strategy.

The purpose of the Conservation Strategy is to improve policies and protective legislation, determine research priorities, reduce existing pressures on the manatee and enhance awareness of the culture and values of the species.

It is noteworthy that the habitats of the West African manatee in many cases span national borders. Consequently, manatee conservation will be more efficient if it is conducted at a regional level. Conservation in one country will be less effective if crucial habitats are destroyed in confluent areas of the manatee's habitat. The factors jeopardising ecosystems also have a regional and international scope and require regional and international cooperation.

The success of manatee conservation across its range is therefore linked to the commitment of countries to a regional approach. This requires the agreed definition of priorities, standards and strategies. Such agreements have been negotiated through the workshop of December 2006, at which most range states were represented, notably through Abidjan Convention national Focal Points. The key areas identified for manatee conservation are illustrated by the four main specific objectives of the conservation strategy:

- Improve policies and legislation for manatee protection, and strengthen their implementation.
- Improve understanding of the West African manatee and use information for its conservation management.
- Reduce pressures on the West African manatee through the restoration and safeguarding of its habitats.
- Instil a wide appreciation of the West African manatee and its ecological and cultural values through targeted communication, education and public awareness.

The recommended actions provided under each objective together aim to fulfil the overall strategic objective: **'Improve the conservation status of the West African manatee across its range'**.

However, there is still a need to consult more widely with manatee experts, agencies active in wetlands conservation and development in the region and with local stakeholders before this strategy can be more formally adopted. Further, the strategy does not provide specific details concerning its implementation, and as such lacks a timescale (targets) and methodology (actors responsible for executing the different recommendations). In order to fulfil these steps, further work is needed with, potentially, the establishment of an implementing structure.

Nevertheless, there is clearly much regional interest in the development and implementation of a conservation strategy for this species. This is in part due to the great interest that the manatee generates in most range states, largely thanks to traditional beliefs and culture. However, there is a need to carry out renewed awareness campaigns relating to the manatee, including environmental education and communication with decision makers and local communities. This is partly on account of the changing social structures in the region, whereby some traditions become eroded over time. Clearly local communities must participate in decision making at all levels, which will foster ownership and transparency for a future collective intervention for the protection and monitoring of manatees and their habitats.

Overall, it is clear from the country profiles provided in this document that the West African manatee is decreasing across much of its range, and if steps are not taken at a regional level for its conservation then the gradual disappearance of the species, wetland by wetland, catchment by catchment, can be expected. This strategy should serve as a blueprint for the survival of this species, known in some countries as *Mami Wata*, an emblematic flagship for the wetlands of Western and Central Africa.

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1 - Introduction

1.1. General background

Manatees and dugong are members of the Sirenia order, also known as sea cows. They are large aquatic mammals found in mainly tropical waters. Manatees inhabit coastal waters and rivers on both sides of the Atlantic Ocean, whilst the dugong is more marine, found in coastal waters from the western Indian Ocean to Pacific waters of Asia and Australasia. Another sirenian, Steller's sea cow, lived in colder waters of the northern Pacific, but was hunted to extinction some 200 years ago. There are three species of manatees: the Amazonian, the West Indian and the West African manatee. All three manatees and dugong are classed as Vulnerable under the IUCN Red List of Threatened Species and in Annex II of both the Convention on International Trade in Endangered Wild Fauna and Flora (CITES) and the Convention on Migratory Species (CMS).

The West African manatee (*Trichechus senegalensis*) is found in coastal and estuarine habitats, coastal lagoons and the lower reaches of most river systems along the west coast of Africa from the Senegal River of Mauritania/Senegal to the Longa River in Angola (Figure 1). It has also found its way into the mid and upper reaches of several rivers in this region, notably the Senegal and Niger Rivers. In the Niger, it has reached far inland through Niger and Mali into northern Guinea. It has even crossed over from the Niger Basin into the Chad Basin, where it occurs in wetlands of northern Cameroon and Chad.

The West African manatee is the least studied of all sirenians, and its status across much of its range is only poorly known. However, despite a general lack of information, there is a growing body of evidence documenting the decline of the species, due mainly to habitat loss, accidental captures in fish nets and hunting.

There are currently no official regional mechanisms for the conservation of the West African manatee, whilst national and local laws and customs across the many range states do not adequately cater for the species' conservation needs. Some efforts have been made by governments and civil society in the region to support the conservation of species, but even in countries where it is protected by national law, enforcement is not widely applied.

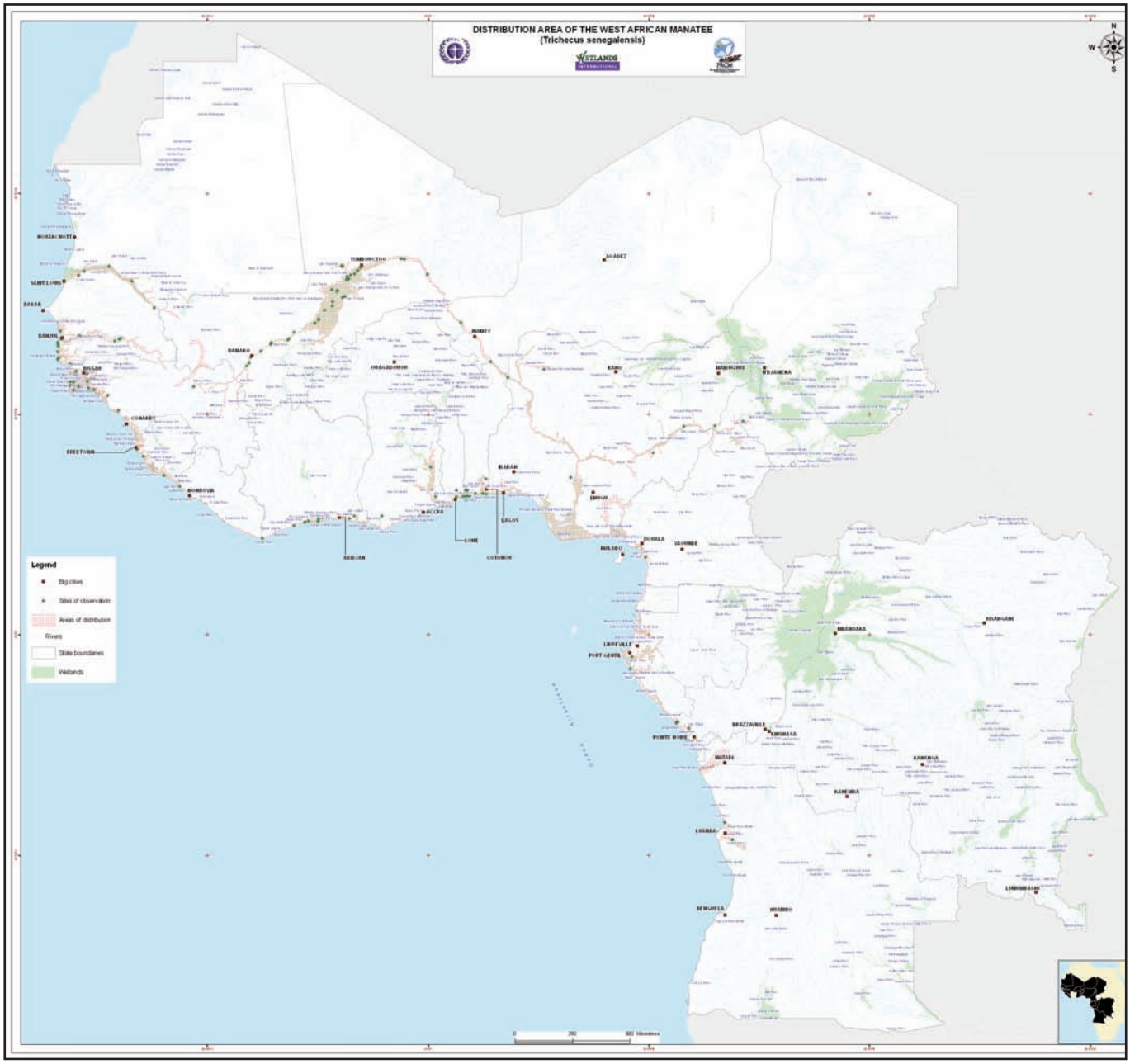
1.2. Regional conservation approach

In 2005, in recognition of these efforts and the need for effective management of the West African manatee, governments from the region at the 7th Conference of Parties of the Abidjan Convention[1] requested that new partnerships and networks for the conservation of migratory species such as the West African manatee should be established (decision CP 7/5:3).

In response to this decision UNEP, through its Regional Seas Programme and the Secretariat of the Abidjan Convention, and with further support from the Swedish International Cooperation and Development Agency (SIDA), provided financial support to Wetlands International, which had already initiated a major project on the conservation of the West African manatee, to produce a regional status report and proposed conservation strategy for the species. This document is the final product of that support. It provides a synthesis of national manatee reports from participating countries, with the aim of providing a regional synopsis of the status and distribution of the species and the threats it is facing, in order to detect knowledge gaps and identify actions to improve the management of the species.

1 The Convention for Cooperation in the Protection and Development of the Coastal and Marine Environment of the West and Central African Region (1984), covering all coastal states from Mauritania to South Africa including the island states of Cape Verde and São Tomé & Príncipe.

Figure 1. Distribution of the West African Manatee



2. Context

2.1. Western Africa and the Gulf of Guinea

The West African manatee is essentially a species of Western Africa, extending into Central Africa along the Gulf of Guinea to mid-Angola. The coastal area of this region is diverse, with arid and semi-arid areas in the north at Mauritania, and with tropical forests meeting the sea in several countries of the Gulf of Guinea. The coastal wetlands (where manatees may be found) are characterised by coastal lagoons, mangrove creeks, river mouths and archipelagos. Many of these areas are important for national and regional development. The most populous areas of Western and Central Africa are found along the coastline, which supports booming cities such as Dakar, Abidjan, Lagos, Port Harcourt, Douala and Luanda. There are enormous pressures on many of the coastal resources, especially fish and timber, whilst the Gulf of Guinea has witnessed major industrial developments, in particular through the extraction of oil and gas. Despite the general wealth of this zone in terms of natural resources, poverty is generally high, and exacerbated by the spread of urbanisation and influx of people from the interiors of the Gulf of Guinea countries. In addition, government agencies charged with the management of natural resources invariably lack the means to effectively implement the wise use of coastal wetlands.

The marine environment is influenced heavily by the Sahelian Upwelling Marine Ecoregion to the west, and, further south, by the Guinea Current, which moves generally eastwards along the southern coast of West Africa. The southern parts of the manatee's range are also influenced by the Benguela, Angola and South Equatorial Currents. These currents affect nutrient levels in the coastal waters, as well as other aspects, such as impacts on the spread of pollutants.

The region has a number of sizeable rivers that all flow into the Atlantic or to inland waters, such as Lake Chad. Some of the larger rivers include the Niger (and its tributaries), the Senegal, Gambia, Volta and Congo. The source of several West African rivers is in the highlands of Guinea. Here, and in other areas, headwaters have been impacted and are further threatened by deforestation, which affects water quality and flow. Most rivers also have barrages or dams across their main channels, which have hydrological impacts, as well as blocking routes for fish and other aquatic animals, including manatees. This has resulted in the genetic isolation of some manatee populations.

2.2. Regional conservation frameworks in Western Africa

There are several regional frameworks in Western Africa that are relevant for the conservation of manatees and their habitats. The Regional Conservation Programme for the Coastal and Marine Area of West Africa (PRCM) is a coalition of some 50 partner institutions whose aim is to coordinate efforts to protect the coastal zone in the seaboard countries between Mauritania and Sierra Leone, as well as the island state of Cape Verde. The initiative was established by IUCN, FIBA, WWF and Wetlands International in partnership with the Sub-regional Fisheries Commission (CSRP). This commission is a network of agencies working together to promote sustainable fisheries in the same region.

Western and Central Africa also host a number of regional river authorities that provide frameworks for cooperation in the management of shared water and other resources of key catchments. They include the Niger Basin Authority (NBA), the Organisation pour la Mise en Valeur du fleuve Sénégal (OMVS) and the Lake Chad Basin

Commission (LCBC). These organisations provide opportunities for formal government-level debates concerning the catchments, and thus serve as important fora for the mutual planning of developments such as large dams and regional projects. The Niger Basin Initiative (NBI) was established to provide guidance to the NBA in key environmental and biodiversity aspects concerning the Niger Basin.

Many countries in Africa now work together through regional United Nations networks and conventions. One example is the New Partnership for Africa's Development (NEPAD), supported by its Interim Secretariat (SINEPAD). Most countries in the West African manatee's range are contracting parties to relevant conventions and agreements, including:

- Convention on the Conservation of Migratory Species of Wild Animals (CMS).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Convention on Wetlands (Ramsar, Iran, 1971).
- Convention for Cooperation in Protection and Development of the Marine and Coastal Environment (Abidjan Convention 1984).
- Convention on Biological Diversity (CBD).
- Convention to Combat Desertification (CCD).

These international frameworks provide targets and guidelines that help governments meet their international obligations under the respective convention.

2.3. Manatee conservation initiatives in Western Africa

2.3.1. Regional manatee conservation initiatives

Under the aegis of the Regional Conservation Programme for the Coastal and Marine Area of West Africa (PRCM), a conservation project of the West African manatee was established at the end of 2004 to build a regional network, collect scientific data and develop a conservation action plan for the manatee across the PRCM region. The countries involved in the PRCM are Senegal, Mauritania, The Gambia, Guinea, Guinea-Bissau, Sierra Leone and Cape Verde. All were involved in the project except Cape Verde, which falls outwith the range of the manatee. For two years, studies were conducted at local and national levels to evaluate the status of the species and to propose conservation measures, whilst awareness was also built related to its protection. These were achieved through field surveys and the organization of national and international forums with the participation of technical, political and local community actors. The project yielded national technical reports and communication tools focused on the threats to the species and its cultural importance (PRCM 2005; PRCM 2006).

Prior to this, Wetlands International had also supported manatee surveys in Nigeria, Benin, Niger, Mali and Guinea through the Niger Basin Initiative (NBI), a partnership with WWF and the Nigerian Conservation Foundation (Wetlands International 2002). Wetlands International also organised the first regional meeting to specifically discuss the status of manatees in West Africa in November 1998, which led to the development of manatee conservation project proposals (Dodman 1999a).

At the 7th Conference of Parties of the Abidjan Convention, held in Libreville May 2005, the Contracting Parties requested the Secretariat of the Abidjan Convention to establish new partnerships and networks for the conservation of migratory species of wild animals such as Sirenians (decision 7/5:3). In line with the COP decision, the Abidjan Convention Secretariat under the framework of the UNEP Regional Seas Programme and with support from the Swedish International Development Cooperation Agency (SIDA) entered into a partnership in 2005 with Wetlands International to work towards the conservation of the West African manatee.

The objective of the partnership was to build on the presence and experience of Wetlands International in western Africa and expand the range of the PRCM manatee assessment to enable the development of a Conservation Strategy for the West African manatee across its entire range, using the framework of the Abidjan Convention

and the Convention on Migratory Species (CMS). It is under this partnership that Wetlands International, UNEP and the Abidjan Convention have developed the current document, with extensive contributions from National Focal Points of the Abidjan Convention and CMS and the network of the PRCM, as well as experts from the region and other partners (IUCN Central Africa, Wildlife Conservation Society-Ivory Coast etc.). In 2007, further synergies were developed with CMS, and this strategy will form the basis of a new inter-governmental CMS agreement and action plan on the conservation of the West African manatee.

2.3.2. National and local manatee conservation initiatives

On top of these regional initiatives, a range of national and local manatee conservation initiatives have also taken place. These include the following examples:

Manatee saving efforts in the Senegal River

Manatees are known to become trapped by receding water levels in wetlands adjacent to the Senegal River, especially in the region of Matam in northeast Senegal. The organisation Océanium collaborated with government agencies and local communities to rescue a manatee from such a pool, Wendu Kanel, where it had become trapped when water levels fell (Ali 1999). The manatee was moved by track some 35km and released into the Senegal River, and the event attracted much local interested and national media attention. A manatee was captured again in the same area in April 2006 for release into the river and fitted with a satellite transmitter, whilst an important part of the programme involved a significant public awareness campaign (Noé Conservation – Océanium 2006).

Manatee conservation strategy for Guinea-Bissau

Silva *et al.* (1999) carried out an extensive survey of manatees in Guinea-Bissau, demonstrating their distribution, status and threats, and culminating in a comprehensive National Conservation Plan for the species, which provides clear conservation recommendations.

Manatee research and conservation in Ivory Coast

A significant site-based research programme has been taking place in Ivory Coast, centred on Fresco Lagoon, a shallow coastal wetland favoured by manatees. A number of manatees have been trapped and fitted with transmitters, which has enabled a series of close studies to take place (Powell 1988; Powell 1992; Akoi 2000). These have involved significant awareness activities, whilst local ecotourism ventures have also taken place.

Manatee surveys at Lake Volta in Ghana

Ofori-Danson (1995) conducted manatee surveys at Lake Volta, establishing their presence in this large lake formed by the construction of Akosombo dam, and identifying the Afram arm of the lake as an important area for the species. Further surveys were conducted here in 2004 and 2006, during which period further information was collected and plans developed for working with local communities to minimise threats to the manatee population (Sheppard 2007). This is being followed up with a fellowship project for West African manatee conservation and capacity building.

Manatee surveys in Niger

Specific surveys for manatees have been conducted in Niger mainly through interviews with fishermen and other people living along the Niger River, and manatee distribution plotted and threats assessed (Ciofolo & Sadou 1996; Louis 2003).

Manatee sanctuaries in Chad

Manatee sanctuaries have been established within lakes Léré and Tréné adjacent to the Mayo Kebbi River through a community-based natural resource management programme, whilst a local club, Les Amis du Lamantin was also formed, and a national manatee conference held (Salkind 1998).

Manatee surveys in Gabon

Following field surveys in 2006, when the Loango National Park in particular was identified as an important site for

manatees, a programme is underway in Gabon to survey lagoon and river systems; to perform GPS tagging of manatees at selected sites to look at fine-scale habitat use and behaviour; to carry out market and interview surveys to ascertain biological, cultural and economic issues; to provide in-depth training for local biologists; and to collect samples for genetic and other analyses (Keith & Collins 2007).

Manatee surveys in Congo

Akoi (1999) conducted manatee surveys in the Conkouati-Douli National Park in the coastal zone of Congo, and considered that this site provided excellent habitat for manatees. Dodman *et al.* (2006) and Kaya (2005) included manatee surveys in brief assessments of the coastal wetlands of Congo. From these initiatives it is clear that the coastal wetlands of Congo provide good habitat for manatees, although the species is under pressure in some of the sites.

2.4. Aims, structure and method of this document

The aims of this report are to describe the status of the West African manatee in its entire distribution and to propose a regional conservation strategy for the species. In order to achieve this aim, it was necessary to build a network of human resources and institutions (governmental and non-governmental) to facilitate full partnership in the initiative. Thus, in each country within the manatee's range, national reports were produced to provide information on the manatee and in particular its conservation status.

In addition, responses to a widely disseminated questionnaire, a literature survey and information exchange between manatee specialists contributed the development of this strategy. The information contained within the national reports is broadly structured under the following main headings, though there are some variations:

- Manatee status and distribution;
- Socio-economic and cultural values;
- Threats to the species;
- Institutional and legislative framework;
- Availability of information for conservation management of the species;
- Initiatives for the conservation of the species;
- Comments and Recommendations.

To further develop the conservation strategy, Wetlands International and the Abidjan Convention organised the First Regional Meeting for the Development of a Conservation Strategy for the Conservation of the West African Manatee in Dakar, Senegal at the end of December 2006. Sixty participants from 15 countries attended the workshop, including the partner organisations of the PRCM (WWF, IUCN, FIBA and CSRP), contributing experts to national reports and field surveys (Abidjan Convention and CMS focal points) and other regional partners (such as SINEPAD, OMVS and the WWF Freshwater Programme for West Africa). The objectives of the meeting were to:

- review existing reports and update information about the status and protection of the manatee;
- recommend strategic actions to incorporate into a draft conservation strategy and to take the required measures for its adoption and implementation;
- develop a draft conservation strategy identifying specific and strategic measures for conservation action and management.

It is in reflection of these aims and development processes, that this document is divided into three main parts:

- Introductory sections: giving a context to the document and an overview of the natural history and distribution of the West African Manatee;
- Regional Status of the West African Manatee: presenting 21 country profiles with country-specific information on the current status of the manatee within each territory;
- Conservation Strategy for the West African Manatee: recommendations derived from a consensus building process building on the guidelines for strategy development set out at the regional meeting of December 2006.

3. Distribution and status of the West African Manatee

3.1. Distribution Overview

The West African manatee occurs in a wide range of wetlands and coastal ecosystems covering a score of countries from the Senegal-Mauritanian border to the Longa River in Angola, its presumed southern limit (Figure 1). It lives in the middle and lower reaches of rivers of this section of the Atlantic coast (Powell 1996; Dodman 1999b). It is also found in adjacent seasonal floodplains, lakes and shallow coastal waters and around some offshore archipelagos and islands. It does not occur in deep marine waters however, and has not reached offshore island states, such as Cape Verde. Isolated populations occur a considerable distance upstream in many of the region's rivers, including the Niger, Bénoué, Oubangui and Chari. There are reported sightings as far 2000km inland (Figure 4 and Box 1). Its preferred coastal habitat is undisturbed estuarine waters, coastal lagoons and the mouths of rivers, whilst inland it favours extensive wetland systems with lakes and floodplains.

3.2. Status Overview

Given its wide range across diverse coastal and inland wetland habitats, it is not surprising that the West African manatee's status is variable across this wide range. Bessac & Villiers (1948) considered it to be common in some areas of Senegal, such as the Casamance, Saloum and Senegal river mouths. Silva *et al.* (1999) certainly found it to be widespread throughout the coastal zone of Guinea-Bissau. Powell (1996) provided an overview of its status in all range states, and considered that its range appeared to be comparable to historic reports. Its range does not seem to have diminished further, although it appears to be absent from the Chari basin in Chad (Salkind 1998), from where there are earlier reports.

A key change in manatee status during the second half of the 20th Century is the fragmentation of populations through construction of dams and other developments. Whilst major dams such as the Akosombo in Ghana and Kainji in Nigeria may create new areas of suitable manatee habitat, they also lead to the genetic isolation of populations and prevent movement along traditional waterways. In many areas the West African manatee's numbers have declined, and several localised sub-populations have been decimated. Such declines are largely attributed to hunting, incidental capture in fishing nets and habitat modifications. As with other aquatic mammals, it is very hard to estimate population size, and few attempts at quantifying populations in West Africa have been made. However, there is growing evidence to support a declining trend.

3.3. Distribution and status overview by country

Separate country assessments are presented in Section 6, but brief information on national status is provided in Table 1. The main sources of information for this table are Powell (1996) and the national reports provided (Section 6).

Table 1. Regional status of West African manatee

Country	Occurrence	Status
Mauritania	Senegal River and associated wetlands.	Limited to Senegal River.
Senegal	Senegal River, Lac de Guiers, Sine Saloum Delta, Gambia River (Niokolo-Koba), Casamance River system.	Widespread in main rivers and in coastal wetlands; probably decreased in Senegal River.
The Gambia	Gambia River (lower and middle sections), with records also from coastal areas and creeks and bolons.	Distributed mainly in Gambia River.
Guinea-Bissau	Bijagós Archipelago; most continental watercourses, including Rio Cacheu, Rio Mansoa, Rio Gêba, Rio Grande de Buba, Rio Tombali and Rio Cacine; coastal creeks and bolons.	Widespread throughout coastal and riverine wetlands.
Guinea	Occurs in coastal wetlands and lower reaches of the main rivers, such as Rio Componi and the Cogon River in the northwest and the Baie de Sangareyah. It also occurs in the headwaters of the Niger River, such as the Tinkisso, as well as the Gambia River.	Coastal wetlands and the upper reaches of the Niger and Gambia rivers. It is considered as a pest by some coastal rice farmers.
Sierra Leone	Most river systems, including the Sierra Leone, Great Scarcies, Little Scarcies, Bunce, Sherbro, Malam and Waanje. Also present in lakes Mape and Mabesi.	Widespread in the main river systems.
Liberia	Lake Piso, Cestos-Sankwen and the main rivers, including Mesurado, Cavally, St. Paul, Morro, St. John and Cestos.	Occurs in most river systems.
Ivory Coast	Occurs along entire coastline, especially in coastal lagoons, and some distance up the main rivers, including the Cavally, Sassandra, Bandema, Comoé, Bia and Tano. Key areas include the lagoon complexes of Aby-Tendo-Ehy, Ebrié-Comoé, west Ebrié-Agneby, Tagba-Makey-Tadio-Niouzoumou, and N'gni-Fresco.	Widespread, especially in coastal lagoons and lower reaches of rivers. Not reported from upper reaches of rivers.
Ghana	Found in coastal lagoons, such as Abi, Tano and Ehy, and in the Dayi, Asukawkaw, Obusum, Sene, Digya, Oti and Tordzie rivers. It is also in the Volta River and Volta Lake, notably in the arm of Afram area.	Occurs in coastal lagoons and Volta system. Lake Volta provides good manatee habitat.
Togo	There are manatee records from coastal areas of Togo, such as Lakes Togo and Aheme and in the Mono River.	Rare in coastal wetlands.
Benin	Found in coastal lagoons such as Nokoué and lower reaches of rivers, including the Ouémé and Mono. Also in the Niger River in northern Benin.	Occurs mainly in coastal lagoons. 50 estimated in lower valley of Ouémé.
Nigeria	Occurs in the Benue, Niger and Cross Rivers and their associated wetlands, also in Lake Kainje and Yankari. It is well known from Lake Pandam, a sanctuary off the Benue River. It also occurs throughout much of the Niger Delta, and is reported from Lagos Lagoon.	Widespread in rivers, lakes and coastal wetlands, but of variable conservation status.
Mali	Found throughout the Niger River system, including the Bani, except where access is halted by dams. Most numerous probably in the Inner Niger Delta, with its many lakes such as Débo. It also occurs in the Senegal River, especially in the Kayes region.	Widespread in wetlands of the Niger River; the Inner Niger Delta may support reasonable numbers.
Niger	Occurs in the Niger River and associated wetlands and lower reaches of tributaries.	Occurs in Niger River, where there are about 10 key sites.

Country	Occurrence	Occurrence
Cameroon	Found throughout the coastal zone in suitable wetlands, especially where there are extensive creeks and estuary habitat, such as Rio del Rey, Baie de Cameroun and the River Sanaga (below Edea). They also occur in the Benue River in northern Cameroon, including Lake Lagdo.	Widespread in coastal wetlands.
Chad	Present in the Mayo-Kebbi River and associated wetlands, notably lakes Léré and Tréné, but appears to be absent from the Chari River Basin.	Limited distribution in south-west Chad. Apparently extirpated from Chari Basin.
Equatorial Guinea	There is a general lack of information, but they probably occur in suitable coastal wetlands, notably the Rio Muni estuary.	Limited to a few coastal wetlands.
Gabon	Found throughout the coastal region of Gabon, including Mondah Bay, Gabon River, the Ogooué River and its delta and in coastal lagoons such as Setté Cama.	Widespread in coastal wetlands.
Congo	Occurs in most coastal wetlands, notably Conkouati-Douli and in the Kouliou River and associated wetlands, including Lake Nanga. Also in the lower Loémé River.	Reasonably common in coastal wetlands, but under pressure in some areas.
Democratic Republic of Congo	Found in the lower reaches of the Congo River, including the Parc Marin des Mangroves.	Restricted to the lower Congo River.
Angola	Occurs in lower reaches of rivers as far south as Longa, including Mussulo Bay.	Scattered distribution from Cabinda to Cuanza and Longa rivers.

There is no evidence to support the occurrence of West African manatee in Burkina Faso, although there are limited possibilities of their occurrence in tributaries of the Niger and Volta rivers.

In practical terms, it may be considered that the manatee has a restricted distribution in Mauritania, Togo, Equatorial Guinea and Chad, whilst in most other range states it is fairly widespread in suitable wetland habitats, especially along the coast and in the lower reaches of the main rivers.

4. Biology and life history of the West African manatee

4.1. Taxonomy and Description

Manatees are aquatic mammals of the manatee or Trichechidae family, which belongs to the order Sirenia. There are three representatives of this family, namely the Amazonian manatee (*Trichechus inunguis*), the West Indian manatee (*Trichechus manatus*) and the West African manatee (*Trichechus senegalensis*). There are two subspecies of West Indian manatee: Florida manatee (*Trichechus manatus latirostris*) and Antillean manatee (*Trichechus manatus manatus*).

The West African manatee closely resembles its West Indian counterpart in its external morphology, though it is somewhat less robust. It is a large animal with a grey fusiform body, a wrinkled skin which is almost totally naked, and with a thick layer of fat (5cm at the back, 1cm on the belly). An average adult is generally 3m long and weighs between 450 and 500kg, although some exceptional individuals may reach 4m in length and weigh more than 1000kg.

Manatees have a rounded, paddle-like tail formed from a horizontal caudal fin which serves as a flipper. Their eyes are very small in proportion to the overall size. The end of the muzzle is made of thin fibres bent slightly downwards. They have large muscular lip pads that are highly movable and prehensile (Powell 2002). They live underwater, surfacing to breathe through valved nostrils. They have no external ear, and the opening of the ear canal, located behind the eye, is almost invisible. The forelimbs are modified (essentially from five withered fingers) into flippers. The female has a pair of voluminous pectoral breasts, hence the name Sirenian and the manatee's association with folkloric tales about mermaids. The female also has longer fore fins than the male.
Manatees have two remarkable adaptations to their environment. Firstly, as many plants eaten contain silica, which is an abrasive substance for teeth, a continuous movement of molar teeth towards the front of the jaw enables the manatee to constantly renew its dentition. There is a maximum of ten teeth at any one time in each jaw. Secondly, the manatee has a very slow metabolism which permits long periods of fasting, though this can render it vulnerable to cold.

4.2. Life history

Life history details of the West African manatee are not well known, but are assumed to be similar to the West Indian manatee, which has been studied in more detail. Gestation is probably around 12-14 months, age at maturity about four to five years and longevity up to some 70 years (Powell 2002). Reproductive behaviour is not well known, but there are reports of mating herds from Mali that form between July and September as water levels rise (Kienta 1982). Peak calving also tends to occur at the start of the rains; females have calves about every two and a half years (Powell 2002).

4.3. Habitat and diet

The West African manatee inhabits almost every type of aquatic habitat that may be reached within its range, occurring in sea, brackish and fresh waters. In some cases it has found its way into lakes and above cataracts, where there is no longer a passable route from elsewhere. Its colonisation of waters of the Chad Basin is remarkable, and point to the high degree of adaptability of this manatee. A common factor of all main habitats occupied is sheltered water with access to food and freshwater. It does not like fast-flowing or turbulent waters, whilst even in marine environments it must have sources of freshwater

for drinking. In the coastal belt of Ivory Coast, optimal habitats described by Powell (1996) are :

- Coastal lagoons with abundant growth of mangrove or emergent herbaceous growth ;
- Estuarine areas of larger rivers with abundant mangrove in the lower reaches and lined with grasses upriver ; and
- Shallow protected coastal waters with fringing mangroves or large marine plants.

Within coastal lagoons manatees favour shallow sandbanks as resting areas, where they may spend much of the day. They may also rest within mangroves or in the middle of large rivers, a behaviour that may be an adaptation to hunting pressure (Powell 1996).

Manatees move between the Kouliou River and Lac Nanga in coastal Congo depending on the rains and water levels (Dodman *et al.* 2006). This kind of habitat suits them well, where there is a network of interconnecting sites with slightly different habitats, some of which are preferred during different seasons. They may thus move between freshwater lakes via freshwater channels and main rivers, where they may move into brackish and estuarine waters. In the mid-Niger River, the Inner Niger Delta also presents a mosaic of aquatic habitats, where manatees may move between lakes, flooded ricefields, river channels and floodplains.

Manatees feed primarily on vegetation: they consume floating or submerged plants such as mangroves (*Rhizophora*), water hyacinth (*Eichhornia crassipes*), and grasses (*Paspalum vaginatum*). Its preferred food in inland floodplains of the Inner Niger Delta in Mali is bourgou (*Echinochloa stagnina*), as well as wild rice and leaves of *Mimosa pigra*, though villagers claim that they will also eat shellfish, clay and cattle dung in the dry season (Kone & Diallo 2002). A survey carried out in the reserve of Conkouati-Douli in The Congo revealed that manatees selectively browse floating plants, notably *Nymphea lotus* and *N. maculata* (Akoi 1994), although they have a varied diet, scratching the soil of the shore with their fins to unearth roots rich in carbohydrates, as well as grazing at the surface and on submerged vegetation. Powell (1996) lists 32 known food species from observations in Senegal, The Gambia, Guinea-Bissau, Ivory Coast, Ghana, Nigeria and Cameroon. The main diet comprises emergent plants, particularly grasses, such as *Vossia, Echinochloa, Typha, Phragmites, Pennisetum purpureum* and *Paspalum vaginatum*, with preferences for particular species, such as *Polygonum* and *Alternanthera sessilis* (Powell 1996). Fruits and seeds are also eaten, and manatees can gain access to them during seasonal floods.

In summary, the West African manatee has a diverse diet, comprising of a wide range of vegetative products, whilst at times other items are also ingested, including bivalves and small fish. This diverse diet coupled with a strong adaptability helps to explain their successful colonisation of almost every type of aquatic habitat available to them, where their route has not been blocked by cataracts or other physical obstacles.

4.4. Movements

The West African manatee indulges in some seasonal movements according to changes in water levels, salinity and access to food (Powell 1996). The main factors affecting movements in the Gambia River are currents, salinity variation and water level changes (Powell 1985). Manatees are not able to live in some sections of rivers during the rainy season when currents or stream flows are too high. Thus, they are more frequently found in the lower reaches of the Gambia River during the rainy season and in middle sections of the river during the dry season. Manatees may move along the main channel of the Niger River between Mali, Niger and Nigeria, but such movements become impossible when river channels are blocked by dams. Manatees certainly used to move regularly between Lac de Guiers and the Senegal River, favouring the lake during the rainy season (Bessac & Villiers 1948), but these movements were halted by construction of a dam.

Movements up and down rivers and between rivers and connected riverine wetlands, such as lakes and floodplains are reported from several

range states, and are generally linked to rainfall seasons, river flows and availability of food. Manatees move up and down the Senegal River, and at times become trapped in dwindling tributary pools during the dry season (Noé Conservation - Océanium 2006).

Manatees in the more static habitats of coastal lagoons tend to be more sedentary. Manatees studied in coastal lagoons of Ivory Coast generally remained within a 10km range, though there were occasional movements between river systems (Powell 1996). There do not appear to be regular coastal migrations between countries, but movements certainly occur.

5. Threats

5.1 - Natural threats

The only natural predator of the West African manatee, apart from man, is the Nile crocodile, but few manatees appear to be taken by them. Some skin infections and parasites have been recorded (e.g. Kienta 1982, Powell 1996). Although there is generally little information on diseases of West African manatee, no die-offs have been reported.

The main natural threat to manatees is from drought and climate change. There are numerous records of manatees becoming stranded in dwindling pools of tributaries of the Senegal River, notably in the Matam area. Manatees have been reported stranded in other lakes and wetlands of the region as well, particularly during extended drought years of the 1980s. The current wave of climate change may well cause Sahelian wetlands to dry up and favoured coastal wetlands to disappear as water levels rise. However, the manatee is likely to survive such changes due to its adaptability and tolerance of different aquatic environments.

5.2 - Habitat modifications and genetic isolation

Manatees are capable of tolerating people, and indeed have lived alongside man for many thousands of years. However, some modern developments threaten manatees in West Africa. These include the conversion of wetlands to other land uses, usually for building or for agricultural developments. Pollution is another threat, from urban centres in the form of sewage, agricultural run-off and notably from the oil industry. Some areas of the Niger Delta, for instance, become heavily degraded by oil spills.

Another specific threat to manatees is the construction of dams or barrages, especially those that completely cross main river channels. There are numerous dams throughout West Africa. These include relatively small dams that control flow to/from lakes or irrigated areas, such as hydrological developments in the wetlands of the Senegal Delta and Lac de Guiers. There are anti-salt dams in coastal wetlands of Guinea-Bissau and other countries where rice is grown behind mangroves (Bos *et al.* 2006). There are also large dams along the main rivers of the region and their tributaries, such as the Kainji Dam in Nigeria, the Diama Dam in the lower Senegal River and the Selingué and Markala dams of the Niger River in Mali. Other planned dams in the Niger Basin include the Fomi in Guinea, the Talo and Djenné on the Bani River in Mali.

Dams and barrages have wide-ranging impacts on livelihoods and biodiversity, both positive and negative, and this is also true for manatees. Some reservoirs or lakes created behind dams can provide excellent habitat for manatees. Some parts of Lake Volta in Ghana, formed by the Akosombo Dam, support good manatee populations. However, a key threat posed by such developments is genetic isolation of populations, as manatees lose the ability to move between different sections of rivers and their associated wetlands. This can lead to local extinctions as small isolated populations die out.

5.3 - Hunting, capture and use of manatees

Across their range, wherever manatees are reasonably common, they tend to be hunted. In some areas there are (or were) specialist manatee hunters, such as in the Bijagós Archipelago in Guinea-Bissau and in the Sine Saloum Delta of Senegal. In other areas fishermen hunt manatees either opportunistically or to supplement their main fishing activities. Harpoons are the most common weapons employed for hunting manatees,

and in some areas platforms are built for the hunters, usually near popular feeding sites or close to freshwater seeps in salty / marine areas (Powell 1996). A variety of traps are also used in different countries, which are usually baited, as well as special manatee nets, large hooks and even poison.

Being a large animal, a manatee catch is invariably highly prized by local fishermen. The meat is widely considered as being delicious, whilst many other parts of the animal are used for consumption and traditional medicine, including the oil, skin and bones. In Mali, different parts of the manatee's body have different traditional medicinal uses, such as oil to treat anaemia and ear infections, bones to treat rheumatism and epilepsy and sexual organs to treat impotence and sterility, whilst wider beliefs are also associated with most parts (Kone & Diallo 2002).

In some countries, manatee hunting is part of strong local rituals and traditional practices. For example, in Niger, killing a manatee is an act of prestige among Sorkos populations. In countries from Ivory Coast to Congo and from Mali to Chad, hunting practices have reduced the sizes of the populations. Even when carried out at low levels, hunting is a real threat to the animal given its low reproductive rate; (a calf is only born every two to three years). Not only is the manatee hunted for its meat, but also for its magical attributes known only to traditional healers. Despite the progress made to discourage hunting in some countries (e.g. Cameroon), manatee products are still much coveted. Unregulated and unsustainable hunting is widely considered as the main threat to the survival of manatee populations across its range.

On rare occasions manatees are captured live for zoos or for wildlife collections. Captures have taken place recently in Guinea-Bissau.

5.4 - Incidental killing and capture

Incidental capture in fishing nets is perhaps one of the greatest threats faced by West African manatee today. As fishing has increased and with the wider use of strong nets made of synthetic fibres, so the incidental capture of manatees has also increased. In most cases captured manatees are consumed locally and treated as an additional bonus, although on occasion the catches are reported to appropriate authorities. Akoi (1992) also describes how manatees are at times caught in fishing weirs in Ivory Coast.

In Senegal and Sierra Leone, manatees have been captured in fishing nets intended for sharks (Cadenat 1957; Reeves *et al.* 1988). They are also victims of industrial fishing where they end up in trawlers or in monofilament nets. In the Republic of Guinea, local communities of Dôbiret (Boffa area) reported five manatees caught in fishing nets in 2004, while in Sangaréyah, 34 had been captured and nine had beached themselves on banks after fluctuations in water level. There is no estimate of the effects of modern fishing materials on manatees.

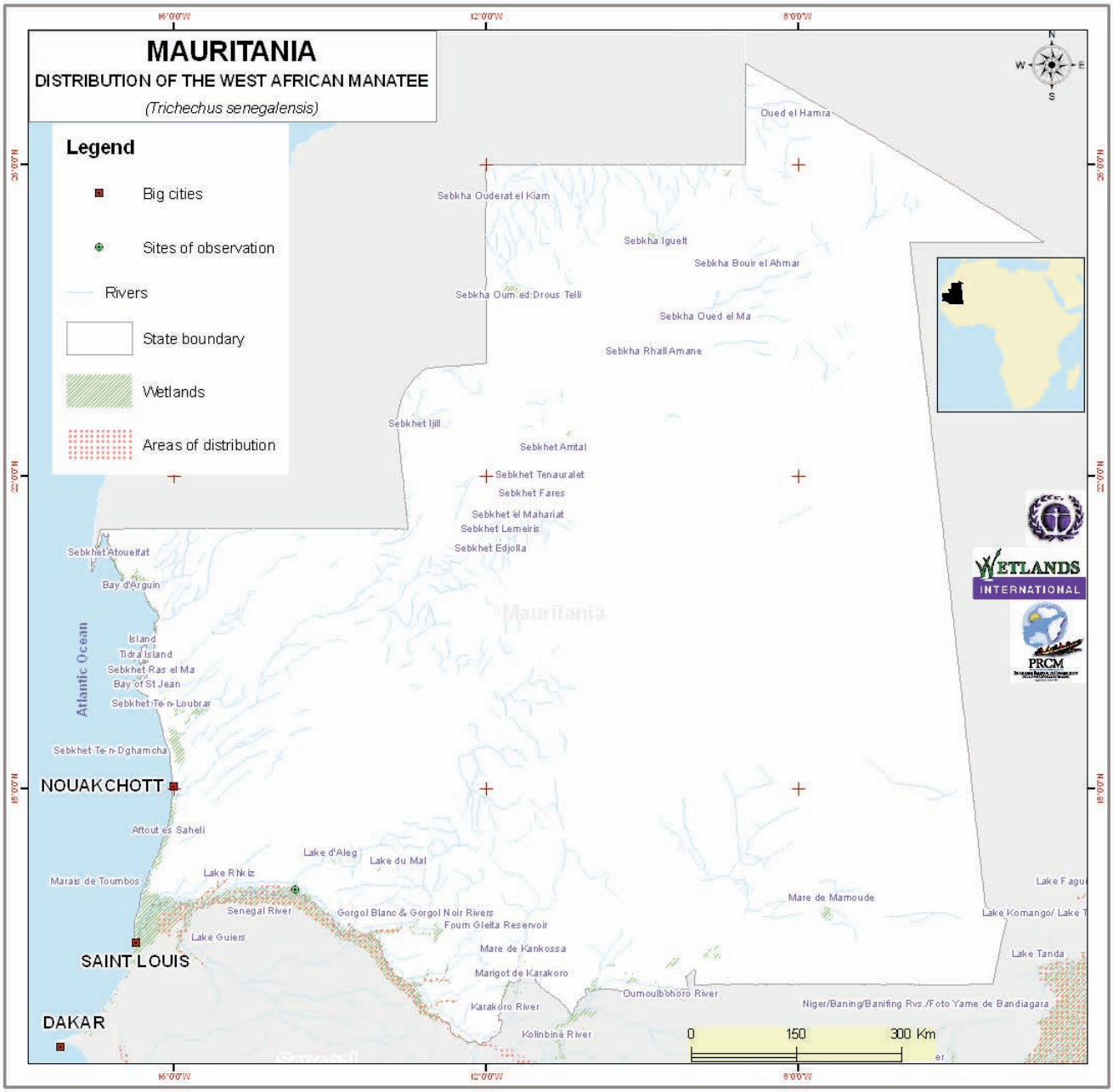
Manatees may also be killed in the turbines or control gates of dams, with reported cases from Kainji in Nigeria (Powell 1996). There are also reports of manatees caught in control sluice gates of dams, for instance in the Senegal Delta, whilst in Guinea, construction of the dam and ferry port at Fatala impacted manatee occurrence and movements in the Fatala estuary. The building of a dam in the Upper River Division Bank at Sami Wharf Town in The Gambia around 1993 is believed to have caused the death of many manatees.

6. Regional Status of the West African Manatee

The first large scale study of West African manatee status and distribution was undertaken between 1980 and 1981 by Nishiwaki *et al.* (1982), and yielded a regional overview of the species based on a literature review and field travels, with interviews. Reeves *et al.* (1988) studied the West African manatee in Sierra Leone and in Nigeria, while Roth & Waitkuwait (1986) undertook a survey on the distribution and status of the species in Ivory Coast. Powell (1996) spent nine years in West Africa studying the biology and conservation of West African manatee in seven countries. His report contains undoubtedly the most complete presentation and most recent regional information to date about the species. Research has also been undertaken since the 1990s by Akoi (2004) in the lagoon complex of Fresco in Ivory Coast, which included the close monitoring of 18 manatees between April 2000 and September 2002.

The first regional meeting on the West African manatee was convened by Wetlands International in 1998 in Dakar, Senegal, when the status of and threats to the species were discussed between participants of most range states (Dodman 1999a). This resulted in the development of proposals for addressing the various threats and knowledge gaps identified. Funds were not secured initially, but some resources were mobilised to support a range of surveys in countries of the Niger Basin, namely Guinea, Mali, Niger, Benin and Nigeria (Wetlands International 2002). Further attempts to raise funds yielded support through the PRCM for surveys and a regional conservation plan for countries of the coastal zone between Mauritania and Sierra Leone. Outputs included information leaflets, T-shirts and other awareness materials, whilst results from national meetings were consolidated into project reports (e.g. PRCM 2005). The Abidjan Convention provided additional support to extend this project to other range states. A key combined activity of both projects was a regional workshop held in Dakar, Senegal in December 2006, when information on the regional status of the West African manatee was exchanged to develop recommendations for a species conservation strategy (Wetlands International 2007).

Between these recent funding mechanisms (PRCM and Abidjan Convention) participating countries undertook surveys of the known information on the status of the manatee within their territory. Resulting information is presented in the following country profiles.


MAURITANIA
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
Oued el Hamra
Sebkha Ouderat el Kiam
Sebkha Iguelt
Sebkha Bouir el Ahmar
Sebkha Oum ed Drous Telli
Sebkha Oued el Ma
Sebkha Rhall Amane
Sebkhet Tjill
Sebkhet Amtal
Sebkhet Tenauralet
Sebkhet Fares
Sebkhet el Mahariat
Sebkhet Lemeiris
Sebkhet Edjolla
Sebkhet Atoueifat
Bay d'Arguin
Island
Tidra Island
Sebkhet Ras el Ma
Bay of St Jean
Sebkhet Te-n-Loubrar
Sebkhet Te-n-Dghamcha
Atlantic Ocean
NOUAKCHOTT
Aftout es Saheli
Lake d'Aleg
Lake du Mal
Lake Rkiz
Marais de Toumbos
Senegal River
Gorgol Blanc & Gorgol Noir Rivers
Foum Gleita Reservoir
Lake Guiers
SAINT LOUIS
Mare de Kankossa
Marigot de Karakoro
Karakoro River
Kolinbiné River
Oumoulbohoro River
Niger/Baning/Banifing Rvs./Foto Yame de Bandiagara
Mare de Mamoude
Lake Tanda
DAKAR
Mauritania
0
150
300 Km
WETLANDS
INTERNATIONAL
PRCM

6.1. MAURITANIA

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Hundland, Papa Westray, Orkney KW17 2BU, UK

6.1.1. General presentation of the area

Mauritania is a large mostly arid country on the Atlantic seaboard of West Africa, bounded to the south by the Senegal River, which provides the only habitat in the country for manatees. The Senegal River marks the boundary between Mauritania and Senegal to the south, from Mauritania's eastern border with the Mali as far as the Atlantic. On the Mauritanian side there are important wetlands in the river basin in the lower stretches of the river, including the Diawling National Park, which is contiguous with Senegal's Djoudj National Park. The lower delta is impacted heavily by water management developments, mainly for irrigation, which have affected water flows and salinity. Small and more significant dams have been constructed, as well as canals and locks.

6.1.2. Habitat and distribution of the manatee in Mauritania

Manatees are restricted in Mauritania to the Senegal River Basin in the extreme south of the country. There are few lagoons and tributaries off the river in Mauritania that support manatees, which are largely confined to the main river channel. Manatees have been found in the Diawling National Park. The various infrastructures of the lower Senegal basin, such as dams and locks present obstacles to the movement of manatees into Mauritanian wetlands from the main river channel.

6.1.3. Threats

The main threat to manatees in the Senegal River is from incidental capture in fishing nets, whilst habitat modifications and degradation are also of significance.

6.1.4. Conservation initiatives

Mauritania has ratified all the major environmental conventions relating to wetlands, biodiversity and migratory species, though there are limited resources for their implementation. The Diawling National Park contains suitable manatee habitat, but the site requires a transboundary effort and hydrological interventions to enable it to play a significant role in conservation of the species.

6.1.5. Recommendations

An education and public awareness programme in the Senegal River basin would be of great benefit, to include community meetings and a campaign that aims to minimise the capture of manatees in fishing nets. A practical assessment of potential manatee areas in the Mauritanian section of the delta would be very useful, as well as a general assessment (Senegal and Mauritania) of the status of manatees the length of the Senegal River. Villages adjacent to key manatee sites should also benefit from alternative income generation initiatives, whilst there is also potential for ecotourism, particularly in relation to infrastructures of the Diawling National Park and transboundary arrangements.

6.2. SENEGAL

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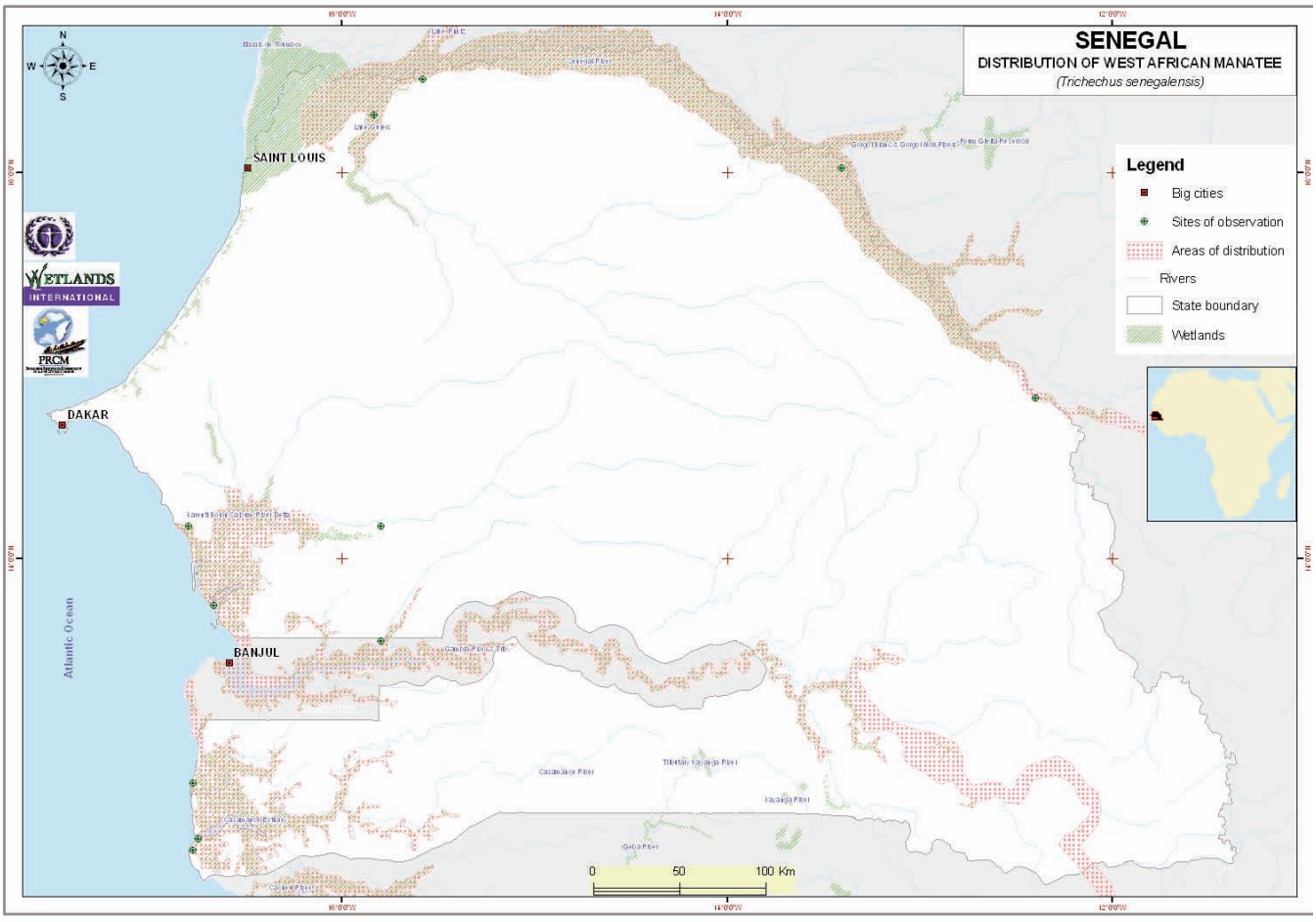
2 Wetlands International, Regional Africa Office
3 The World Conservation Union, Senegal

6.2.1. General presentation

The littoral of Senegal includes sandy coasts (about 300km), estuaries of mangrove swamps (about 234km) and rocky coasts (about 174km). The Senegal River Delta begins in the enlargement of the lower valley near the town of Dagana and continues west to the mouth of the river and the town of Saint Louis. The area includes a wide range of habitats. The wetlands of the coast are characterised by estuaries, mangrove swamps and lagoons, whilst the continental part of the delta comprises waterways, lakes and swamps. A number of hydrological developments have taken place in the area, resulting in the formation of artificial wetlands, notably water impoundments (Diop Ndiaye 2004). The Senegal River enters



Senegal from Mali, and flows generally northwest then westwards to the delta. The other major rivers to flow through Senegal are the Gambia and Casamance rivers. The Gambia River flows into Senegal from the Guinea highlands, and meanders through the south-east of the country for several hundred kilometres before entering The Gambia. Its travels take it through the extensive Niokolo-Koba National Park, where much of the original fringing riverine habitat has been retained.

The Sine Saloum delta is a wide swampy area at the coast, characterised by an ecosystem of mangrove swamps, lagoons, forests, dunes and sandy islands. This region, formed by the confluence of the Rivers Sine and Saloum, opens up in the west to the Atlantic Ocean where there is much tidal influence. It lies in the southern part of the country, close to the Gambian border and covers a land area of some 334,000ha.

The lower Casamance, delimited in the north by The Gambia, in the south by Guinea-Bissau, in the west by the Atlantic Ocean and in the east by Kolda region, covers an area of about 7,400km2. The Casamance River, with a semi-permanent flow, produces a maze of bolongs, which experience limited hydrographical variations. On the right bank, the bolongs of Baila, Diouloulou and Bignona constitute the main tributary. On the left bank, the river receives the bolongs of Katakalousse, Kamobeul and Guidel. A network of secondary bolongs is formed in these outlying basins. The bolongs, or 'backwaters' support mangrove swamp - the predominant landscape in lower Casamance.

6.2.2. Habitats and distribution

The West African manatee occurs in the rivers Senegal, Sine Saloum and Casamance and their adjacent wetlands, and is also found in the Senegalese section of the River Gambia.

From the mouth of the river Senegal manatees venture upstream as far as the Felou falls in Mali. When the temperature of the water becomes cooler, they swim downstream and are frequently observed in the region of Matam. In Richard Toll, when food sources are scarce, manatees used to migrate between Lac de Guiers and the river Senegal, through the Taouey channel, though these movements were greatly restricted after the construction of the Taouey dam (Maigret 1982; Powell, 1996). Manatees are still relatively common in the eastern part of the delta zone, notably in Lac de Guiers (where they may be increasing), around Richard Toll and near Podor. In the area between Diama and Rosso, most people interviewed on the left bank mention an increase of manatees in the Senegalese section of the basin. There are reports of frequent (daily) sightings in the areas of Diawar, Khor, Tiaga and Caïman. When the water level rises, manatees move into the area near the Diama dam. In this area, the transboundary complex of Djoudj-Diawling offers the best habitat for the species. In the Senegal River mouth, manatees are found around the island villages neighbouring Mauritania. The building of the Diama dam, however, has disrupted the ecological balance of the delta, and prevents manatee movements within the delta area.

Manatees are well known to the local populations of the Saloum Delta Biosphere Reserve, and occur in most areas of the delta, from Pointe Sarène and Ngazobil on the Petite Côte south to the Saloum Delta National Park at the coast and inland upstream to Foundiougne, and further south up the Diombos and Bandiala rivers (Cadanet 1957; Maigret 1982; Powell 1996). The manatee is an itinerant species, which may be observed at any period of the year in the Saloum. It occurs in mud flats, bolongs and mangrove swamps, and may particularly be found where there are sources of freshwater. During the rains, freshwater penetrates far into the saltwater zone, forming pockets, which may be located by the presence of duckweed. Manatees visit these areas for drinking water, as do fishermen of the Saloum Delta and from Joal to Mbour on the Petite Côte, who claim that they can locate these fresh water pockets.

More than half of the people interviewed have not seen a manatee since the 1990's. Around 20% claim to have observed manatees in 2004 and 2005. The most recent observation in the bolongs dates from 21st September 2005. Around 10% of the people interviewed in the villages had seen a manatee during the month of September. These testimonials mention Bandiala (Djinack and Sangako), near the sea coast (Palmarin), or the

entry of Ndagane bolong, not far from the mouth of the river as the sites of observation. An accidental capture was reported in 2005 in Palmarin, when a female and a calf were reportedly trapped in fishing nets. The fishermen are said to have freed the calf and killed the female.

In the lower Casamance, manatees live notably in the bolongs of Diouloulou, Esoukoudiack and the main river in the Kolda region. Fishermen interviewed in the village of Boudiediete (12°31'972N 16° 38'310W) mentioned the abundance of manatees in the Boudiediete bolong, which flows from the Basse Casamance National Park, and good numbers in the wetlands bordering Guinea-Bissau. They also quoted the island of Caravello, some 10km away ten as containing "lots of them". These fishermen suggested that the species may be more abundant than before. The habitat at the Guinea-Bissau border offers ideal conditions for reproduction of the species, whilst there is reported to be a revival of ecosystem in the Basse Casamance National Park. In the Gambia River, manatee sightings are reported from the Niokolo-Koba National Park, in the region of Gouloumbo.

6.3.3. Socio-economic values

In Senegal the manatee is a much coveted animal. Communities appreciate it for its meat, its oil and its medicinal properties as well as its use in traditional medicinal practices. The manatee holds an important place in the socio-economic life of all riparian communities of the Saloum Delta. According to testimonials collected, the meat is very nourishing, and possesses therapeutic properties. It is subject to illegal trade: during the 1980's, one kilo of manatee meat was sold between 200 and 300 FCFA. Presently, 1kg is sold between 1000 and 1500 FCFA (ca. €1.5-€2). The price fluctuates according to the locality and the demands of the seller. Individual animals accidentally captured by fishing nets are consumed. They are not declared to the Fishing and National Parks agents or to the Water and Forest services. A manatee can yield much oil, especially from the upper part of the manatee, the head and fins included. An adult may yield up to 5 litres of oil, which is edible. It is considered that some drops applied in the ear can relieve pain, whilst applied to the body it reportedly acts efficiently against aches and sprains. Only the dorsal skin is processed, and is used to manufacture very renowned horsewhips. Hung in a be-room, these also protect against misfortunes and spirits. The number of horsewhips produced depends on the size of the animal. They are sold illegally between 500 and 2000 FCFA each. The tip of the caudal fin, mixed with water, is used to prevent and cure finger and eye ache. The bones are also used for their medicinal properties. The sternum is used to produce purification baths, intended for anyone who has participated in the capture of the manatee. The small bone of the ribs is used to cure intercostal pains. According to interviewees, the genitals are an excellent aphrodisiac. The genitals, consumed or soaked in water, absorbed as a drink, increase the sexual power of man and animals.

6.3.4. Cultural values of the manatee

In the Senegal River estuary, the manatee is widely considered as a fish. However, in most areas of the wider Senegal Delta, the manatee plays an important part in the culture of riverine communities. This is largely due to the morphological resemblance between the woman and the female manatee, which has aroused veneration and prohibition of harming manatees. In predominantly Wolof communities, there are verses and rituals linked to manatee hunting. These communities testify to a mystical relation between man and the animal. Fishermen of Gaya village consider the manatee and other aquatic animals as an important part of their culture, which has in foundations in the river and its waters. Villagers invoke the *Perkhane*, traditional chants sung by the river. In the *Diowougal*, a regatta of pirogues, one person starts the song, which is then continued by others. During interviews at Gaya, one fisherman recited a verse dedicated to the manatee, but another interrupted him quickly saying that the verses were secret. Among the Thioubalos (Pulaar fishermen), the manatee culture is reserved only for a handful of people initiated in the secret rites; only those who know the ritual and verses can communicate with the manatee. Through some secret verses, they believe they can overpower the animal during a capture or force it to move towards other places.

In the estuarine section of the River Senegal, the manatee used to be widely feared. Legends portrayed it as a fearsome, repugnant and frightening animal which resembled a man. Here also, fishermen revisit the Peulh legend about a woman taking a bath on the river bank who was caught naked by her son-in-law. To hide her nudity she plunged into the water and prayed not to stand again in front of her relative. She was then transformed in to a manatee, and thereafter led an aquatic life. This legend, with variations between son-in-law and father-in-law, is told throughout the Senegal River Basin. Unfortunately, manatee cultures are being lost, and younger generations are not interested in them. This process of abandonment of traditional beliefs, noticed elsewhere, is explained by increasing openness to other cultures and a process of modernization. In those villages, they regret the loss of cultural identity in the River Senegal.

In the Saloum delta, two stories were told about the origins of manatees during recent field surveys. The first and most popular one also tells the story of a woman who was surprised taking her bath near the river by a man. Since the woman, named Penda Sarr, could not bear the shame of being caught naked, she plunged in the river and became a manatee. In some villages, it is said that the man also plunged in the water, and both of them became manatees. In some versions the man is called Gayesiré and the woman is named Gayesira. The second version, less popular, considers that the manatee was born from the story of an old shepherd and his two twins. To thank the Lord, the shepherd sacrificed a meagre cow. After his death, his son Diagué and his daughter Ilo decide to part away and share the herd. Ilo, the daughter decides to go to sea, with her herd. She became a mermaid, her herd becoming manatees. Ever since, the mermaid keeps on protecting her herd. In this legend, the mermaid is the small manatee guiding the herd and frightening hunters.

In Casamance, the Diola and Mandingo culture reveals veneration for the manatee, and in these two communities, there is no tradition of manatee hunting. In many villages, fishermen avoid even capturing manatees, such as at Boudièdiète and Elinking, areas where manatees occur frequently. This cultural reality has always protected manatees in this region, as well as the ecological and climatic conditions that favour their survival.

6.3.5. Threats

In most parts of the River Senegal, manatee hunting has been abandoned for a long time. This is explained by the prohibition of hunting and by the fact that those practicing ethno-medicinal methods related to the manatee have become less numerous. According to surveys, manatee hunting is not an established tradition in the culture of surrounding Wolof, Pulaar and Moor (Harratine) communities. Incidental capture in fishing nets is however an important factor in the decline of the species, though most fishermen interviewed considered that manatees can avoid nets or free themselves.

Dams and barrages also pose a threat to manatees, which may be accidentally caught in the openings of dams (such as Taoué dam at Lac de Guiers), and become injured and die. Dams have further contributed to the genetic isolation of manatees, and in some cases may render smaller populations non-viable. Decreases in water levels also affect the manatee. In the mid 1980's, manatees were found in the Taoué channel due to fluctuations in water levels. Safeguard measures were taken during the years of great drought in the Djoudj National Park, and a basin was dug by park agents, which was frequented by at least four manatees.

In the Saloum, hunting is widely described as a major threat for the manatee. In the Sérère culture, hunting includes a ritual comprising holy bathing and incantations, though nowadays, those who hold on to this tradition are generally at least 40 years of age. However, a more pressing threat in Saloum relates to the transformation of natural habitats the area has been experiencing over the past decade due to the effects of drought, uncontrolled exploitation of mangroves and shellfish, the degradation of sand banks and pollution. This general loss of habitat diversity in Saloum is considered a significant threat to manatees in this zone. Some pollution incidents are related to the discharge of boat fuel tanks. The construction of tourist infrastructures may also

modify the manatee's habitat, notably blocking some shores and disturbing access to manatee drinking sources. Sound pollution, caused by the engine of pirogues may further disturb manatees, and pirogues entering some channels may disturb the manatee's movements or migratory habits.

6.3.6. Manatee conservation initiatives

With the adoption of the first Hunting Code in 1967, the Senegalese State has taken the first initiatives for the conservation of the West African manatee. Prior to this, the French code had been protecting the species since 1948. Senegal adhered to CITES in 1973, and is also a Contracting Party to other relevant international agreements, including the Convention on Wetlands, under which the main sites for manatees are designated Ramsar sites.

In recent years, some local manatee conservation initiatives have been developed with the support of development partners (including Wetlands International, IUCN and UNESCO). Thanks to a Senegalese association (Océanium) and the mobilization of a number of international partners, manatee rescue operations are organized to save manatees from dwindling pools of small branches of the River Senegal, especially in the Matam area. These operations are also important for building awareness populations about this threatened mammal. In 2006, the French association Noé Conservation commenced the scientific monitoring of manatees in the Senegal River using Argos transmitters, in partnership with the Monaco agency Act for Nature and IPHC of Strasbourg.

6.3.7. Recommendations for manatee conservation in Senegal

The following recommendations are proposed based on perspectives provided in PRCM (2006):

- Ecological monitoring and restoration of wetlands in Senegal to provide suitable habitat for manatees in Senegal. Priority sites within the Senegal River basin are Lac Tahouey, the Ngawlé and Tiagar streams, Wendou Kanel near Matam, the Parc National des Oiseaux du Djoudj and Lac de Guiers. Key sites elsewhere include areas of the Saloum Delta, the Casamance and Niokolo-Koba in the Gambia River.
- Research and monitoring of manatees at key sites.
- Community-based conservation activities and alternative income-generation.
- Community-based education and public awareness programme focused on manatees and wetlands.
- Strengthen awareness of decision makers and site and water resources managers.
- Investigation and development of ecotourism initiatives based on manatees.
- Strengthen capacity of technical agents in manatee conservation, research and monitoring.
- Enforce legislation relating in particular to hunting and fishing.

6.3. THE GAMBIA

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6.3.1. General presentation of the area

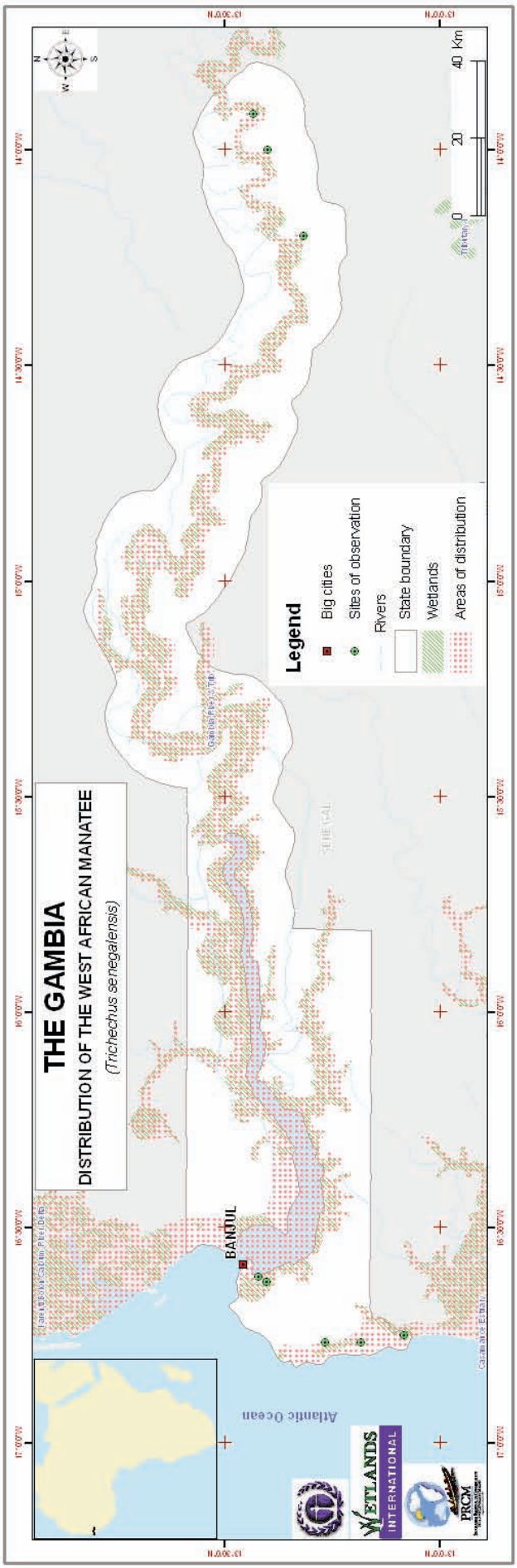
With a land area of 11,295km², the Gambian territory is watered throughout the whole country by the river bearing the same name. The River Gambia takes its sources in the Fouta Djalon in Guinea and flows through eastern Senegal before becoming totally Gambian in its last several hundred kilometres. The Gambia River estuary has a decreasing salinity gradient from downstream to upstream. It is exempt from any serious agricultural or industrial pollution, and is without a dam in its whole course. It is one of the last estuarine environments of West Africa that is largely preserved from natural or human disturbance. The coast and shores of the river are mainly covered by mangroves; while downstream they are dotted with red steep limestone rocks, covered by forest and bamboo.

6.3.2. Habitats and distribution of manatee

The presence of the manatee was reported on the Gambian coast during the second half of the 19th century. The species was well represented in the beginning of the 1990's, but it has experienced a decline as a consequence of intensive subsistence hunting, combined with the destruction of its habitat. Manatees appreciate both salty and fresh water areas. During the rainy season, they live in the middle section of the River Gambia, and migrate towards the lower part of the river in search of food and fresh water. Powell (1996) reports their presence at the coast, along the main course of the river and its tributaries, in estuaries and in small rivers. Some sites where manatees are observed are provided in Table 2.

Table 2: Observation areas of manatees in The Gambia (Jallow et al. 2006)

Main areas	Visited sites	Comments
Upper course of the River Gambia from Kau-ur to Basse Santa	Region of Baboon Island, Panchar Bolon, Kanube Tanga, Baboon Islands National Park, to Basse Santa.	Captures and discovery of a dead body certify their presence in this part of the river.
Lower Gambia River, from Banjul to Kaur-ur	Between Bara and Sika Point Bintang Bolon and affluents, Warambang and Jumutug. From the northern bank of Mini Minium to Kerawan Bolon and Jali Bolon.	Remarkable habitat for the species and good availability of food
Main river bed (from Temdaba to Bai Tenda)	In the Kanyeta Bolon, towards Sofianama Bolon up to Tabiani.	Areas of mangrove and reeds. Carcasses testify to their presence in the 1980's.
Gambian coastline	Between the river Allahein and Tanji Bolon; towards the mouth of Tanji at the level of Solifor Point.	The drought of the 1980's is thought to have contributed to a reduction of sources of fresh water and to the degradation of the mangrove.
Other potential sites	Avicenia creek, Sami Wharf Town and Jinnack	This region belongs to the Tanbi wetland, now classified as a reserve.


THE GAMBIA
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
BANJUL
Atlantic Ocean
0
20
40 Km
WETLANDS INTERNATIONAL

6.3.3. Values and threats to manatees

From a socio-economic point of view, the traditional uses of the manatee are related to cultural beliefs. Many people still believe in the powers gained by consuming some parts of the manatee. As an example: a man who eats the genitals of a female mammal could have sexual difficulties for the rest of his life. Also, each body part has a particular pharmaceutical function, associated with beliefs often related to the nature of the attribute. For instance, the consumption of the genitals increases virility and fecundity. The oil is intended to treat otitis. The skin cures dermatoses; it is also dried and transformed into a whip to beat children and draught animals.

In terms of threats, the drought of the 1980's and its consequences on the intake of freshwater and degradation of mangroves, are thought to have also contributed to a decrease of manatee populations, due to a lack of food. However, the field survey carried out in September 2005 suggests that the number of manatees living in the Gambian coasts may have increased during recent years (Jallow *et al.* 2006).

Although the manatee is completely protected, it is still widely hunted. There is little recent information about the extent of manatee hunting in The Gambia, but at the beginning of the 1990's, the population had considerably decreased due to hunting. Hunting is traditional in numerous communities and represents the main threat to manatees, notably in areas of *Avicenia* mangroves. The presence of manatee traps has been observed in such areas, with small constructions, including seats for hunters, arranged above fresh water seeps. In the 1980's, an observer confirmed that manatee hunters were still active in the region, and the presence of harpoons in the settlements testifies to this. Manatees are also affected by the destruction of their habitat due to deforestation of mangroves and their still frequent accidental capture in fishing nets, especially in the Massarinho Bolon. In 1993 the building of a bridge in the Upper River Division Bank at Sami Wharf town is thought to have caused the death of many manatees which used to gather around the dam. The low reproductive capacities of the manatee reduce further its chances of survival when faced with these various threats.

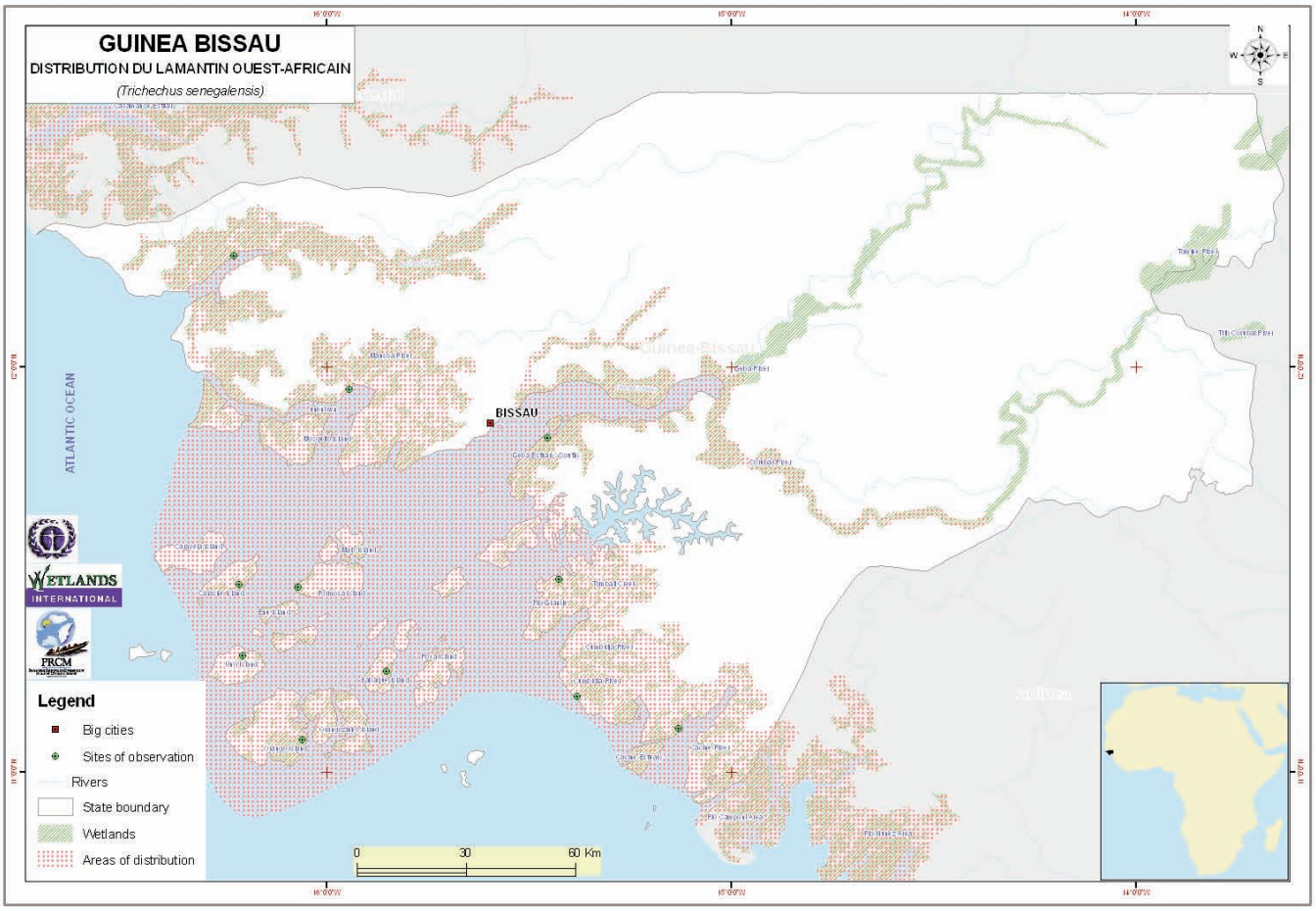
6.3.4. Recommendations for manatee conservation in The Gambia

The findings of the surveys undertaken in 2005 by Jallow *et al.* (2006) reveal a lack of knowledge concerning the status, socio-economic and cultural values of manatees in The Gambia. There is a need for research and monitoring so as to determine the accurate nature of the manatee population and their habitats, and to contribute to the development of relevant conservation and management actions for the species. Some specific recommendations include the following:

- Identify key habitats and breeding sites.
- Through an education and awareness programme, raise understanding about manatees and instil a wider appreciation of the animal and its folklore.
- Mount sign boards at key and known manatee sites.
- Encourage manatee ecotourism.
- Conserve freshwater drinking wells that manatees depend on.
- Encourage communities to stop hunting manatees.
- Create local manatee committee.
- Share existing traditional knowledge with the young generation for posterity
- Sensitise the Agriculture Department about the potential impacts of irrigation schemes on manatees.
- Research into manatee corridors and threats during migration.

Some key recommendations for specific areas include:

- At Ginack Bolon, Neegi Bolon, Upper Niumi and Njumgum-Misseranding Bolon, the priority should be given to conservation, education, research and monitoring.
- At Jali Bolon, Morri Bolon, Manyoka Bolon, Basu, Kayama and Onkofalo, sensitization activities should be conducted targeting hunters and fishermen, to reduce as much as possible all the forms of illegal capture and massacre.
- In coastal and estuarine areas, the restoration of mangroves is recommended.


GUINEA BISSAU
DISTRIBUTION DU LAMANTIN OUEST-AFRICAIN
(Trichechus senegalensis)
ATLANTIC OCEAN
BISSAU
Guinea-Bissau
Guinea
WETLANDS INTERNATIONAL
PRCM
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
0
30
60 Km

6.4. GUINEA-BISSAU

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[2] Programme Manager of protected areas and Biodiversity institute of Guinea-Bissau
[3] Head of Urban Environment Office of Environment General Department
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6.4.1. Introduction

The West African manatee is still a common species in Guinea-Bissau. A basic survey of the status of this species was carried out in fourteen areas in 2005 including the Boloma–Bijagós Biosphere Reserve (notably Orango and Formosa Islands), the Gêba River, the Cacheu River and the Mansoa River (Silva *et al.* 2006). This survey built on results of an extensive national survey of manatees carried out in 1998 (Silva *et al.* 1999).

The Bolama-Bijagós Biosphere Reserve is an archipelago covering a land area of 1,046,950ha located at the junction of the north and south Atlantic coastal drifts. Created in 1996 by UNESCO, INPE and IUCN, the archipelago comprises mangroves associated with numerous mud flats, and shelters many animal and plant species, several of which are protected and rare. One of the priorities for the reserve is to protect biodiversity and ecology of the site.

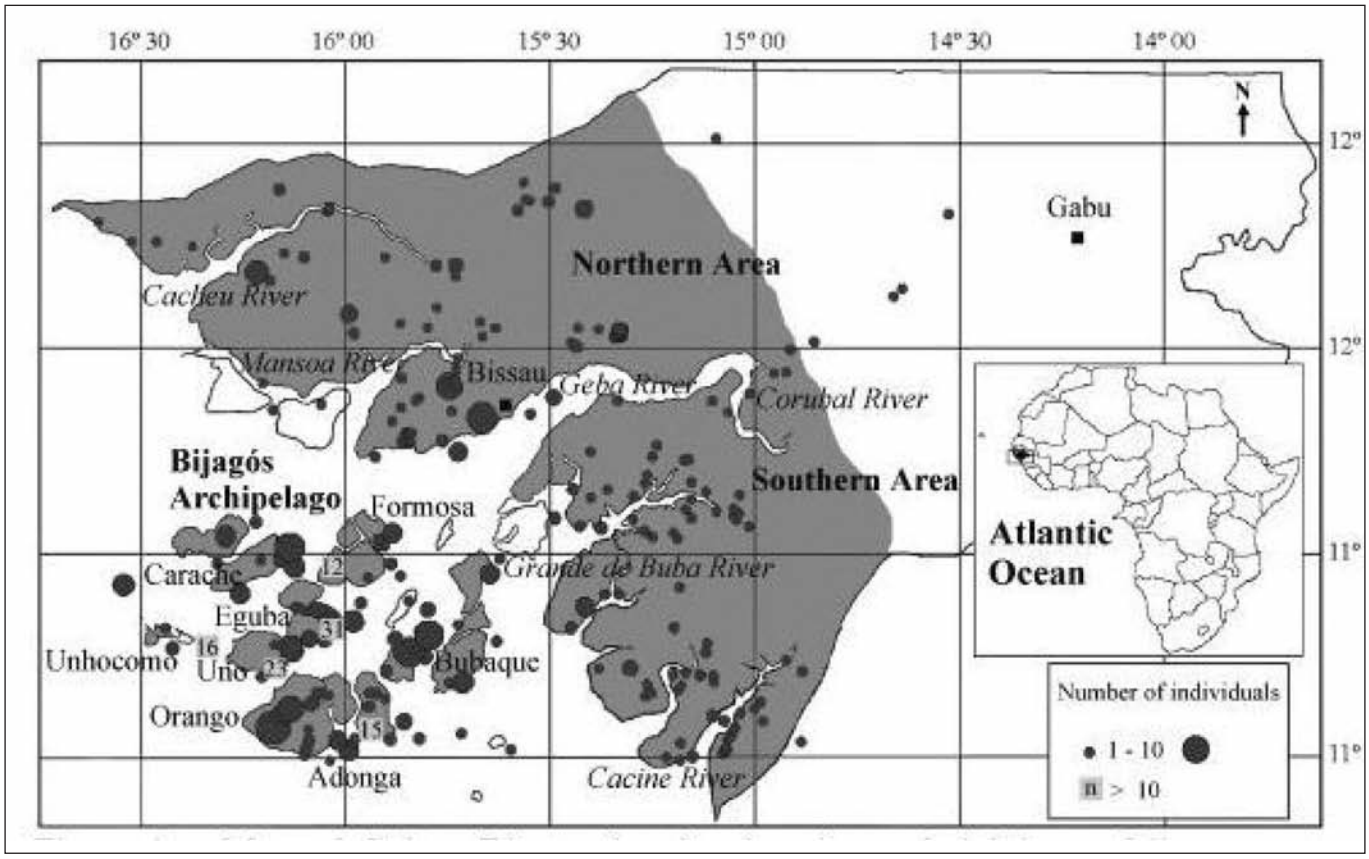
The mangroves of the Cacheu Natural Park and environs in northwest Guinea-Bissau form one of the largest mangrove areas of West Africa. The mangroves are important as a breeding ground for fish, crustaceans and molluscs, and shrimps represent an important economic resource for the country. Several protected or rare species live in the park including hippopotamus (*Hippopotamus amphibius*), crocodiles (*Crocodylus niloticus* and *Crocodylus tetrapis*), bushbuck (*Tragelaphus scriptus scriptus*), vervets (*Cercopithecus aethiops*), West African hump-backed dolphins (*Sousa teuszii*), bottlenose dolphins (*Tursiops truncatus*) and West African manatees (*Trichechus senegalensis*).

The whole coastal zone of Guinea-Bissau is rich in mangroves, mud flats and extensive networks of creeks. There are freshwater springs in the Gêba River and within the Bijagós, important resources for manatees that live primarily in saltwater.

6.4.2. The West African manatee, a common species in Guinea-Bissau

Silva *et al.* (1999) found the West African manatee to be widespread in the coastal zone of Guinea-Bissau, with numerous observations reported during extensive interviews, as illustrated in the following map.

Map of Guinea-Bissau showing locations of sightings of live manatees reported during the 1999 interview survey (number of animals is proportional to symbol size); areas surveyed are shown in grey (Silva *et al.* 1999).



Whilst manatees are widely distributed in the coastal zone, the Bijagós Archipelago stands out as being a key area, with several areas supporting sizeable numbers. Groups of manatees were also noted in the Cacheu, Mansoa and Gêba Rivers. These sites were all target areas of the surveys of 2005:

Bijagós Archipelago: At Orango Grande, manatees occur in the Orango National Park and in the Domingo area, notably in the Rio Bijante and Ancarrosso. They occur in Eticoga near Anaba Bridge. Manatee observations are also commonplace in Formosa, in Rio Acoco and associated wetlands, Rio Amerito, Acuno and Barriga de Ilha. Locals of Amera, Ancarin and Amerebu report them to occur in 'great numbers'. On Chedea island they are thought to be very abundant, notably in Rio Urok located between Formosa, Nado and Chedea. At Nado Island, they occur in the Rio de Picpus. According to credible estimates made by interviewees the number of manatees ranged from up to five at Tamba de Acuno and Formosa island, to more than ten at other sites. At Bijante village on Orango Grande Island, Marcos Pedrezhino Oringa, a 50-year old fisherman, reported having seen them at high tide in the mangrove, in groups of five. Manatees are more frequently observed during the rainy season.

Mansoa River: Manatees occur in areas near Cuboi and in wetlands at the outskirts of Mansoa town, especially during the rainy season. At high tide, manatees may on occasion cross dykes and enter into ricefields, which leads to conflicts with rice growers. However, manatee occurrence in the ricefields of this area appears to have decreased.

Cacheu: Manatees occur in the Cacheu area mainly during the rainy season, when it is easier to see them at high tide. In this area they are apparently most abundant in the Cassama River, where there are estimates of some 30 manatees. In the area of Boffa, Antoninho River and São Domingos up to Cacheu River, numbers may be around 10-20 animals, whilst there may be more

than 15 in Apillo. In the Cacheu River and at São Vicente, one of the least frequented sites, observers report sightings of single animals. Disturbance due to the ferryboat carrying passengers or vehicles may have caused manatees to move away from São Vicente.

6.4.3. The place of manatees in local culture in Guinea-Bissau

Bijagós communities traditionally used to hunt manatees using traps known as *gambuas de pedra*. In every community, this hunting was practiced during the *kamabes*, initiation ceremonies during which teenagers give sharks, turtles, rays, a cow or a manatee as a present to community elders. This offering, known widely as a *garandessa* in Guinea-Bissau is called a *kusina* among the Bijagós. A *balobeiro* appointed by the community and who has mystic powers accomplishes the action. He is the spiritual guide of the community and is in charge of offerings and killing the animals. To the Bijagós animist community, this *balobeiro* is an intermediary between the *Iran* (the supreme spirit) and the community. In the Bijagós, the balobeiros have participated in sensitization campaigns, contributing to their efficacy.

The association between manatee and the *garandessa* was told during each site visit among the Bijagós in the surveys of 2005. Manatee sacrifice follows a ritual performed exclusively by an initiated person, who is the only one entitled to claim that there is a spiritual relationship with the manatee. In the Orango National Park, witnesses agree that the last sacrifice occurred in 1979. Ever since, the manatee has lost its place in the imagination of the Bijagós community. Most of the interviewees of 2005 said that there was no relationship between the manatee and their community's culture and mythology. However, in São Domingos and the Nua Basin, people say that when a manatee is accidentally captured, it is an obligation for them to conduct a traditional ceremony. This ceremony allows the one who has captured the manatee to get internal peace. They say that, according to the elders, a woman in menstruation was turned into a manatee; this link between woman and manatee was also mentioned in São Vicente and Apilho. Men find it difficult to discuss this 'woman-manatee' association unhindered, when women attend talks. In Apilho, João Lopes Moreno says that if a pregnant woman sees a manatee, she needs to attend the traditional ceremony to 'purify' her future baby.

In Rio Gêba, the manatee is not present in the culture or mythology of riparian communities. However, in Flamingo village, it is said that seeing a manatee gives 'happiness and success', and when somebody kills a manatee, only a ritual ceremony can preserve him from a malediction. In Sintcham Mbonco, people say that if a pregnant woman sees a manatee or eats it, then her baby will look like a manatee.

6.4.4. Social and economic values

In San Domingos (Orango National Park), Sr Domingos Alves Junior replied frankly to an interview question in 2005 that "a manatee has almost no social and economic value except for its meat". This comment was repeated many times (Bijante in Orango, Acuno in Formosa Island, and in Chedea Island). These unsolicited comments show that the manatee remains a source of food. It can explain the presence of *gambuas de pedra* in some sites. In Acuno village, some manatee bones were b believed to have healing properties, relieving muscular and bone pains. These properties are also mentioned in Chedea Island. João Alberto Rapaz informed that it is the last vertebra of the back that has these relieving properties. In Gêba and Cacheu river communities, the manatee has no great social and economic value. The manatee's bones are reported to have healing properties in Famandingo, relieving lower back pains. In Cassama, manatee skin is processed to make whips used for traditional fighting. In the Balante community, the manatee has no social or economic value and holds no cultural or mythological interest. In this village, people do not know that manatees represent a protected species, according to them, it is 'just another inhabitant' of the Mansoa River.

6.4.5. Threat status of manatees in Guinea-Bissau

Silva *et al.* (1999) reported the death of 209 manatees between January 1990 and May 1998, an average of 25 individuals per year. Mainly observed in the continental part of the country (as opposed

to the islands), this mortality is believed to be caused above all by the accidental capture of manatees in fishing nets. Although recent data about the causes of mortality are not available, it seems that accidental capture remains the main threat to manatees in Guinea-Bissau; the captured manatees are invariably consumed by the local population. Accidental capture in traditional nets is the main threat to manatees in the Bijagós archipelago, and cited at all sites visited during interviews of 2005 (Silva *et al.* 2006), underlined by former surveys (Powel 1996; Silva 1999).

The cultural initiation practices of the Bijagós are reported to be less frequent nowadays, although in some villages, interviewees reported the existence of *gambuas de pedra*, used for occasional hunting for initiation rituals. Manatee hunting is still practiced by Nyominkas, professional fishermen from Senegal. Manatee hunting in Bijagós was very regular until the 1990s but decreased after 1996, when the archipelago became a Biosphere Reserve. The manatee, still widely considered as a sacred mammal or even an incarnation of the devil finally became a species widely protected by the Bijagós community, which does not traditionally practice fishing.

In Gêba, some locals consider that fresh water springs and drinking water are more difficult to access, whilst natural food stocks have also declined. In Famandinga and Fode Daaba, drought has had negative effects on ecosystems function, exacerbated by the Gambiel dam. This dam also renders manatees migration difficult. In all Gêba villages visited during surveys of 2005, the manatee was considered as a 'troublemaker', destroying fishermen's nets and eating rice in the ricefields (Silva *et al.* 2006). These nuisances however do not generally lead to physical confrontations with manatees.

In Cacheu, the negative consequences of different droughts have also impacted the quality of habitats, leading to mangrove systems dysfunctions. Accidental manatee captures in fishing nets do not necessarily cause the death of the mammal. In São Domingo, Mua Bassin informed that if a fisherman captures a manatee in his nets, only a traditional ceremony can purify him (Silva *et al.* 2006).

6.4.6. Perspectives for West African manatee conservation in Guinea-Bissau

Guinea-Bissau was considered as a sanctuary for manatees in the mid 1990s (Schumann 1995; Powell 1996) due to the abundant productivity of mangrove ecosystems and the importance of river and stream networks and associated wetlands. The prohibition of manatee hunting in 1996 and numerous patrols have since contributed to limiting poaching, especially through enforcement in Orango National Park, João Vieja, and Formosa. Manatee protection has been combined with a sensitization programme about the precariousness of some species and their habitats. Tiniguena, a Bissau-Guinean NGO has been one of the promoters of this environmental education. According to witnesses, community associations have already worked to sensitize populations about the management of the archipelago resources. The Bijagós archipelago, benefiting from preserved ecosystems, an effective legislative mechanism and sensitized communities who are widely respectful of manatees, provides good conditions for manatee conservation.

However, these conservation measures need to be improved through:

- ecological monitoring of habitats and direct monitoring of manatees;
- an effective delimitation and zoning of areas where manatees occur;
- evaluation and monitoring of the human pressure on the manatee and its habitats;
- evaluation of natural factors influencing the degradation of habitats;
- restoration of damaged habitats.

Key sites for conservation or restoration of mangrove systems include:

- the Bijagós archipelago;
- the Cacheu River, especially the Cacheu National Park and São-Vicente;
- the Gêba River, especially near Sintcham Mbonco village.

Silva *et al.* (1999) provide clear recommendations as part of a National Conservation Plan for West African Manatee in Guinea-Bissau (Box).

Priority conservation actions for conservation of the West African manatee in Guinea-Bissau (Silva *et al.* 1999)

1. Reduction of man-induced mortality

Research

1.1. Determine current distribution and relative abundance.
1.2. Monitor manatee sightings, hunting activity and bycatch.
1.3. Assess impact of hunting and incidental mortality on the manatee population.
1.4. Determine impact of different fishing gears.
1.5. Identify areas where interactions with fishing gears are most likely to occur.
1.6. Identify less destructive fishing gears.
1.7. Implement a carcass salvage programme.

Management

1.8. Promote actions to increase public awareness in relation to the species' conservation.
1.9. Establish a collaborator network to collect information on the species.
1.10. Promote the use of less destructive fishing gears.
1.11. Review current legislation and increase law enforcement efforts.

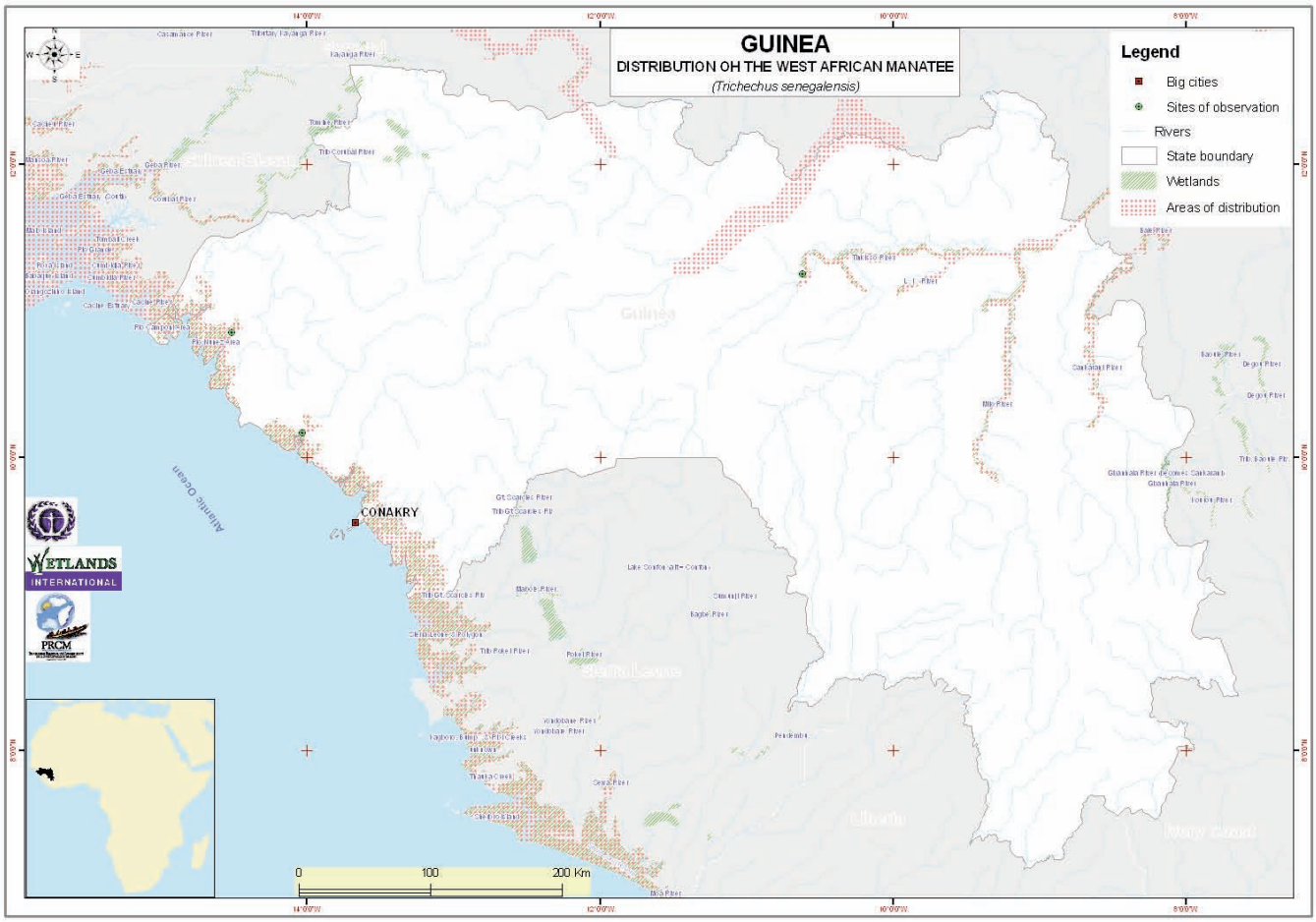
2. Habitat preservation

Research

2.1. Determine manatee movements and habitat utilisation.
2.2. Determine habitat available for the population.
2.3. Monitor important habitat components.
2.4. Determine diet composition of the population.

Management

2.5. Develop education and awareness campaigns.
2.6. Ensure protection of important habitat areas.
2.7. Evaluate the potential of the protected areas network to the conservation of the population.


GUINEA
DISTRIBUTION OH THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
CONAKRY
Atlantic Ocean
Guinea
Sierra Leone
Liberia
0
100
200 Km
WETLANDS
INTERNATIONAL
PRCM

6.5. GUINEA

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6.5.1. General presentation of the area

The Atlantic area of Guinea is 300km long and 152km wide, with a land area of 47,400km². There are four types of ecosystems: mangrove, estuarine, the coastal strip and the marine ecosystem. This classification is flexible and acknowledges that mangrove and estuarine ecosystems are intertwined. Due to its climate, vegetation, natural resources and geographically strategic position, this area has become a hub for an increasingly numerous population (1,600,122 inhabitants in 1983 to 2,112,666 in 1990). The socio-economic activities are diverse although they remain focused on traditional activities: agriculture, forest exploitation and artisanal fishing. Rice is grown in some wetland areas along the coast, whilst several river estuaries support extensive mud flats.

The mangrove area provides habitat for a wide range of biodiversity, including a number of threatened species. The marine waters are important for cephalopod molluscs, notably octopus cuttlefish and squids. These and the marketable crustaceans, notably *Penaeus notialis*, *Penaeus keratum*, *Parapenaeopsis atlantic* and *Palmurus regius*, are subject to intensive fishing. Turtles of the *Dermochelidae* and *Eretmochelys* families and dolphins and whales are present in Guinea's coastal waters, and are mostly threatened. The manatee is found in several areas of Guinea's coastal zone.

The highlands of Guinea are extremely important, and give rise to some of the most important rivers of West Africa, notably the Gambia, Senegal and Niger. There has been quite heavy deforestation in some headwater areas, notably in the Upper Niger River. Manatees also occur here, completely separate from the manatees in the country's coastal zone.

6.5.2. Habitats and distribution of manatees in Guinea

There is little historical information available about the manatee in Guinea, with perhaps the first sightings recorded at the Guinean coast being those of Christopher Columbus (True 1884). Recent surveys carried out under Niger Basin Initiative and PRCM projects have confirmed that the country is an important area for manatees (Keita 2002; Cisse *et al.* 2006a). This is due to the presence of an extended estuary system (in Forecarah region) and rivers (Kogon River in Boké region and Konkouré River around Dubréka and Boffa) providing good habitat for manatees.

The presence of the manatee is reported in the great river basins, especially the Upper Niger Basin (notably in the Tinkisso River) and the River Senegal. It also occurs in the River Gambia (Breuil 1993). At the coast it occurs in the Soumba, Konkouré and Fatala estuaries, Rio Komponi, Rio Nunez and the border area of the Guinean southern coast, notably in the Benty estuary (Table 3). The estuaries associated with the Kogon River

and Rio Komponi below Boké, along the coasts and estuaries of the prefecture of Dubréka, the river Kandouze around Boffa and the estuaries of the Forecariah region also provide favourable habitats for the manatee (Matthès 1993; Damien 1993; Powell 1996). The manatee is commonly found in the Sangareyah bay and lives generally in pairs in the mouths of River Konkouré and River Soumba in areas of mangrove. It is common in Kakounsou in the sub-prefecture of Khorira, where the last accidental victim of capture in a fishing net dates back to September 2005, with the presentation of the trophy to the 2005 survey team. In Boffa and Boké, manatees are more easily observed during the rainy season, in channels when they are feeding.

Table 3. Distribution of manatees in Guinea (Cisse *et al.* 2005)

Main areas	Observation sites	Typology of areas
Haute Niger National Park	Diaragbèla, Banakorodjini, Badalaba, Banakrodjiba, Niankafin, Woyomba, Takalawassa and Mamamyo	River, stream and backwater with sandy, rocky, clayish bottoms
Dubréka	Dubréka centre, Gbéréyiré, Kopèrèn, Makompo, Yéguiyah, Kakounsou and Arabanti	Mangrove estuaries in deep waters
Boffa	Marara, Dobiret, Dominghia, Toukéren, Boffa centre, Thiè, Baralandé and Soumbourou	Mangrove areas
Boké	Kanfarandé-centre (Victoria), Kanoff et Teskène, Rio Komponi, Kogon River	Estuary with mangroves
Forécariah	Benty Port, Benty Centre, N'Konpan, Kigbali, Makon, Roka, Kontigui, Bouramayah , Salatougou Port, Salatougou village, Kaléyiré village, Mènkiya, Biloya, Kigbali Yédè, Kiragba, Beylaya , Wondima, Kagnèkissa, Sorobolomiya	Estuaries with mangroves

There is limited information about the status of manatee populations on the Guinean coast. Inland, Keita (2002) estimated that there were about three to five manatees per 15-20km of river length in the Niger and Tinkisso rivers. Within the rivers of the Upper Niger Basin in Guinea, the general consensus is of a species in decline, as supported by inventories undertaken in the River Niger within the Haute Niger National Park over a distance of around 80km (Diallo & Cisse 1995; Camara *et al.* 2000) and among Bozos and Somonos in the Upper Niger and its tributaries; reliable trends, however, are very difficult to establish.

6.5.3. Socio-economic values

Riparian communities have a number of uses for the manatees they hunt. Consumption of its meat, which is a source of animal protein, and the processing of its fat into oil for medicinal purposes (for treatment of acute rheumatoid arthritis and purulent otitis among children) are principal values. The meat is consumed on site after presentation of the remains to the chief, who is

entitled to receive the tail and the caudal fin. It is not subject to any local, regional or inter-regional trade in the areas visited.

Further uses of the manatee include its bones, which are believed to immunize against scabies and have aphrodisiac properties, and the possession of its head or teeth to bring success. It is not rare to find small manatee bits in the purses of some initiates which, according to them, guarantee their fortune (Bah 2002).

In the culture of the Mandés of the Niger (Beal 1939), *Mââ* means manatee, *N'dé* means son, and the manatee is the son of *mandé*. To kill this 'aquatic parent' is manslaughter, hence the birth of a superstition which prohibits contact with its skin. Any transgression of this law has serious consequences, the most benign of which is leprosy. In Dubreka, the animal is cursed by its fellow animals after having disobeyed them, and must thus live eternally in an aquatic environment and instead of hind limbs, possess a caudal fin. For others, the morphological resemblance of the female with the woman makes this mammal venerated. Traditional cultures are secretive when discussing the manatee.

Among the Bagas and the Soussous of the area of Boffa, however, the manatee does not hold any particular value. Some local people even wish for its extinction because of the damage it causes in the ricefields. In some areas, the manatee is frequently sighted by farmers whose fields are periodically devastated by the manatee, such that they have built fences around their rice fields. The Bagas and Nalous consider the manatee as a 'cursed individual'. For some it is a woman who has disobeyed her husband. For others manatees are people who have gone fishing on Saturday despite the prohibition. In the sub-prefecture of Benty, the manatee is only valued for its meat and medicinal or mystical properties.

6.5.4. Threats to the species

The manatee is a vulnerable and passive species. The pressures exercised on it are various (Akoi 2000), notably through capture in fishing nets, the modification of its habitat through cutting of mangroves for various purposes (growing rice, timber, smoking, salt extraction etc.) and some engineering works (dams and bridges). Capture in fishing nets, generally of females, is the greatest threat. In Dôbiret in the Boffa area, five manatees were captured in fishing nets in 2004, while in Sangaréyah, 34 were captured and nine beached themselves on the seashore, after a fluctuation of the water level.

Nonetheless, hunting is also a real threat to the animal. The manatee is not only hunted for its meat but also for its magical attributes only known by selected members of the community. Manatees captured in fishing nets are killed by harpoons. Some hunters also do not hesitate to use firearms. The Somonos of the Niger use harpoons with barbed wire, tied to a long bamboo shaft. With a small cord made of palm fibres and from a canoe or a platform, they strike a generally deadly blow against the passing manatee. If not dead, they follow it while waiting until it is weak to finish it off.

In the sub-prefecture of Benty (N'Pôtôlôn Section), the instruments used by hunters are traps functioning according to the 'harpoon principle', the *fénsi* (a sort of barbed wire mesh) and the *bamban yèlè* (barrier nets). In the Nalou area fishermen use the bark of *Harungana madagascaringis,* known as *wobé* in the Sosso language, to deter manatees from fisheries activities. Sometimes they call specialized and initiated hunters originating from Guinea-Bissau, who reputedly divide the water through magical rituals to indicate accurately the place where the remains will be retrieved the following day (OGM, *in litt.* 2005).

Disturbances such as the ferryboat of Fatala and the building of a dam have had consequences on the habitat and the migration of the species in the Fatala estuary. It is also worth reporting the case of manatees beached in channels when water levels decrease - a direct consequence of drought.

6.5.5. Institutional and legislative framework and availability of information

The manatee was classified for the first time as a 'fully protected species' on 18th November 1947 in

the whole of French West Africa by decree N047-2254 by the President of the Overseas Council of Ministers. It was never declassified to permit its exploitation. The Republic of Guinea possesses national legislation in terms of wildlife conservation. Under the law L/97/038/AN repealing the ordinance 007PRG/SGG of 15th February 1990, adopting and promulgating wildlife protection and the hunting regulation code, the manatee is on list A of Annex 1, rending the species fully protected throughout the country. The definition of fully protected species is provided in articles 36-44 (chapter II of Ordinance n°1). The capture and detention of manatees is prohibited, except for scientific purposes under license. The export and import of living specimens, trophies or remains are prohibited except for a holder of an export, import or re-export license upon the approval of a scientific authority. This regulation makes provisions for protection of the manatee.

6.5.6. Manatee conservation initiatives

There are no local initiatives to protect the manatee, though in some areas, people are ready to get involved in manatee conservation, subject to the enhancement of sustainable livelihoods. Communities generally wish to be involved in sensitization activities that help enforce legal measures, such as prohibition of woodcutting in channels, the use of barrier fishing nets and hunting. Awareness programmes have been launched relating to the problems of conservation and to find means to reduce threats on manatee populations (Table 4).

Table 4. Manatee conservation programmes launched in Guinea

Title of programme	Geographic scope	Date
Inventory of the Africa manatee (*Trichechus senegalensis*) in the Republic of Guinea	Niger Basin	2002
Project for the monitoring and protection of the West African manatee (*Trichechus senegalensis*) along the coast	Bay of Sangaréyah in Dubréka (mid coast), Rio Nunez and Komponi in Boké (northern coast) and Forécariah (southern coast)	2003-2006
Regional Conservation Project of the West African Manatee (*Trichechus senegalensis*) along the coast	Areas of Dubréka (Soumba and Konkouré), Boffa (estuary of Fatala), Boké (Rio Nunez-Komponi) and Forécariah in the south (region of Benty)	2005-2010
Conservation Strategy of the West African Manatee (*Trichechus senegalensis*) as part of the Abidjan Convention	Coast and continental part (Niger and its affluents) of Guinea	Beginning 2006

6.5.6. Recommendations

Awareness and capacity building: It is recommended to employ an integrated approach working through education, sensitization and communication, using as the main vehicles of sensitization activities:

- Radio (stories, legends, songs about the manatee);
- Schools programme, incorporating conservation into education curricula relating to the precariousness of the species and the manatee's habitats (plays, slide shows, films etc.);
- Cultural and religious structures (wise men and recommendations from mosques) to sensitise the population.

Dubréka, Boffa, and Boké are considered as potential sites for sensitization activities, aimed at building awareness of the need to protect species

related to wetlands. Recommended target groups are fishermen, women and children within the communities. There is a need to build capacity for effective resource management and develop best practices in management of species and of their natural environment. This may be achieved through a network of potential partners composed of local radio station animators, teachers, community animators, forest and environment agents, old fishermen and conservation consultants.

To contribute to successful conservation of wetlands and species and to satisfy population needs, resources are required to support to conservation activities through building local institutional capacities whilst also supporting income generation activities aimed at raising the living standards of beneficiaries.

Research and monitoring: The disappearance of mangroves and estuaries, the manatee's habitats, is compounded by the lack of capacity to use currently available information. Practical problem-orientated studies are needed, for example, to better understand the relationships between man and animals, the causes of conflicts, traditional

practices of aquatic mammal conservation, migration and the impacts of human interaction on the population. Actions should focus on:

- Monitoring of manatee populations;
- Research into the distribution, migration and status of manatee populations, and their socio-economic uses (both for nutrition and medicinal purposes);
- Determination and classification of threats;
- Identification of conflict areas and causes of conflict (manatees, fishermen and rice growers);
- Relationships between man and manatee: place in the culture and mythology of riparian communities (Soussou, Baga, Nalou and Landouma).

Ecological monitoring and habitat restoration: The outcomes of this research should help village communities to initiate and plan priority development projects and undertake concrete actions for monitoring wetlands and restoration of the most threatened habitats. It is recommended to:

- Capitalize on the achievements of former conservation projects;
- Pursue the protection and reforestation of deteriorated areas (through women's co-operatives, young people associations etc.);
- Characterize habitats, evaluate human and ecological threats and protect ecosystems;
- Identify resting, reproduction and refuge places of manatees;
- Design a map of sensitive areas (reserved areas for manatees, destroyed habitats); and
- Create a database for purposes of ecological research.

6.6. SIERRA LEONE

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6.6.1. General presentation of the area

Sierra Leone is a coastal country of West Africa surrounded by Liberia and Guinea. The coastal sector is 506km long, including 320km of sandy beach and the rest composed of muddy coastal swamps and rocks. Coastal wetlands comprise about 4,838km^2, nearly 8% of the land surface area of Sierra Leone (Bah 1994). The coastal swamps are mainly ecosystems of mangrove swamps and swamps along estuaries. These formations are of great importance to wildlife, five species of marine turtles, waterbirds, primates, manatees and many other rare species in Sierra Leone.

The country is well endowed with ten small rivers draining the high lands of the north which flow into the Atlantic. The main rivers are the Sewa, Jong, Great and Little Scarcies, Rokel and Moa. All these rivers have rocky beds and torrential flows in their high valleys, but form subsequently large and wide estuaries boarded by mangrove swamps, mud flats and floodplains in their lower reaches.

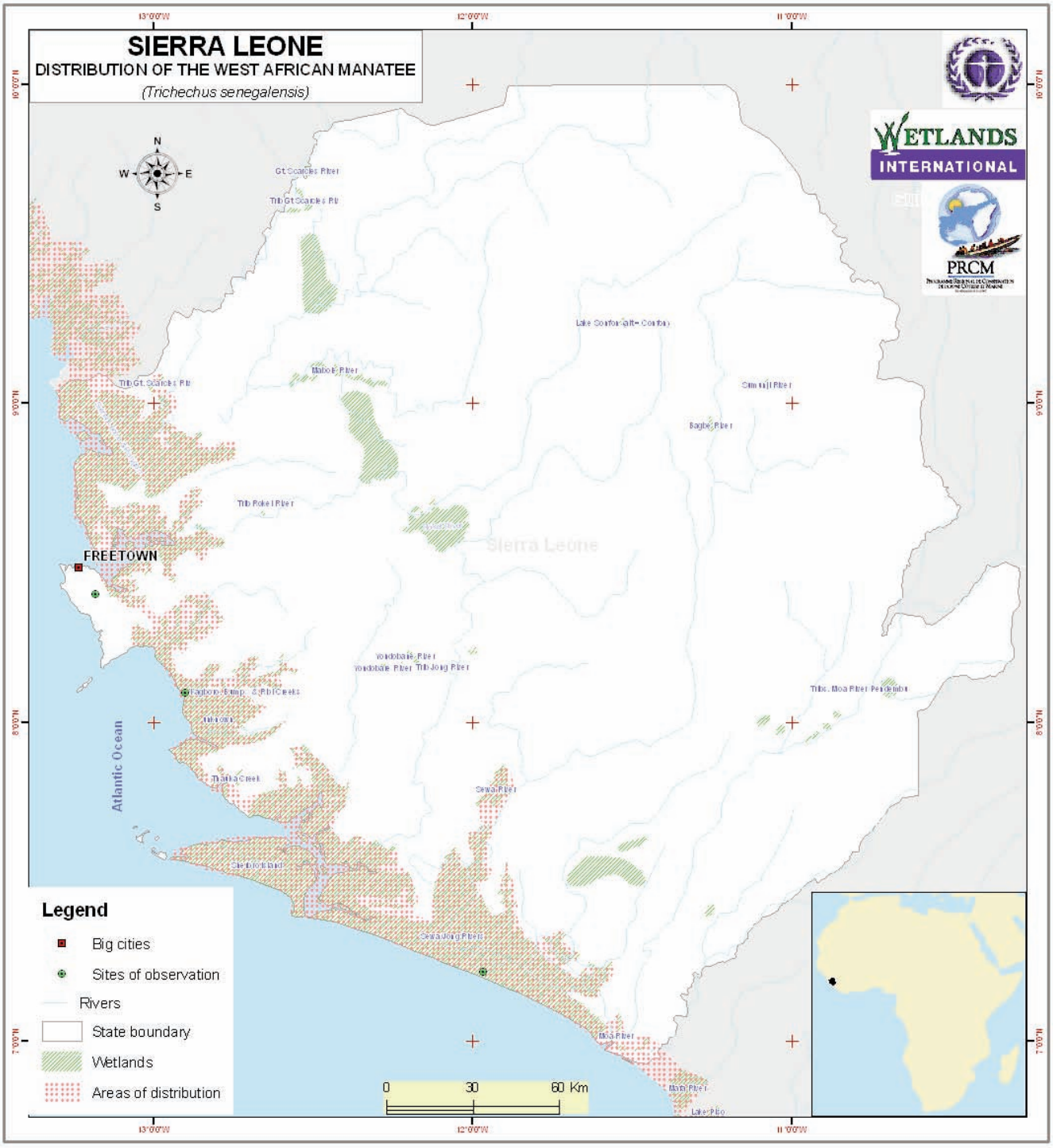
The civil war prevailing in Sierra Leone from 1991 to 2000 compelled many people to settle in the coastal area, which was generally the most secure. This demographic rush has added to the pressures on the marine and coastal biodiversity, notably for the satisfaction of domestic needs (shelter, food, firewood). Although there is peace now, most of the displaced populations have become sedentary now, thus maintaining the pressure on space and on marine and coastal resources.

6.6.2. Distribution and status of manatees in Sierra Leone

Generally boarded by a forest of mangrove swamps, the coast of Sierra Leone presents a typical habitat for manatees. Hatt (1934) pointed out the presence and the exploitation of manatees in Sierra Leone. Hill (1963) concluded that manatees occurred throughout the coastal areas of Bonthe and Pujehun districts. Robinson (1971) and Lowes (1970) confirmed their presence at the Sierra Leone River estuary. At the end of the eighties, there was still a high number of manatees in Sierra Leone. Reeves *et al.* (1988) reported their presence widely in Sierra Leone, including the Great Scarcies, Little Scarcies, Sierra Leone, Sherbro, Wanje and Sewa river systems and Lake Mape. Manatees migrate between the Malem, Shenge, and Wange River and probably move upstream near Teboh, whilst their presence is confirmed at Yeluba Island (Reeves *et al.* 1988). Their occurrence in many wetlands is seasonal, with high numbers seen up rivers during the rainy season when the water level is high (Siaffa & Jalloh 2006).

Although protected, the manatee is still frequently hunted and sold. Manatees are trapped, caught in fishing nets and harpooned, and in some areas are considered a pest due to the damage caused to fishing nets (Powell 1996).

Manatees are observed in estuaries, creeks, mangrove swamp ecosystems and flood plains. Investigations in February 2005 have shown that the species is still well represented in the estuaries of the Sierra Leone River, at the two Scarcies


SIERRA LEONE
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
WETLANDS INTERNATIONAL
PRCM
FREETOWN
Sierra Leone
Atlantic Ocean
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
0
30
60 Km

estuary, in the Yawri Bay and in Sherbro Islands (Winden & Siaka 2005). The Sierra Leone River Estuary (SLRE) and its associated creeks, Yawri Bay (Tombo, Kargboro), the estuaries and the strait of Sherbro River Estuary to Sulima via Boho, are the most visited areas by the manatee. Manatees are very active during the rainy season (devastating rice fields) with the increase of the level of water, when their presence is confirmed by accidental captures in fishing nets. The southern side of the coastal area (Shenge to Sulima) is expected to contain the most important numbers of manatees.

6.6.3. Values and threats to manatees in Sierra Leone

The manatee is considered as a sacred animal in the northern part of Sierra Leone. The tail is treated with respect and is only handled by those initiated in such matters. The mythical beliefs are most developed among the members of the Temne tribe. The manatee is not purposefully caught by fishermen, but once it is caught, the tail is cut and given to the local chief. The cultural values which were linked with the species are disappearing in many areas, maybe due to societal change and modernization. The meat is not considered a delicacy and is rarely found in the market. The rarity of sightings is hindering the ecotourism potential of the manatee.

Hunting is described as the main threat for the manatee (Winden & Siaka 2005), and is widely practised at river mouths (e.g. Bunce River) and notably in mangroves areas. The animals are tracked and captured with special traps. This hunting is intended for the consumption of meat by riparian communities and hence is a real threat for the manatee. The conflict between the manatee and man is of note. Some rice farmers disturbed by the presence of manatees in their fields ask hunters to get rid of them, for fear that they will destroy their crops (Winden & Siaka 2005). Hunting is most prevalent in the wetlands of southern Sierra Leone, where manatee meat and oil are relatively common household food items, selling for around 2,500-3,000 leone (<€1) per piece of approximately 0.5kg (Siaffa & Jalloh 2006). Possibly the major threat to manatees is their incidental capture in fishing nets; the modernization of fishing methods with the use of monofilament nets particularly threatens the species in Sierra Leone. No estimation has been made of the impacts of modern fishing methods on manatees.

6.6.4. Legislative and institutional frameworks

It is only in the year 2000 that the manatee, the five species of turtles and other endangered and/or threatened species were fully protected by the national wildlife legislation. But the items of ratification and of approval of this legislation are still at the level of the parliament for a final decision. The manatee is a typical species of the coastal areas, as given in the species list of the National Biodiversity Report. It is also important to report that there is no scientific basis to specify accurately the trends of manatee populations. Thus far, little has been done to protect or even survey the species. Many documents have been lost during the periods of civil war experienced by the country in recent times. The National Commission on Environment and Forestry (NaCEF) is the leading entity in charge of the protection of the natural resources of the country, and within this commission the Division of Wildlife Conservation is directly accountable.

6.6.5. Initiatives and recommendations for the conservation of the manatee in Sierra Leone

An important step was made in the year 2000, in drawing up the act which consists of classifying the manatee in the national list of fully protected species. Some recent manatee studies have got underway, but outcomes are not yet available. In 2003, a National Strategy and an Action Plan on Biodiversity were elaborated and the manatee has been identified as a species for which a management plan must be initiated. The Sierra Leone Conservation Society has been conducting investigations on the status of the species with funds from Wetlands International.

The main recommendations for improved conservation of the species are:

- The Government of Sierra Leone should submit a proposal for the Scarcies River Estuary, Yawri

Bay and the Sherbro River Estuary to be declared as Ramsar sites. These sites require protection status and wise management.

- Conduct awareness seminars for policy and decision makers to sensitise them about the importance of coastal wetlands, and carry out wide public education, awareness and sensitisation campaigns on the manatee as an endangered wetland species and educate people about laws protecting the manatee and its habitat using appropriate communication media.
- Investigate the use of coastal wetland resources at a national level.
- Develop a Manatee Conservation Strategy and Action Plan and raise funds for its implementation in the four key coastal wetland sites: Scarcies River Estuary, Sierra Leone River Estuary, Yawri Bay and Sherbro River Estuary).
- Enforce laws in the areas where the manatee lives.
- Introduce alternative means of income generation from ecotourism as opposed to killing and selling manatees for their meat and oil.

6.7. LIBERIA

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6.7.1. General presentation of the area

Liberia is a coastal country with a 560km long coastline, sharing common frontiers with Ivory Coast in the east, Sierra Leone in the west, and Guinea in the north. The coastal area is characterized by wide areas, lagoons, lakes, estuaries, bays and a complex of mangrove and delta ecosystems. Sea currents are a decisive factor influencing the coastal area's natural productivity. Current reversal through the Sahelian Upwelling Marine Ecoregion is marked in the coastal waters between Senegal and Liberia, which considerably affects the natural productivity of sea resources. Various natural ecosystems are found in these waters, which represent a stronghold of biodiversity. The flora and fauna are rich and varied in this equatorial transition area with 87 species of phytoplankton and fresh water *Cyanophycae*; dominant families are the *Bacillarophyceae*, *Chlorophycae* and *Cyanophysceae*. Phytoplankton density in brackish waters changes according to seasons. Benthic macro fauna is dominated by oysters, *Brachiostoma*, cockles, molluscs, shellfishes and polychaetes. Mangroves occur in some of Liberia's coastal wetlands, though they are much more limited in extent than other countries of West Africa.

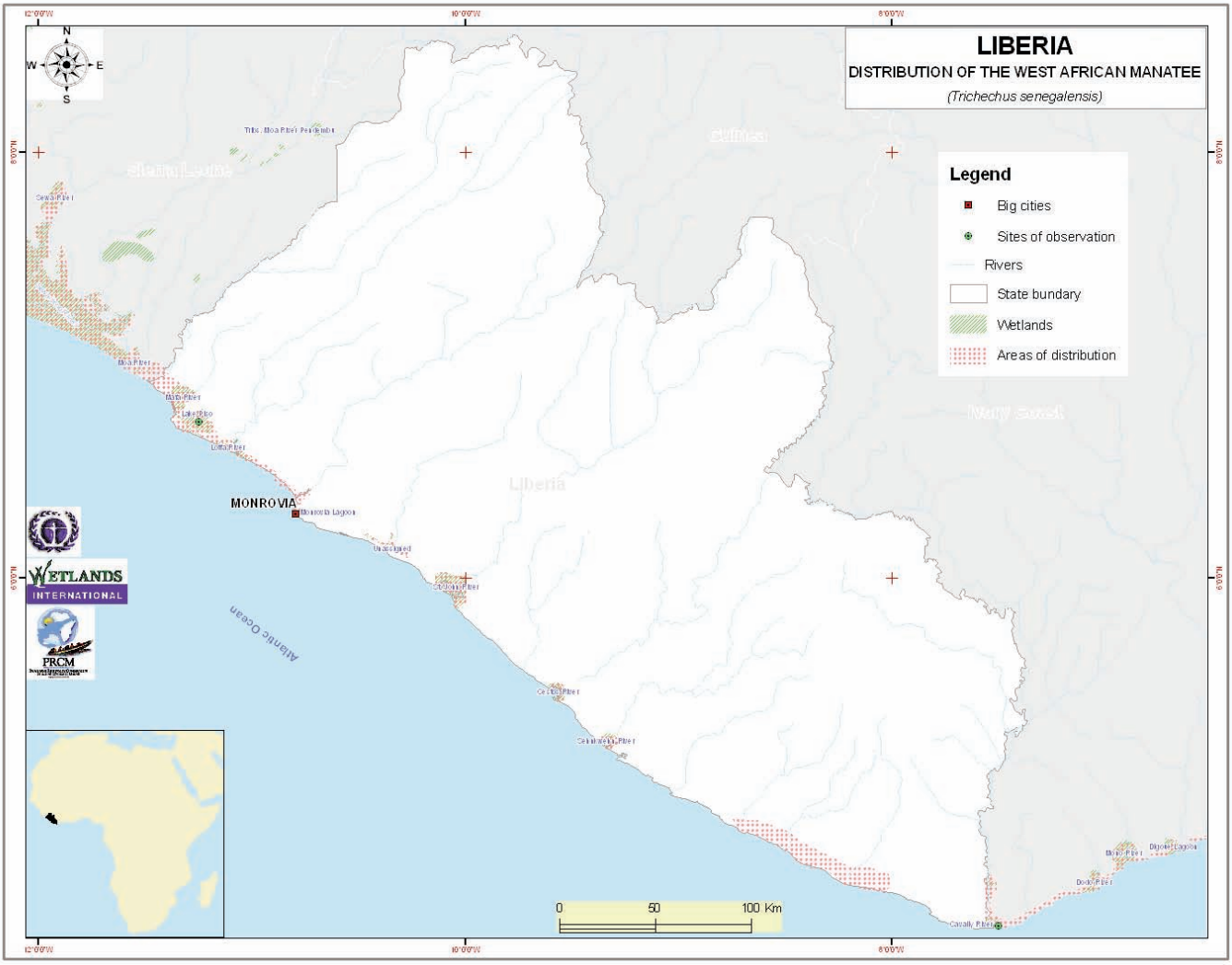
The coastal area concentrates 48% of the human population of Liberia and the greater part of the country's economic activities. There are significant coastal wetlands, including Lake Piso and the Mesurado Wetlands and the mouths of the main rivers. The country is well watered by six major rivers and numerous small ones, which have developed into a dense drainage system. The major river basins drain the territory in a general northeast to southwest direction. The six major rivers in Liberia are: Mano, Lofa, St. John, Cestos, Cavalla and St. Paul; together they drain 80% of the country. The short coastal watercourses drain the remaining 20% and include the Po, Du, Timbo, Mesurado, Farmington and Sinoe Rivers. The largest and longest river in Liberia is the Cavalla River. These rivers are not navigable and therefore do not support water transport and industrial fishing.

6.7.2. Distribution and threats

The manatee is an emblematic species of the coastal zone of Liberia, along with the dwarf hippopotamus and giant forest hog (which live in forest areas). Information collected from fishermen and riparian communities in 2006 show that manatees occur in the Cavalla River estuary in the southeast and Lake Piso in the southwest of Liberia. They have also been recorded from St. Paul River, Mesurado River, the lower Moro, St. John River, as well as the Cestos and Sankwen Rivers (Powell 1996). They are thus widely present in most suitable coastal wetland habitats, but probably only in reasonable numbers in Lake Piso and the Cavalla River. It is not possible for manatees to move far up most of Liberia's rivers due to rapids.

Fishermen indicated that manatees die accidentally because of entanglement in fishing nets, and appear to be in decline. Even though its status is not accurately known, all interviewees in 2006 agreed that manatees were in danger in Liberia. The main threats of manatees in Liberia are:

- Incidental capture in fishing nets;
- Wounds caused by nautical engines;


LIBERIA
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State bundary
Wetlands
Areas of distribution
MONROVIA
Liberia
Guinea
Sierra Leone
Atlantic Ocean
WETLANDS
INTERNATIONAL
PRCM
0
50
100 Km

- Hunting for its consumption, and for medical needs (traditional medicine);
- The destruction of its habitat;
- Sedimentation of river courses due notably to deforestation and upstream desertification.

6.7.3. Institutional and legislative framework and information availability for the control of the species

The manatee is one of the wholly protected species in the country. Liberia has designed a legislation to control exploitation activities of coastal and sea resources. This legislation has established a list of endangered species among which are manatees, turtles, dolphins, hippopotamus and whales. Liberia is a signatory of CITES (Convention on the International Trade of Endangered Species) and the Convention on Biodiversity. Other international conventions and agreements in favour of the protection of endangered species such as manatees are also ratified by Liberia, including the Convention of Wetlands. Lake Piso, a key site for manatees in Liberia, was the country's first Ramsar Site.

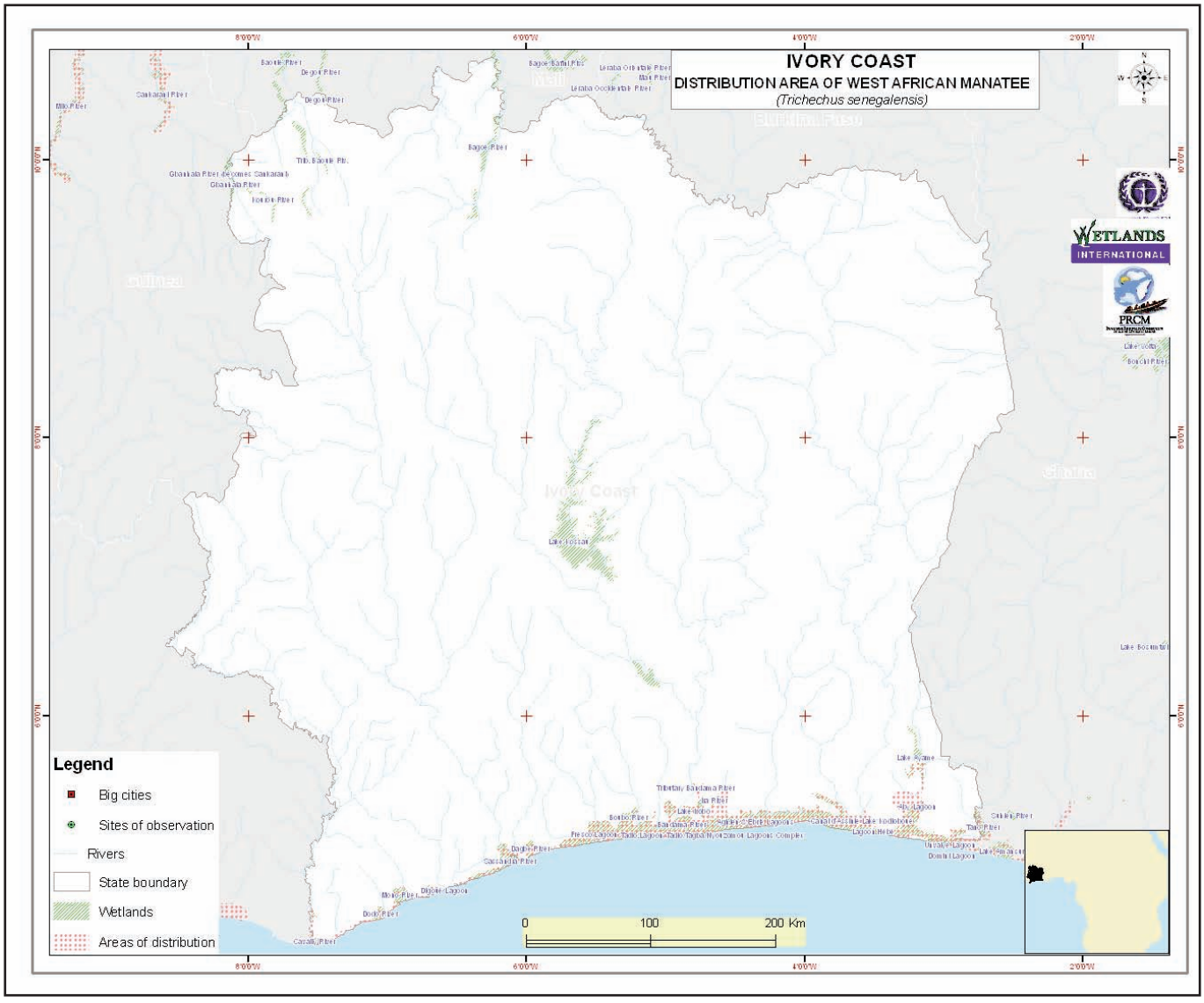
The Bureau of National Fisheries of the Ministry of Agriculture and the Forestry Development Authority are charged with complete responsibility to conserve the fauna and flora of Liberia, whilst the former has the responsibility to control the efficient enforcement of directives and regulations for the management of fisheries. It is also commissioned to protect the habitats of endangered aquatic species, notably by protecting, temporarily and/or partly, sites of scientific interest, spawning grounds or extension areas.

6.7.4. Manatee conservation initiatives and recommendations

The Liberian State has expressed some signs in favour of the implementation of national programmes for manatee conservation, although this is very recent (since 2005), and there is a lack of accurate information about manatee populations dynamics. The National Agency for Environmental Protection is the focal point for biodiversity conservation, whilst the Society for the Conservation of Nature of Liberia (SCNL) also carries out important conservation work in collaboration with other partners.

The restoration and conservation of manatee populations in Liberia requires cooperation and multilateral agreements, and concrete initiatives at the national and local level. At the national level the following measures are required:

- Enhance national legislation on the protection of threatened and vulnerable species, including a total prohibition to capture manatees and other key aquatic species.
- Consistency in policies and sectoral legislation influencing the coastal and marine area that may have effects on manatee conservation.
- Conduct more detailed studies on the status and habits of the manatee and other aquatic fauna in Liberia.
- Conduct public education and awareness campaigns about the status of threatened aquatic species, notably manatees, sea turtles, dolphins and whales.
- Discourage the wanton and reckless human settlements in the coastal areas.
- The prevention of manatee habitat degradation by controlling the cuttings of mangrove wood.
- Encourage riparian communities to participate in the decision making process relevant to the protection of marine and coastal ecosystems.


IVORY COAST
DISTRIBUTION AREA OF WEST AFRICAN MANATEE
(Trichechus senegalensis)
WETLANDS INTERNATIONAL
PRCM
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
0
100
200 Km

6.8. CÔTE D'IVOIRE / IVORY COAST

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6.8.1. Summary

Manatees occur in the lagoon complexes of Aby-Tendo-Ehy, East Ebrié, West Ebrié, Tagba-Makey-Tadio-Niouzoumou, the N'gni lagoon, and the mouths of San Pedro and Cavally rivers. Nonetheless, it is accepted that manatee populations in Ivory Coast have diminished due to poaching and the number of individuals captured accidentally in traditional fisheries and fishing nets, despite sensitization campaigns. The manatee is therefore seen as an endangered species which should benefit from urgent protection actions before it becomes extinct.

6.8.2. General presentation of the area

The coastal area of Ivory Coast ranges from Ghana in the east to Liberia in the west. The intake in fresh waters of the whole area is ensured by great Sudan Guinean rivers represented by the Comoé (900km), the Bandama (700km), the Sassandra (650km) and the Cavally (700km), as well as the southern rivers: Tanoé, Bia, Mé, Agneby, Boubo, Gô and Niouniourou, all of whose lengths do not exceed 300km. There are two types of vegetation at coastal wetlands depending on whether the water is salty or fresh: swamp forests with predominantly *Mitragyna ciliata*, *Symphonia globulifera* and Raphia palm as well as red and white mangroves (*Rhizophora racemosa* and *Avicenia germinans*).

In terms of demography, the Ivorian coastal areas account for around 1% of the land area and nearly 20% of the total population of the country, which is unevenly spread, for instance throughout the river Bandama (Nicole *et al.* 1994). However the key factor in the region is the economic and social influence of Abidjan, the economic capital of the country, where more than 80% of the national population live.

6.8.3. History of manatee research in Ivory Coast

The information collection about the ecology and biology of the species started belatedly, as for all the large mammal species of the country. Beal (1939) and Blancou (1960) first drew the attention of the authorities about the threat to this mammal, though this did not lead to studies about the species or immediate protection measures. Some information about the distribution and relative abundance of the manatee in Ivory Coast was collected for the first time between 1978 and 1983 by the German Technical Assistance Mission (MATA), which covered 107 sites and estimated that the number of manatees living in Ivory Coast was well below 850 individuals (Roth & Waitkuwait 1986). Aerial observations similar to the ones made for manatees in Florida were made around the Tagba and Aby lagoon but did not provided any outcomes due to the turbidity of the water.

A manatee conservation project was initiated in 1986 with funding from the Wildlife Conservation

Society, under which 17 manatees were monitored between 1986 and 1988 by radio telemetry under the supervision of Dr James Powell of the Ecological Research Centre in Florida, USA. The field operation enabled the training of local technicians in capture and research by telemetry. Following this, a sensitization and education campaign was been initiated in January 1990 throughout the whole coastal strip (Akoi 1992). An evaluation of this operation undertaken in 1997 indicated a significant decrease of manatee poaching, which suggested an increased awareness of conservation issues by the local population (Akoi 1997).

From April 2000 to September 2002, 18 manatees (9 females and 9 males) were again captured and fitted with telemetric VHF beacons and monitored by the method of instantaneous observation as advised by Altman (1974) and Martin & Bateson (1996) to evaluate the territoriality of the manatee, its behaviour and the impact of human activities on its behaviour (Akoi 2004).

The implementation of a long term manatee conservation strategy has been going on since 2003 as part of a large programme entitled 'Sustainable management of the coastal biodiversity in Ivory Coast' with the financial support of the Wildlife Conservation Society, the United States Fish and Wildlife Service (USFWS) and of the Toronto Zoo of Canada. However, this project did not take into account the whole coastal strip but only the regions ranging from Grand Lahou to Fresco.

6.8.4. Habitats, distribution and populations of the manatee

In Ivory Coast the manatee occurs in the whole coastal strip, including all the great rivers and their estuaries, as well as almost all the lagoons (Akoi 2004). According to findings of surveys and the movements of individuals monitored by radio telemetry, six main areas of occurrence may be singled out:

- the Aby-Tendo-Ehy lagoon complex with the estuaries of River Tanoh and River Bia;
- the Ebrié lagoon complex with the mouth of River Comoé;
- the west Ebrié lagoon complex with the mouth of River Agneby;
- the Tagba-Makey-Tadio-Niouzoumou lagoon complex with the mouths of River Bandama and tributaries of Gô and Boubo;
- N'gni lagoon with the mouths of River Bolo and Niouniourou;
- the mouths of Sassandra, River San Pedro and Cavally.

The individuals monitored by radio telemetry spend the day in small deep parts of the lagoons, far from human activities. From as early as 17:00 hours, they slowly approach river mouths in search of food in mud below the water. In the evening they undertake long sorties (10-40km), from river mouths moving upstream in search of food made up of leaves and young shoots of plants in banks (Akoi 2004).

If the movements and displacements are generally motivated by the search for food, their extent and scope are dictated by the availability of water. Thus, during the dry season when there is a sharp decrease in the water level in rivers, manatees remain confined in lagoons. The individuals monitored remained generally solitary. However, some groupings of 10 to 20 individuals have been observed several times in the N'gni lagoon of Fresco in the month of August (Akoi 2004).

The turbidity of the water and the green cover on the shores of rivers make it difficult to estimate the sizes of manatee populations, and no reliable data about populations trends is currently available. However, based on the extent of poaching and the number of individuals accidentally captured in traditional fisheries and fishing nets, it is generally accepted that manatee populations in Ivory Coast have diminished, despite sensitization campaigns.

Only manatee populations in lagoon complexes of Tagba-Makey-Tadio-Niouzoumou, the Bandama River, of N'gni, Bolo and Niounourou in Fresco, have experienced a relatively positive growth. The possibilities for observation of manatees in these waters varies between four and six individuals per hour of walking, while they vary between one and two individuals for 40 hours of observation in

other localities (Powell 1996; Akoi 2004). Numerous fishermen around Niouzoumou lagoon assert to never having seen so many manatees in the vicinity of their villages as during the last five years. Poaching has almost stopped, and a self-monitoring programme is carried out by fishermen in this region, so much so that accidentally captured individuals are systematically reported, and usually released, sometimes endowed with a telemetric beacon for their monitoring.

6.8.5. Socio economic and cultural values

Communities sharing the Ivorian coastal wetlands belong to ethnic groups of very different origin and culture. All know the manatee well and give it a preferential place in their culture and mythology. In terms of mythology, there is an alliance between the manatees and the Ebriés who, for that reason, do not consume its meat. According to local legend, an Ebrié woman was drowned in the Ebrié lagoon. After several days of search without result, one morning the community was helped by manatees that had found the body of the woman and came to deposit it on the shore. Ever since and in recognition of the service provided by manatees, the community has concluded an alliance with them. As a consequence, no Ebrié will harm a manatee, much less hunt and consume its meat (Akoi, pers. obs.). Among the Godies around the N'gni Fresco lagoon, only a bachelor or a widower may hunt the manatee. Indeed, according to a popular belief, a male manatee will always avenge a beaten female by causing the death of the wife of the hunter.

The manatee is hunted mainly for food. The meat is highly appreciated along the coast and all parts are consumed, except the head, which must be immediately cut and thrown away. According to a widespread belief, the eyes of a manatee must not be seen by a pregnant woman because of risks for the woman to give birth to a child with small eyes looking like those of the manatee.

Generally the good parts, such as the heart, are reserved for the village chief. Among the Ahizis of Jacqueville, a person who slaughters a manatee is considered as a hero. However, local custom only permits a person to kill three manatees during their lifetime, and any killed in excess will be lead to different misfortunes in the family. The meat is considered as a benefit for the whole community and the hunter can only sell parts of the manatee after having provided for the community. According to Dominique Lela, a former Ahizi hunter, a slaughtered manatee could earn him between 150,000 and 170,000 FCFA (ca. €225-255), after deduction of the share served to the village. Formerly, he used to slaughter three manatees at the beginning of the academic year to enrol his five children in the secondary school. The meat is cut and sold in small morsels costing 1000 CFA francs, about €1.5 (Akoi, pers. obs.).

The manatee is subject to modest tourist exploitation in the N'gni lagoon in Fresco, where the observation of the species is relatively easy. Some oarsmen organize visits in mangroves for some expatriate tourists coming from Abidjan, especially during weekends. However, this activity should be better organized with appropriate remuneration packages.

6.8.6. Threats

The threats to manatees in Ivory Coast are mainly due to man, even if there is a rare report of a baby manatee half consumed by a crocodile. There are two types of human threats: direct and indirect threats. Direct threats concern illegal hunting and accidental capture in traditional fisheries and fishing nets, notably those of shrimps. Illegal hunting is performed by using traditional traps (fence baited with cassava, suspended arrows, special nets and big hooks baited with cassava). In all regions where the manatee occurs, there are specialized hunters, one of which has reportedly captured 10 manatees in one week. In other villages, up to five manatees per year are regularly consumed (Akoi 2004).

Indirect threats concern the destruction and modification of the habitat. These include:

- cutting of red mangrove,
- opening of channels (*vridi*),
- building of upstream river dams (e.g. Kossou in the Bandama and Buyo in the Sassandra),
- pollution of the Ebrié lagoon in Abidjan,
- inappropriate fishing methods,
- poisoning of the water, hence modifying the

environment through an excessive salinity,
- human population pressures.

In Ivory Coast, the coastal wetlands are home to nearly 25% of the human population. This strong concentration of people creates effluents which concentrate in estuaries and rivers and affect the health of manatees, which Perrin (2001) described as fragile mammals. As a consequence to these threats, manatees have totally disappeared from waters around Abidjan.

6.8.7. Institutional, legislative framework and availability of information

The West African manatee is classified as a vulnerable species in the IUCN Red List. Attempts by the Sirenian Specialist Group to give it a stronger international status (e.g. during the Sapporo meeting in Japan in August 2005) have not yet come to fruition. In Ivory Coast the species is fully protected by the legislation code on hunting and nature protection (law 65-225 of 4th August 1965) and listed in Annexe I, class A of fully protected species. As for all Ivorian wildlife, the manatee is managed by the Ivorian environment, water and forest ministry, notably the division in charge of nature protection and wildlife management.

6.8.8. Manatee conservation Initiatives in Ivory Coast

The manatee conservation initiatives in Ivory Coast remain national initiatives, focused on the 'manatee project' undertaken in collaboration with the Wildlife Conservation Society since 1986. This project, which covers the coastal region from Grand-Lahou to Fresco is a research project on the ecology and biology of the species. It also concerns the conservation of sites identified as the most important ones for the species, education and sensitization of the population. Communities of fishermen in important sites are gathered in 'Friends of Manatee clubs' to contribute to the efforts of conservation via self monitoring.

6.8.9. Comments and recommendations

The manatee has been subject to protection in Ivory Coast, particularly since 1986. The potential threats affecting the species have been identified, the most visited sites for the species are known, there is a legislative tool helping in the protection and a research and conservation project is underway. However, in addition to these initiatives should be added the following recommendations:

- Extend the scope of the manatee project to the whole coastal strip, through increased fund raising.
- Build a collaboration trans-boundary framework with neighbouring Ghana to monitor the movements of manatees in the lagoon complex of Aby-Tendo-Ehy.
- Reinforce the legal status of important sites such as the classified forest of Port Gauthier sheltering the rivers Niouniourou and Bolo, food sites of the manatee; (sites could be designated as manatee reserves, for example).
- Provide settlements located in lagoon areas with the means to intervene in water issues, and better involve them in sensitization action and the destruction of manatee traps.
- Pursue research and telemetry activities to obtain sufficient information about the biology of the species, notably its food and reproductive habits.
- Carry out genetic research with other countries, especially those sheltering manatee habitats not having a connection with the sea (e.g. Lake Léré and Lake Tréné in Chad, Lake Débo in Mali) to know if manatees in West Africa all share the same sub-species.
- Better organize the tourist exploitation in the N'gni lagoon of Fresco and assess the ecotourism potential of the species in other lagoons.

6.9. GHANA

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6.9.1. Summary

Presently, the populations of most aquatic mammals are reduced to dangerously low levels in Ghana. The West African manatee occurs in estuaries, coastal lagoons and inner swamps related to the waterway system of the Volta. Some research work has been carried out relating to the distribution and socio cultural evaluation of the mammal. Although the status of the manatee has not been established, it is clear that the species is endangered in Ghana by the loss of its habitat and by the hunting practiced by local communities. To protect the animal against these threats, Ghana classified the manatee as a fully protected species in 1971 by the law L.I. 685, relating to the conservation of wild animals. The Wildlife Division of the Forestry Commission and the Environmental Protection Agency are in charge of manatee protection. The initiatives for conservation focus on the monitoring and effective enforcement of regulations about wildlife conservation.

6.9.2. General presentation of the area

Ghana is located on the Gulf of Guinea in West Africa, just above the equator and with the Greenwich meridian running about 24km in the east of the capital, Accra. The country has a coastline of 550km in length, which is subject to the influences of three current systems:

- The Guinea current in the east and which occurs on the surface;
- The counter current in the west which is situated under the Guinea current ; and
- The equatorial current overflowing in the west.

The oceanographic environment of Ghana includes many marine and coastal ecosystems. The latter are characterized by seasonal water upwellings, during which the productivity of the plankton increases to sustain fishing, where captures are dominated by pelagic species such as sardines and anchovy. Coastal ecosystems are made up of (arenaceous and rocky) shores, swamps and lagoons. The lagoons are important because they provide resources for trade and consumption. Great quantities of crabs are fished, processed and sold. In some sectors, market gardening activities are developed with salt extraction using intensive and extended methods.

The coastal area is important for biodiversity of Ghana. It provides habitat for the West African manatee and nesting areas for five species of sea turtle (*Dermochelys coriacea*, *Chelonia mydas*, *Lepidochelys olivacea*, *Erectmochelys imbricata* and *Caretta caretta*) at sandy beaches. The coastal swamps form an important ecological unit providing feeding and nesting areas for thousands of migratory and resident birds. The increasing numbers on shores along the coast indicate that these ecosystems are well conserved. More than 80% of the waterbirds present during the northern winter are migrants from the Palearctic. The swamp ecosystems shelter oysters, crabs and gastropods.

6.9.3. Past research, habitats and distribution of the manatee

There are few scientific works about the manatee in Ghana. The first documentation was provided by Irvine (1947), who gave a short description of the mammal. Research in the 1990s commissioned by the United Nations Environment Programme and


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undertaken by Ofori-Danson & Agbogah (1995) established the distribution of the species. Following this, Entsua-Mensah & Ankude (1996) examined the frequency of the manatee in marine coastal systems and carried out a socio-cultural evaluation of the manatee, providing information on its value and local uses.

The West African manatee occurs in coastal and inner swamps of Ghana, particularly in the arm of Afram of Lake Volta, and in the rivers Dayi, Asukawkaw, Obusum, Sene, Digya and Oti (Ofori-Danson 1995). Manatees occur in Abi, Tano and Ehy lagoons in the southwest of Ghana (Roth & Waitkuwait 1986). They are also found in the River Tano, the lagoons and swamps associated with the lower Volta and in Lake Volta (formed by construction of the Akosombo dam). There are reports of sightings in the tributaries of the river Tordzie, such as Lolo, Altra and Hlortor in the southern area of Tongu. However, there is no report of its presence in the waterway system of the White and Black Volta. Ofori-Danson & Agbogah (1995) concluded that the confluence of Oti could define the upper limit of the distribution area of the manatee in Ghana.

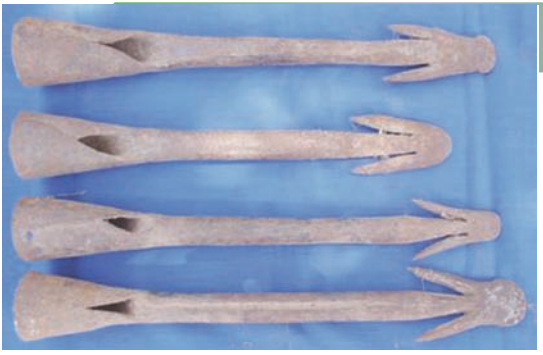
There has been no evaluation of the size of the population. Fishermen in swamps associated with the lower Volta report seeing manatees less frequently now than in the past. The frequency of observations is relatively higher in the coastal area of the Lower Volta and in the river Tano than in swamp tributaries of the upper Volta. Reports indicate that the manatee may face local extinction in some areas of Ghana.

6.9.4. Values of and threats to the manatee in Ghana

The manatee raises great socio-cultural interest. In the Tongu area, the manatee is considered as a goddess of the river, linked to wealth and beauty. Jamoro communities, in particular those living along the Aby-Ehy lagoon in the southwest of the country, consider the manatee as belonging to a deity and at the same time use the carcass and consume the meat if the appropriate rituals are performed. In the Nzima region, it is a taboo to look at the face of a manatee, even when dead. If such a case occurs, exaltations and rituals must be performed to protect a woman from dangers she may face.

The manatee is threatened by the loss and modification of its habitat and the fluctuation of water levels; decreasing water levels lead to reduced availability of aquatic plants, which are the manatee's main food source. Surface waters bear pollutants coming from industrial and municipal drains or from inner drainage in lands and coastal waters. They include sediments, pesticides and fertilisers, which have potential to affect manatees in the long run. The wetlands near the lower Volta have become dry upstream, which has consequently reduced the habitat of the manatee and limited its movements to the swamps of the River Tordzie. The greatest overall threat to the manatee is hunting for meat, which is considered a great delicacy, and which sells rapidly when it becomes available (P. Ofori-Danson, pers. comm.) Another threat is the loss of its habitat, particularly in the lower Volta basin, which has contributed in limiting the frequency of manatee observation in Ghana.

Manatees are accidentally captured in fishing nets. Once captured, most fishermen use harpoons to



kill the animal. In the Avu lagoon, hunters beat the mud to look for the mammal while several trapping techniques (hook line, harpoon) are used in the Ehy-Abby complex, to capture the animal. There is a report of a massacre of 17 individuals in the Afram Arm of Lake Volta (Ofori-Danson & Agbogah 1995), and a great number have been killed by local hunters in the Tao lagoon and Avu in the southwest.

6.9.5 Legislative and institutional framework

The manatee is fully protected by the law L.I 685, 1971 (act 43). The hunting and capture of manatees and destruction of its habitat are formally prohibited. Ghana is a signatory of all the international treaties relating to biodiversity conservation (CMS, CITES, Ramsar, CBD etc.). The Wildlife Division of the Forestry Commission is the authority in charge of the management of natural resources, inside and outside protected areas. Act 43 governs the operations of this division and restricts the hunting of vertebrate animals. It also takes into account the establishment of reserves where it is illegal to practice hunting, capture or killing of animals and birds. NGOs including Ghana Wildlife Society (GWS), Friends of the Earth, the Earthwatch Institute and the Green Earth Organisation (GEO) contribute to the conservation of natural resources, for a healthier environment and a better quality of life.

6.9.6 Perspectives and recommendations

There were no conservation projects specifically directed to the manatee until a recent initiative for research and conservation of the species in the arm of the Afram in Lake Volta, with the support of the Nature Conservation Research Centre (NCRC). Some education and sensitization activities have also been initiated. No specific measures have been taken to impose a regulation of manatee hunting, despite the threats faced by manatees in Ghana. There is a lack of information about the detailed ecology of manatee habitats and the absence of a thorough socio-economic and cultural evaluation of the species in Ghana. There is a need to ensure that conservation and management measures have a sufficient socioeconomic and cultural content to meet the expectations of communities whose culture and lives are linked to natural resources including the manatee.

A conservation strategy should be formulated and implemented. The formulation should be based on research findings of the natural history and ecology of the manatee, but also should take into account various socio-cultural perceptions in order to mobilize traditional communities for the support of the strategy.

One of the most important areas in Ghana for the West African manatee is the Afram Arm of Lake Volta. It is recommended to establish a manatee sanctuary in this area and to develop manatee-based ecotourism initiatives, which would generate income and raise the profile of the manatee in local communities (Ofori-Danson, pers. comm.).

6.10. TOGO

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6.10.1. General presentation

The coastal area of Togo (Figure 2) is located in the far south of the country between the latitudes 6°10'57" and 6°29'58"N and longitudes 1°04'57" and 1°46'00"E with a land area estimated at 6300km^2. The geomorphology of the area covers three main units from the south to the north: a sandy coastal belt, a flood depression and a plateau of "terre de barre" soil. There are three main rivers, the Mono, Zio and Haho, and some minor ones, including the Boko, Gbaga and Elia. There are three main lagoons: Lake Togo, Lake Boko and Aného Lagoon, as well as temporary and permanent ponds. The coastal lagoon system is linked to the Mono by the Gbaga channel.

The coastal area has a diversity of ecosystems supporting several plant formations including mangroves, flood savannah, semi-deciduous forests, and forest relics testifying to a more extended forest environment in the past. Ponds and small, as well as free, stretches of water are increasingly invaded by a floating mono-specific vegetation, with water lettuce often accompanied by *Nymphea lotus, N. guineensis* and *Salvinia nymphellula*.

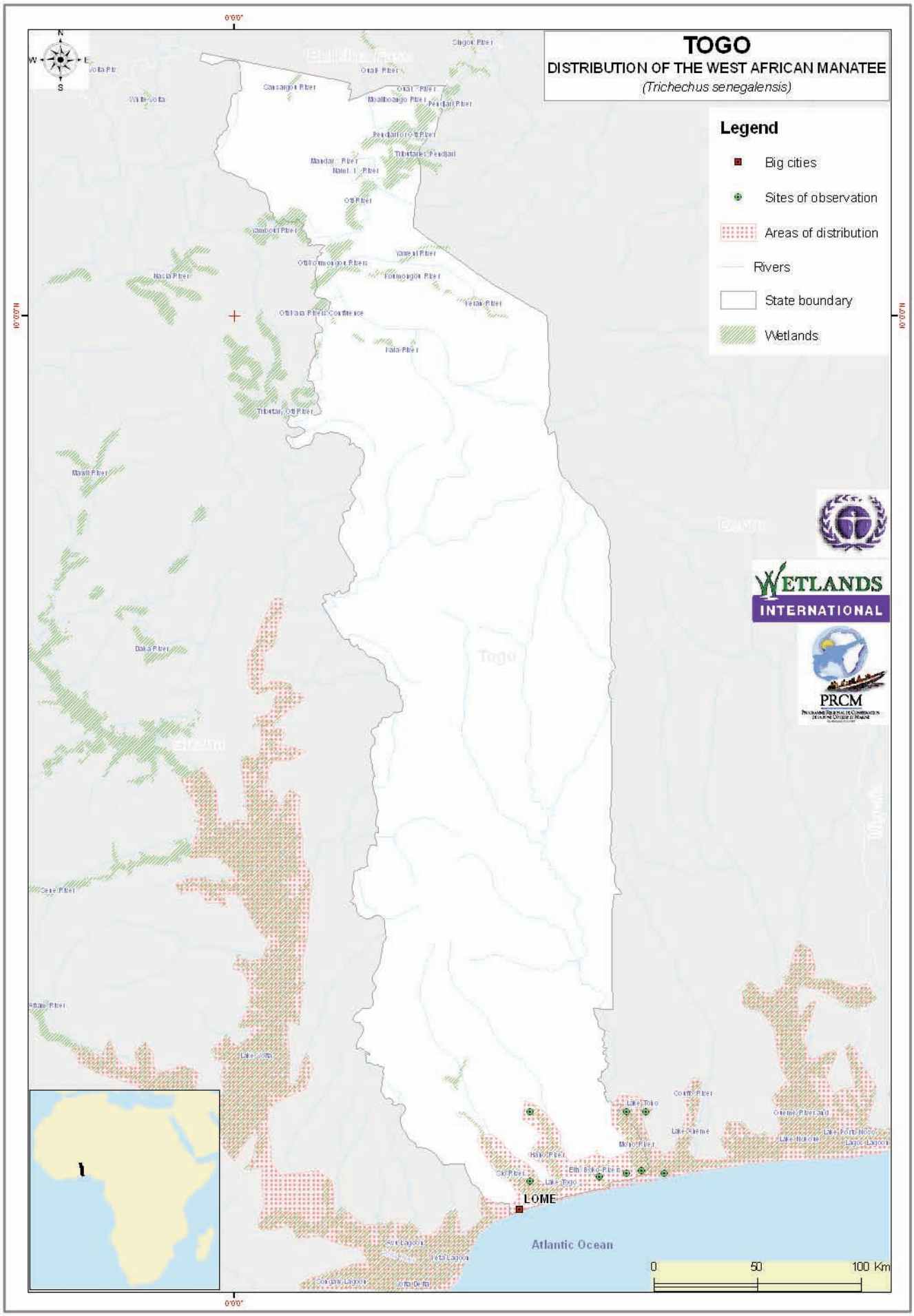
Togo's marine waters support some whales and dolphins, including the common dolphin (*Delphinus delphis capensis*), the sperm whale (*Pyseter macrocephalus*) and the humpback whale (*Megaptera novaengliae*). Aquatic mammals found in some of the continental wetlands such as the Mono, Zio and Haho Rivers and in Lake Togo include the hippopotamus (*Hippopotamus amphibius*), the West African manatee (*Trichechus senegalensis*) and otters (*Aonyx capensis* and *Lutra sp.*). The coastal wetlands of Togo are utilised by resident and migratory waterbirds. Reptiles are represented by the Nile crocodile (*Crocodylus niloticus*), marine and freshwater turtles, monitor lizards and snakes. Many species of freshwater fish and amphibians also occur. Among crustaceans and molluscs, there are six species of crustaceans and sixteen species of molluscs, which form a vital component of the coastal wetlands.

The coastal zone covers 11% of the land area and supports 41.5% of the total human population of Togo. It is subject to exploitation for agriculture and other land uses, which affect the natural balance of coastal ecosystems.

6.10.2. Habitat and distribution of the manatee in Togo

Manatee research work has been undertaken as part of an inventory and conservation of Togolese wildlife, but there little information was yielded for this species. The presence of the manatee is reported from some rare pockets of the country where further studies should be conducted. Information collected from riparian populations, observed manatee captures and reports against poachers are sources confirming the existence of the species in the waterways and lakes of southern Togo.

The manatee is observed in Lake Togo with its tributaries Zio and Haho and in the River Mono. According to the findings of surveys undertaken in 2006 among riparian communities and field observations, the manatee population on Lake


TOGO
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Areas of distribution
Rivers
State boundary
Wetlands
WETLANDS
INTERNATIONAL
PRCM
LOME
Atlantic Ocean
0
50
100 Km

Togo is important. There are two concentration areas in Lake Togo: one in the south of the lake, and at the junction between the lake and the River Haho. The existence of these two concentration areas would justify the number of skulls observed in the villages of Amédéhoévé and Dekpo, which are the closest to those areas. It seems that the confluence between Lake Togo and the river Haho generally supports more manatees than in the Lake Togo-Zio area. All interviewed fishermen exploiting Lake Togo in the riparian villages have backed-up this assumption. The population in the Mono is very sparse according to fishermen. Nonetheless, an area of population concentration has been identified in Adamé. The upper distribution limit of the species in the Mono is in the village of Agomé-Glozou.

The movements of *T. senegalensis* in Lake Togo and in the Mono deserve particular attention in the conservation programme, as the species habitats are threatened by destruction. This situation limits the displacement corridors of the species. For a long time the manatee was reported in Kpessi, Agbodrafo, Abatékopé (near Aného), but today this is no longer the case. The same applies to the other bank of lake Togo, at Ekpui, Togoville, Kéta, Akoda and Kouénou. It is necessary to design a significant map of former and current areas of presence of the manatee so as to establish an efficient conservation status. In the Mono, the unidirectional flow of the water runoff leads to the presence of manatees near the beaches of Avlo in the Boucle du Roy in Benin (Dossou-Bodjrénou, 2003). It would be necessary to determine the real impacts of the Namgbeto dam on manatees and on the whole biodiversity of this area.

The periods of observation of the manatee differ according to the habitats listed. The outcomes indicate that the favourable observation period of the manatee in Lake Togo coincides with the great rainy season (June to August). During that period the rise in the water level causes a dilution of the salinity in the lake allowing the animal to migrate towards areas near the estuary of Aného. Nevertheless, in the two junction areas described, it is possible to regularly observe the animal whatever the period of the year. In the Mono, the favourable observation period according to riparian communities is the dry season (December to February).

The manatee eats floating or submerged aquatic plants or terrestrial plants of stream shores, which the animal seizes by using its forelimbs. Fieldwork conducted during outings on Lake Togo in the locality of Dépki and Amédéhoévé have helped identify some plant species eaten by the animal, which include *Nymphea lotus, Eichhornia crassipes, Pistia stratiotes, Paspalum distchicum, Panicum sp., Ipomoea aquatica, Echinochloa pyramidalis,* and roots of *Cyperus papyrus* and *Typha australis*. *Panicum spp.* was identified in manatee faeces collected in Agbanakin. Local fishermen use the cassava tuber as a bait to capture the animal.

Young manatees are regularly observed by artisanal fishermen, and in Lake Togo, mating displays are observed especially when individuals enter the group during the flood period in the Haho and Zio. This period also corresponds with the period when newborns are regularly observed in the area. The observation of adult females breastfeeding newborns with pairs moving in the environment is also commonplace; some fishermen recognize pregnant females. The findings are similar to those of Bengtson (1981) for Florida manatees, who also recorded groups of males following a female over a large distance. Testimonials of local fishermen in Togo have described similar phenomena.

6.10.3. Ecological importance of the manatee

In some areas manatees may have potential use as a means to control floating weeds and mosquitoes (Allsopp 1960; Maclaren 1967; Domning 1978). The food and consumption rate of manatees and dugongs may render them extremely useful in the control of the growth of plants in rivers and other waterways (Bertram & Bertram 1966; Lowe 1992). It seems that the most important ecological role of manatees is the recycling of the limited nutrients of ecosystems by fostering primary productivity (Best 1982). Very recently, studies have shown that manatees can serve as indicators of the of ecosystem health (O'Shea *et al.* 1991; Domning 1992; Trainer & Baden 1999; Bossart *et al.* 2002; Robert *et al.* 2004). In the specific case of

Togo, manatees could potentially aid in controlling aquatic weeds such as *Pistia* and *Eichhornia crassipes*. In similar conditions in Nigeria, Ajayi (1971) has proposed the use of manatees to control invading aquatic plants. In surveyed villages in 2006, fishermen asserted that manatee faeces are appreciated by *Chrysichthys* fish for their food, in accordance with observations by Chikou *et al.* (2002) from Benin. It seems that other groups of fish may grow in refuges left by manatees. Detailed research work about food habits and the ecological role of manatees deserve to be undertaken in the wetlands and coastal areas of Togo and Benin.

6.10.4. Socio-economic importance

In terms of food use, manatee meat is consumed locally and traded, usually sold in pieces selling for 500-10,000 FCFA according to localities and demand. On some occasions, restaurants in Agbodrafo and Aného have requested it. It seems that they are used in traditional pharmacopoeia, and osteologic pieces of the animal have been found in fetish markets of Vogan and Akodessewa. We have not managed to conduct research about its usage. In villages, according to fishermen, following the capture of a male individual, the testes are collected for aphrodisiac treatments.

Culturally speaking, the peoples of southern Togo are animists. Animist practices urge the populations to build religious shrines to attract and form their followers. These places are often arranged in ceremonial places and in some cases take some items of nature as holy objects (rocks, trees, forests, water, animals etc.). Specimens of manatees are sometimes used in such ceremonies. In localities around Lake Togo, each traditional hunter must possess his fetish or voodoo and is obliged to consult before going out hunting. Generally, shrines comprise a small fence made of stones in which manatee skulls and other animals and osteologic items are placed. Such fetishes, called *Aklmakpoe* in the local Ewe language, were found amongst fishermen hunting the manatee in all the villages visited. Any hunter must take into account the oracles of this fetish before going to hunt, especially if they are hunting manatee. The ritual consists in depositing the fishing or hunting instruments the day before the hunt. The following day, before withdrawing the instruments, the hunter must pronounce some incantations and make offerings of local drink and water. According to fishermen, such a practice increases the chances to capture the manatee and protects the hunter against any malediction which may occur. In addition, the traditional religion forbids any person from hunting the species if he is not initiated. Because the animal has magical powers, its capture requires prior initiations to beat the spirit of the animal.

In the Mono, some local communities affirm that the manatee has a human origin. According to these communities, the manatee comes from a Peul woman who was washing near the river. Then the Goddess of Water *Mami Watta* came to take her and went with her. According to these communities, manatees are the descendants of this woman. In this respect, in some communities it is forbidden to consume the manatee meat.

In general in south Togo, the perceptions about manatees vary from one locality to another, depending on whether they are around Lake Togo or in the Mono. The information about manatee hunting is similar to that collected in Benin (Chikou *et al.* 2002). They underline that hunters must advise their voodoo or the *Fa* (divine science) to designate the person who can hunt the animal Maupoil (1998). Numerous examples have been observed throughout the region about the cultural significance of the manatee in West Africa. According to Olly (2002), in some villages of Congo, the manatee is also known as *Mami Watta*, and is considered as a spirit of the ancestors living in lagoons. Traditionally, the Peul of Sahelian Africa believe, like some communities of the Mono, that the ancestor of the manatee is a Peul woman who was washing in the river (Bessac & Villiers 1948).

6.10.5. Threats to the manatee in Togo

The main threats to the manatee in Togo are predation by man and the destruction and modification of its habitats. The absence of a clearly defined legal status protecting threatened species is also a serious threat for this endangered species.

Human predation: It is difficult to evaluate the significance of human predation as fishermen fear to declare their trophies as they risk sanction from the wildlife services. Manatee meat is widely appreciated by local populations, and manatees continue to be hunted in Togo. The harpoon is the most frequently used instrument in manatee hunting (Figure 5). In some localities (Amédéhoévé, Abobo and Dékpo), fishermen also used a special net they weave themselves. In the Mono, shotguns have been used during the dry season when wetlands dried up, stranding some animals.

The usual technique used is hunting from a hide. In Dékpo, the harpoon is linked to a 50cm long wooden stick; everything is inserted in a 30cm long wooden axis of at least 15cm diameter. The axis is tied to a 10- 20cm long string attached to a 5 litre empty can which can float in the water. The address of the hunter is indicated on the can. When the animal is harpooned, this mechanism is fixed in it and the floating can indicates to the hunter the movement of his prey. The fisherman can thereby track the animal as it loses blood. He can keep on harpooning the animal until it is completely weakened. On the other hand, the animal with the floating can may flee, but because of blood loss, it will end up at the shore of the lake. With the indications written on the can, the fisherman is advised to come and pick up his catch.

Hunting may also be collective, and in such methods it generally requires 20 to 30 persons to kill and draw the animal. The hunting season of the manatee in Lake Togo corresponds with the rainy season, a period when the animals move in herds. However in Mono, the hunting period corresponds with the dry season, when the drying-up of the water increases the possibilities of observation. The profit fishermen may derive from the capture of a manatee ranges between 100,000 and 200,000 FCFA (€150 - €300). This situation makes manatee survival more vulnerable, despite its protected status.

Modification of the habitat: All the indications show that the habitats of *T. senegalensis* in south Togo are strongly influenced by man Ern (1979), Batawila (1997), Kokou (1998) and Afidégnon (1998). The current crisis of firewood and charcoal production is a crucial problem in the south of Togo (Afidégnon 1999). The exploitation of mangrove wood seems the most significant in the recent regression of Togolese mangroves. Natural regeneration following the exploitation of *Rhizophora racemosa* does not always take place; the cleared area may be slowly and progressively colonized by *Paspalum distichum* which then tends towards a meadow, becoming less and less of an aquatic environment.

The building and running of the Nangbeto dam have led to significant modifications in coastal wetlands in Togo and Benin (Antoine & Rossi 1990). Fishermen explain that during high tides when the water level of the Mono is low, marine fish temporarily settle in the mangrove and flood depressions. In addition, during the flood period we can observe a proliferation of freshwater fish. Unfortunately, the dam has deeply disturbed the hydrodynamics in these ecosystems because of the regularization of river courses. The ecological impacts of the building of this dam on manatee habitats still remain to be determined. Fishermen affirm that in the Mono, there are deep areas serving as refuges of *T. senegalensis* which can easily

be observed particularly during periods of low water level. Since the building of this dam, with the almost permanent unidirectional flow, these areas are filled with sediments thus depriving the manatee population of its habitat. In addition, this phenomenon disturbs its migratory behaviour in the Mono. Sometimes, individuals are found in the sea near the Boucle du Roy in Benin (Dossou-Bodjrenou 2003).

6.10.6. Initiatives for conservation

Institutional framework: The priorities of Togo in terms of conservation of natural resources led to the creation of the Environment Ministry by the Government in 1987. This ministry was reorganised on 4th November 2005 and denominated as the Environment and Forest Resources Ministry with a special mission to coordinate the governmental policy in terms of environment and management of forest resources. The Wildlife and Hunting Division being part of this ministry is the focal point of the Convention on the protection of Migratory Species of Wild Animals (CMS). This division is thus responsible for management of manatees and other wildlife and is commissioned for the protection, development, control and monitoring of wildlife exploitation and their habitat. The Wildlife and Hunting Division works closely with civil society institutions such as NGOs and associations for the conservation of natural resources. Some functions are subcontracted with NGOs working in the field of environment protection. In the particular case of the manatee, the Wildlife and Hunting Division is working with the NGO AGBO-ZEGUE specialized in research, conservation, valuation and participatory management of ecosystems and endangered species in Togo.

Legal framework: The Togolese legislation, in terms of conservation of biological resources is highly insufficient and irrelevant to the current context of participatory management of the environment. There is no text really dedicated to the protection of the manatee. In Togo, the basic text about wildlife conservation is the ordinance n°4 of 16th January 1968. In this text, it is said that all endangered species are protected throughout the whole territory. However, there is no list mentioning by name the West Africa manatee. This irrelevance of legislation is also visible when reading ordinances, decrees or implementing decrees relating to wildlife protection (PNAE-Togo 2002). The main reasons for legal weaknesses and their arbitrary interpretation are:

- The absence of knowledge of wildlife; the values of wildlife are poorly perceived;
- Most of the national texts have come before international conventions, in particular the

Convention on Biodiversity Conservation (CBC) signed by Togo;
- The repressive character of the legislation.

It is evident that the inefficiency of the legal bodies, added to the weaknesses of institutions (lack of staff and resources) have contributed to the degradation of biodiversity, particularly for the manatee. The development of a new legal framework for the management of natural resources and its effective implementation would facilitate sustainable management of Togo's wildlife and habitat and consequently save what can still be saved. At an international level, Togo has signed or ratified several conventions, treaties and agreements related to environment and wildlife protection.

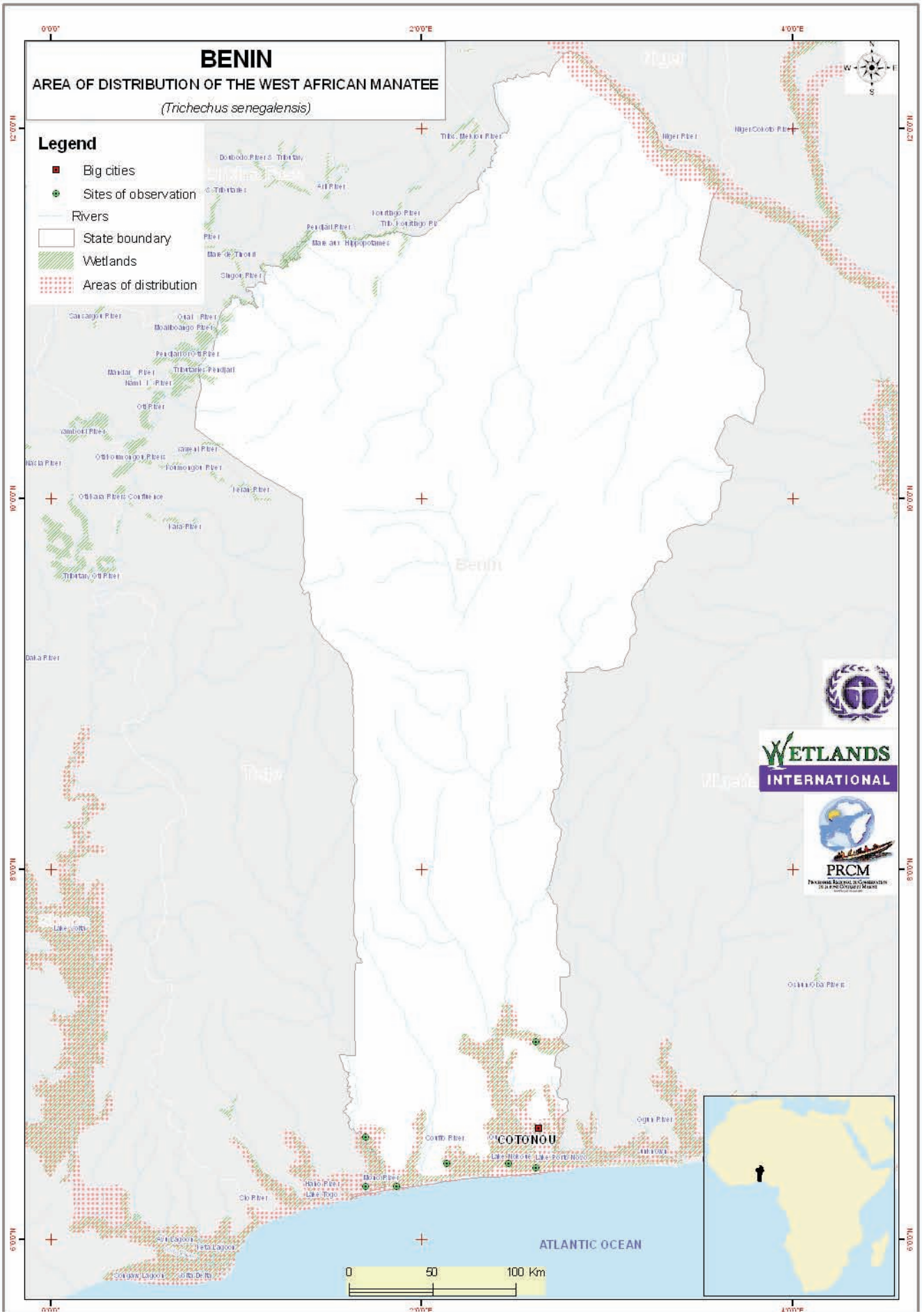
Manatee conservation initiatives: Some initiatives have been taken by AGBO-ZEGUE for manatee protection in the wetlands of south Togo. In February 2003, a sensitization programme of local communities of the Maritime Region of Togo was developed to raise awareness of local communities of wetlands in south Togo with regard to the threats facing biodiversity within their territory, notably turtles, cetaceans, the manatee, hippopotamus and migratory birds. Sensitization meetings were held in village near Lake Togo and in the Mono. Following this first study, a project was developed by AGBO-ZEGUE to define the basis of sustainable conservation of the manatee in Togo. The main objective of the project is to collect required information (scientific, socio-economic and cultural) in the area for the elaboration of a sustainable conservation strategy. This project will investigate the ecology and habitats of the manatee and the socio-economic and environmental aspects of communities living in wetlands considered as habitats of the species, and will resume sensitization activities of to increase the chances of success of the programme.

6.10.6. Comments and Recommendations

The presence of the manatee in Togo is real; however so far no specific study has been dedicated to this animal. The 2006 survey has helped to improve knowledge about the species in the coastal wetlands of Togo, though data related to the ecology of the manatee remains insufficient or unknown, notably the size, structure and density of populations, their reliance on habitats, and threats. Nevertheless, the main areas of distribution have been identified in Lake Togo and in the Mono. These habitats should be analyzed and the structure of the different herds determined. Although all the threats to the manatee in Togo have not been evaluated, this study has enabled setting a basis which will serve as a starting point for future investigations. However, it is necessary to underline that the current habitat degradation is a real danger for species survival in the Togolese coastal wetlands.

Local anthropological considerations related to manatee hunting could be interpreted as limiting the level of hunting, but the numbers of manatee bones in some villages are rather high. Local perceptions may be seen as ritual elements linked to the species and may serve as motives of valuation of the manatee in Togo. There are high ecological, economic, social and scientific values of the manatee, which must be preserved in Togo. Conservation of manatees in their recognized habitats requires an awareness of all the actors in the administration, civil society and riparian communities. The support of development partners is also essential to help Togo set the basis for the conservation of manatee populations in coastal wetlands. Key actions needed are to:

- Develop a national conservation strategy by taking into account all the scientific, legislative, institutional, social and cultural concerns linked to the conservation of the species and its habitat;
- Share skills and human resources with neighbouring countries as well as NGOs and international conventions working for the conservation of the species;
- Conduct biological and ethno-zoological studies so as to know accurately the geographical distribution of the manatee and its different habitats.


BENIN
AREA OF DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
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State boundary
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Areas of distribution
COTONOU
ATLANTIC OCEAN
0
50
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INTERNATIONAL
PRCM

6.11. BENIN

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6.11.1. General presentation

Benin is a coastal state of the Gulf of Guinean covering 670km from the River Niger in the north to the Atlantic Ocean in the south. The coastal area of Benin includes 3460km^2 of wetlands with huge ecological and economic potential at both national and international levels. The coastal wetlands are comprise two main areas (with Ramsar sites in each area):

- the shallow sea, coastal lagoons, Lake Ahémé and the lower Mono valley, covering an area of 47,500ha in the southwest;
- the shallow sea, Lake Nokoué, the lower Ouémé valley, Porto Novo Lagoon and the former lagoons covering an area of 91,600ha in the southeast.

The marine environment supports 449 species of fish of 129 families. The aquatic fauna of Benin has a high diversity and includes hippopotamus (*Hippopotamus amphibius*) and West African manatee (*Trichechus senegalensis*) in inner waters, as well as larger reptiles such as the Nile crocodile (*Crocodylus niloticus*) and dwarf crocodile (*Osteolamis tetraspis*) a threatened species. Aquatic ecosystems such as floodplains, the Ouémé valley, the Mono basin and lakes and lagoons play a pivotal role in the reproduction of these species. However, wetlands are vulnerable to pollution, the modification of water flows, the degradation of habitats and the overexploitation of natural resources.

6.11.2. Distribution, migration and abundance of manatee

The first studies on the West African manatee (*Trichechus senegalensis*) in Benin were undertaken in the south. The species is well known here by local populations, particularly in the southeast and southwest wetland complexes, where it is known by various names, including *gninbin-gningbin* or *tolo* in Ouémé, *toyou* in Toffin and *tognin* in Mina and Pédah.

The manatee is sporadically distributed across the whole country. It occurs in coastal areas, including estuaries and coastal lagoons, in the great rivers in both brackish and fresh water, and in freshwater lakes, with reported sightings from both northern and southern wetlands (Guedegbe 1996; Affomasse 1999; ABE 1999; Dassi 2003). Along the river Ouémé, the manatee is recognized as being an advertiser of floods. In the Niger valley, manatees may be encountered in areas of medium depth at the confluences of the Mékrou-Niger and the Alibori-Niger, and in the branches of Bello Tounga and Kompa Gourou.

Manatees appear to migrate in July and August from the upstream sections of rivers towards the regions of Dasso in the Ouinhi (Department of Zou) and further downstream in the Ouémé. Some Aguegue and Bonou fishermen have reported observing the movement of manatee groups in the Ouémé Valley towards Porto-Novo Lagoon and Nokoué during this period, when the water salinity level is also low. In periods of rising water levels, migratory movements are reported in the Mono River towards Togo, further downstream. In the vicinity of the villages of Hêvê and Agbanakin in the Mono and Wébossou in the Ouémé there are areas of refuge and concentration of manatees. In periods of falling water levels, manatees return to the deep areas of the river, from where they make short sorties in the twilight to look for food.

It is difficult to determine the manatee population size and trends in Benin, as information is based largely on sometimes contradictory testimonials. Nonetheless, given the extent of poaching, we may assert that manatees are endangered in all areas where they occur in Benin. The population may have declined to about 50 individuals in the lower Ouémé valley, between Dasso and Porto-Novo (Affomasse 1999). Some specimens still exist in the Mono and between Agbannakin and Hêvê (Dassi 2003). The total manatee population in Benin waters was estimated at 125 individuals in the 1990s (ABE 1999). Research projects are underway to gain a better knowledge of the species and promote its protection in the future, led mainly by the governmental structure CENAGREF and NGOs (e.g. Nature Tropicale, CEROE, CERGET).

6.11.3. Economic and cultural values

The manatee has a mythical, therapeutic and cultural interest for various ethnic groups in Benin. The meat, genitals and oil are subject to an illegal trade between neighbouring countries, domestic markets and fishermen. All parts of the body are used for traditional ethno-medicinal purposes (Table 5).

Table 5. Summary of ethno-medicinal usage of the manatee (Chikou *et al.* 2002)

Organ or part of the body	Use
Penis	Strengthens the virility of people suffering from low libido
Ribs	Rheumatism - sprain especially in the middle of ribs
Mucus covering the body of the manatee	Therapy for burns Facilitates baby delivery
Skin of the back	Manufacturing a whip
Skull	Used to make a herbal tea for pregnant women in case of retardation in pregnancy
Fat	Fight against fever and tetanus
Liver	Treatment of liver diseases
Bile	A real poison

In cultural terms it has been recognized that capture and hunting of the manatee are amongst the most important events in the life of a fisherman. A kill is generally followed by ritual ceremonies. Slaughter of a manatee traditionally requires sacrifices and mystical rituals to preserve people from natural disasters. These cultural regulation mechanisms are absent in the case of non-initiated hunters.

6.11.4. Institutional, legislative framework and availability of information

In Benin the manatee is governed by law n° 87-014 of 21st September 1987, relating to the regulation of wildlife protection and hunting. The decree N° 90-366 of 4th December 1990 relating to the enforcement terms of this law classifies the manatee as a fully protected species. However, throughout its distribution area, the enforcement of such legislation has not always been efficient and the species is still illegally hunted and used.

Institutionally, there is no authority specifically in charge of manatee conservation. Several organisations working in the coastal area are interested in this, but their actions remain insufficient with regard to the requirements. The Agriculture, Cattle-Breeding and Fishing Ministry plays a major role in the management and valuation

of wetlands natural resources through the Fishing Division, the Direction Générale des Forêts et Ressources Naturelles and the National Centre for the Management of Reserves and Wildlife. In addition, non-governmental organizations operate in the area, such as the Centre de Recherche pour la Gestion de la Biodiversité et du Terroir (CERGET), the Centre d'Études de Recherche Ornithologique et de l'Environnement (CEROE) and Nature Tropicale.

6.11.5. Initiatives for the conservation of the species

In Benin, it was thought that the manatee had disappeared, but it now appears that this is not the case. New research and conservation projects in favour of the species are underway to determine its distribution and population and collect data about its ecology and behaviour. In 1999, the Programme d'Aménagement des Zones Humides (PAZH) carried out an inventory and study for a protection strategy for manatee populations in the south of Benin. In 2002, the Agence Béninoise pour l'Environnement (ABE) took over exploration of the remaining manatees in the lower valley of the Ouémé. The NGO Nature Tropicale is considering monitoring manatee movements by radio telemetry. The documentary film entitled 'Le lamantin au Bénin: Cri d'alarme' is a production of Nature Tropicale in partnership with AV2 Foundation (Amsterdam), with financial support of the Centre Béninois de Développement Durable (CBDD) and the Netherlands IUCN Committee. Community management programmes have also been developed with the New York Aquarium with the following objectives:

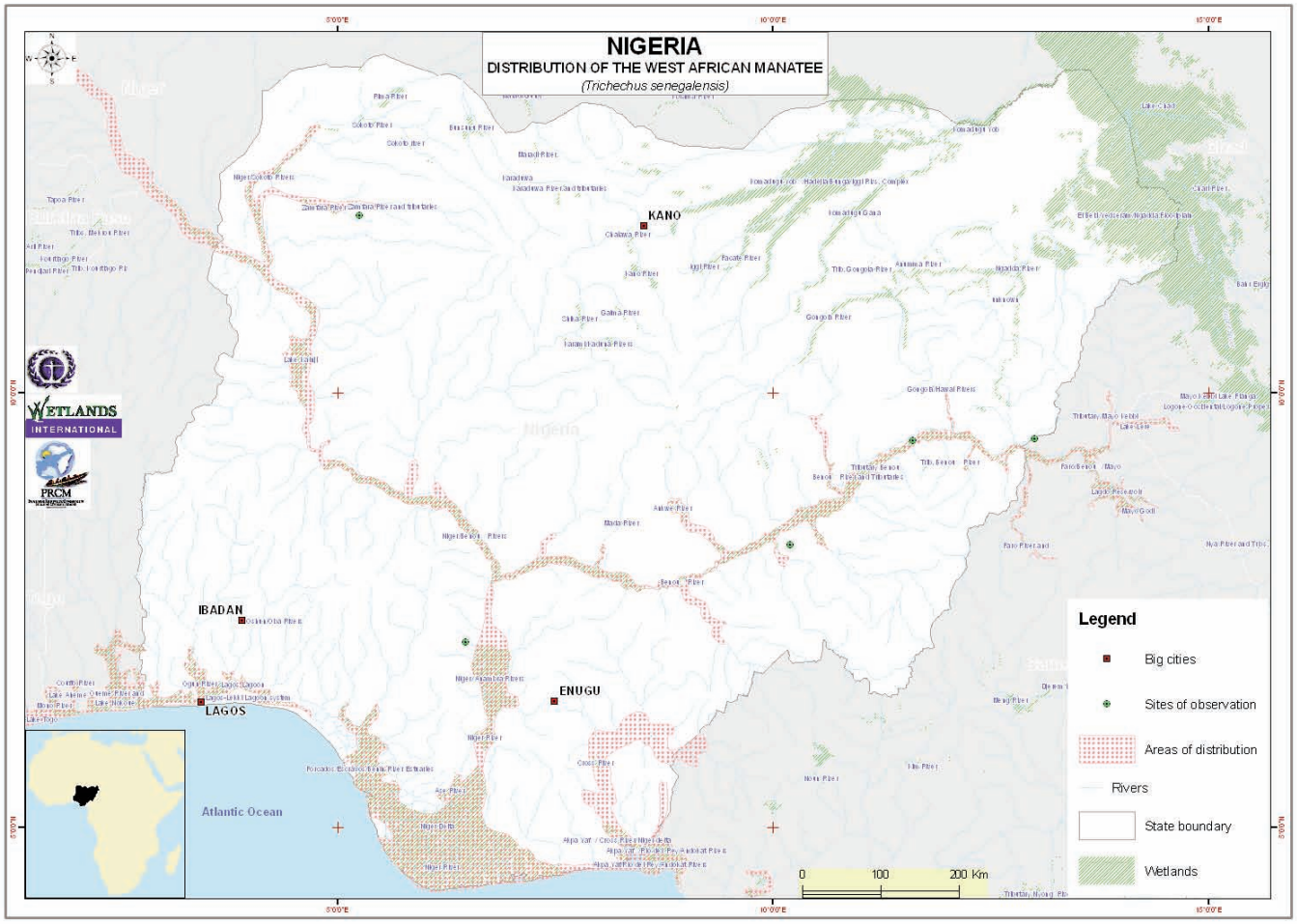
- Counting manatees and deepening knowledge about migratory circuits in the Ouémé valley;
- Development of ecotourism focusing on the manatee in the sites of Danko and Zonnou in the Ouémé valley;
- Support to eco-alternative activities to manatee hunting in Goho and Dogbéhé in the Ouémé valley;
- Characterization of habitats and studies of manatee feeding ecology;
- Dissemination of the ecological role and potential economic value of the manatee in the Ouémé valley.

6.11.6. Observations and recommendations

The manatee remains a highly endangered animal even though there is significant interest in it by local populations. Poaching, habitat degradation, inland waterway transport, pollution and the ingestion of shrimps via the respiratory tract are believed to be the main threats.

As part of inter-state cooperation, joint Information, Education and Communication (IEC) missions must be organized and focus mainly on wetlands riparian communities and fishermen in different areas of Benin. This sensitization should focus on the development of cultural aspects which may be useful to the protection and conservation of manatees and the environment. It should be done through visits to village chiefs, communities of fishermen and political as well as administrative authorities of wetlands, supported by activities such as showing films, making posters, using rural radio stations, and traditional dance contests. In the short term, it would be advisable to undertake the following actions:

- Carry out a literature review of all the work conducted on manatees in Benin;
- Identify the different habitats for manatees in Benin;
- Avoid transforming aquatic ecosystems into dumps;
- Stop the deforestation of shores;
- Identify and monitor important sites for the manatee;
- Analyse the droppings of manatees to determine accurately diet and food preferences;
- Establish a work and advisory network with stakeholders (local communities, NGOs, inter-state institutions, academic and research institutions) for exchanges about data research methods and management tools;
- Sensitize local populations about the properties of manatees based on the cultural items relevant to each riparian community;
- Pursue education and information activities of fishermen to ensure compliance with existing regulations;
- Develop an ecological monitoring programme of ecosystems based on the geographic information system for the management of data banks.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Sites of observation
Areas of distribution
Rivers
State boundary
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0
100
200 Km

6.12. NIGERIA

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6.12.1. General presentation of the area

Nigeria is a large country of the Gulf of Guinea bounded in the west by Benin, in the north by Niger, in the north-east by Chad, and in the east by Cameroon. In the south, the 800km long coast forms two large bays: the Benin Bay in the west, and the Bonny Bay in the east. The Nigerian coastal zone comprises brackish and fresh water wetlands, the level and salinity influenced by tides and topography. Main wetland habitats along the coast include lagoons, major estuaries, mangroves, creeks, bays and beaches. The Niger Delta is the largest delta in Africa and comprises numerous channels and waterways, many of them flanked by mangroves. The Nigerian coastal area is divided into four main geomorphic zones (CEDA 1997):

- The Barrier lagoon coast between Badagry and Ajumo east of Lekki town;
- The Mahin mud coast between Ajumo and the Benin river-estuary in the north-western flank of the Niger Delta;
- The Niger Delta between Benin river in west and Imo river in the east; and
- The strand coastline between Imo river and the Nigerian/Cameroun border in the east, including the Cross River.

Although tide amplitudes are relatively low, they still have a significant impact on the general littoral morphology. However, marshy coasts are less exposed to tidal effects (wrenching and sedimentary deposits). Marine resources include demersal and pelagic fish, molluscs, and shellfish. There are active fisheries, and artisanal fishing represents some 50-70% of national fisheries production. The coastal waters have a potential yield of 201,000 metric-tons per year. About 157 fish species belonging to 71 families have been recorded for the coastal and marine waters of Nigeria.

Nigeria has a population of about 150 million people with an estimated annual growth rate of 2.54%. The coastal states are estimated to account for 25% of the national population. Oil and gas produced in the delta and other coastal areas form the main backbone of the Nigerian economy and provide 95% of foreign exchange earnings and about 65% of budgetary revenues.

The main river in Nigeria is the Niger, which enters in the northwest from Niger and Benin. A major lake has been formed behind the Kainji Dam built on the Niger, which, after Kainji, receives two main tributaries, the Kaduna and the Benue, which enters Nigeria from Cameroon. In the northeast of Nigeria waters drain inland to Lake Chad, including the Kano River.

6.12.2. Manatee distribution and status in Nigeria

Manatees have been known to occur in Nigeria for a long time, but their distribution and abundance has not been fully assessed. Sykes (1974) mentioned their occurrence in the Niger, Benue and Cross rivers, including their larger tributaries. Powell (1986) reported that manatees may be found along most of the coastal areas, and in the Niger Delta, where it is widespread (Obot 2002). Happold (1987) mentions specific sites of occurrence as Bussa, Ekuri, Lake Kainji, Makurdi, Mutum Biya Game Reserve, Numan, Lake Oguta, Pategi, Shangunu and Yola. They are present in Lake Kainji, which provides extensive new habitat for them after creation of the lake by the Kainji Dam,

although hunting pressure may have reduced numbers (Nishiwaki *et al.* 1982). Manatees occur along the length of the Benue River and most of its tributaries, including the Pie River as far as Yankari, the Katsena Ala River and the Deb River, which drains Lake Pandam, an important dry season refuge (Powell 1986; Obot 2002).

The Nigerian Conservation Foundation (NCF) conducted extensive questionnaires within parts of the Niger and Benue basins under a project of the Niger Basin Initiative (Obot 2002). The study showed that the manatee was still living in the Benue (or Bénoué) and its tributaries, with populations varying according to human activity levels, such as fishing and agriculture with large scale irrigation. In all surveyed sites, more than 97% of interviewees said that they had regularly seen manatees during the rising river level period (August-September) along the River Niger and in tributary sectors of the Bénoué, such as Gongola, Taraba and Donga.

6.12.3. Values and threats to the species

In some local languages, the manatee is called a 'water spirit', and viewed as a source of absolute beauty and richness, and many folklore stories and songs are associated with it. Sir Victor Uwaifo, a notable Nigerian musician, produced a song in tribute to the manatee / Mami Wata, which became a popular hit and sold over a million copies (Ita 2005). There is even the 'Manatee Night Club' in Port Harcourt (T. Dodman, *in litt.*). According to fishermen of the Niger Delta, the manatee is worshiped. But the species survival is threatened by habitat destruction, accidental capture in fishing nets, illegal hunting, seasonal hunting (visitors hunting in dry seasons), wounds due to fishing boats, the reduction of the water volume in the Niger and by isolation caused by dam construction.

Traditionally all parts of the manatee are considered useful. It is a source of meat (and protein), whilst many of its attributes (bone, blood, leather, oil,) are used to make medicines against rheumatism, impotence, stomach ache and other ailments. The manatee is coveted in traditional festivals by some littoral communities for its highly regarded meat, its healing properties, and its oil. The government permits a yearly killing quota of one or two manatees on application for cultural purpose during annual wrestling festivals (Obot 2002). Fishermen and manatee hunters on the Benue generally believe that the population is still healthy, and cannot be endangered by hunting which requires specific skills (Obot 2002). However, threats noted on the Benue included damming, preventing manatees reaching preferred breeding areas and the widespread high demand for its meat and other products (Obot 2002). All interviewees during the survey led by Obot (2002) knew that manatees were protected by legislation, but noted that the laws were not usually enforced, although in some areas it can be difficult to hide a kill without the cooperation of many people; in most cases the authorities will hear about it. Overall, there are considerable incentives to hunt manatees because of the high demand for its by-products.

In some areas of the Niger Delta, fishermen reported seeing manatees every day, such as in the Forcados and Gbekebor creeks near Warri, where one manatee hunter used a spear with a floater, an extra large Teflon net with floater and dynamite to hunt them (Obot 2002). Manatees have been captured in the delta for many years; for instance 40 were caught between 1932 and 1935 in Oballi Creek and at Afa, both in the delta (Woods 1937). A fisherman of Sapele district informed that some manatees of different ages and sizes were found dead and floating after the Jesse petroleum pipeline fire incident (Obot 2002).

6.12.4. Institutional framework and conservation initiatives

There is no specific legislative text regulating protection of the manatee in Nigeria, but the manatee is completely protected by Nigerian law. The manatee appears on Schedule I of Nigeria's decree no. 11 – CITES. Manatee conservation is also catered for in general biodiversity conservation laws and other international conventions signed by Nigeria. The Federal Ministry of Environment has a broad mandate for management of the environment, including biodiversity conservation. The State and local authorities are working together to impose

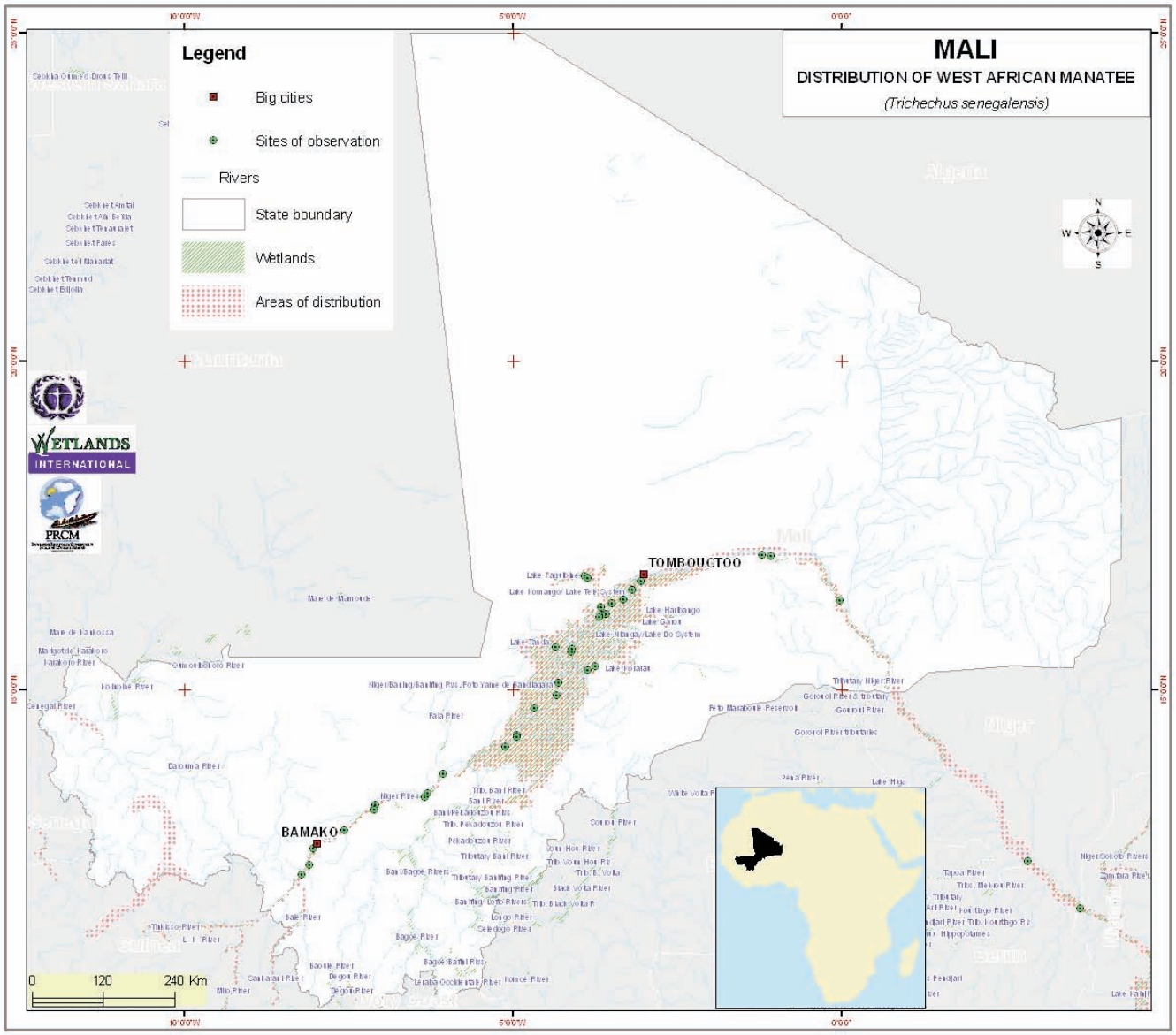
relevant regulations dealing with species in their legal sectors. NCF is collaborating with the Federal Ministry of Environment to work for species conservation and the existing biodiversity regulations.

6.12.5. Recommendations

If manatee populations were well managed, they could serve as a potential source of revenue for its meat and all other parts that are widely appreciated, mainly for traditional medicine purposes. However, this would require population monitoring, control and enforcement, all expensive and time-consuming activities. Unless such measures can be put in place, the manatee should be considered as a protected species in Nigeria. Recommendations provided by Sodeinde (1993) are to:

- verify the current distribution of manatees in Nigeria;
- investigate habitat use, population structure and dynamics and reproductive biology, and create sanctuaries with generous buffer zones at sites identified to support viable populations;
- consider a captive rearing and reintroduction programme;
- carry out outreach programmes on the value and status of manatees; and
- ensure continued monitoring of manatees.

Whilst the first recommendation has been partly fulfilled by recent surveys (e.g. Obot 2002), there are still parts of the Niger River in particular where surveys are required, whilst the other recommendations remain relevant. The most important actions recommended are for education and public awareness about manatees and other wetland resources. Sensitization campaigns should be conducted and meetings convened to conciliate sometimes contradictory interests between the cultural uses and legal protection of the species, by building strong community relations.


MALI
DISTRIBUTION OF WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
TOMBOUCTOO
BAMAKO
WETLANDS INTERNATIONAL
PRCM
0 120 240 Km

6.13. MALI

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6.13.1. General presentation of the area

Mali is a large landlocked country covering an area of 1,241,238km², stretching from the northern sides of the Fouta Djalon to the flat lands of the Central Sahara. It falls within the boreal tropical zone, extending for more than 1600km from north to south. The country is divided into four major climatic zones with a wide range of agro-ecological environments, from the Saharan climate in the north to the Guinean moist climate in the south. These natural habitats endow the country with a varied and interesting fauna. However, many species have declined, due largely to habitat loss and related impacts of the long drought of the 1970's and 1980's, agricultural pressure (intense and uncontrolled clearing) but also and above all, poaching, favoured by the long closure of hunting (1977-1995).

A key feature of Mali is the River Niger, which enters the country from Guinea and snakes through the southern and mid parts of the country flowing east into Niger. The river forms the extensive Inner Niger Delta, a vast wetland complex that supports high levels of natural, agricultural, livestock and fisheries productivity. The Senegal River also runs through the western corner of Mali, entering from Guinea and flowing into Senegal.

6.13.2. Manatee distribution and status in Mali

Manatees occur widely in wetlands of the Niger River and tributaries as well as in the Senegal River. Their main areas of occurrence are:

River Niger:
- Kangaba at the Guinea border,
- around Bamako up to Tienfala,
- the Niamina-Tamani section,
- in the vicinity of the Markala Dam,
- Macina (arms of Ke-Bozo and Merou),
- the Inner Niger Delta, including Lake Debo (Gouraou, Youwarou, Akkagoun and Akka), branches of the Korientzé, the whole area of Niafunke, at Dire, Gourma-rharous, Tossaye, Bourem, Tondibi, and
- Gao (Hamakouladji, Haoussa Foulane, Fafa, Ouataggouna, Labezanga);

River Bani:
- from Djenné to Mopti (especially at Pagou),
- at Mopti (especially near the boat wharf and opposite the Governor's Office);

River Senegal:
- observations near the power station of Kayes.

It appears that in Mali manatees prefer the deep sections of rivers, particularly in the regions of Koulikoro (Kayo and Souban), Ségou and Gao (Gao and Ansongo). These deep sections contain swampy areas and depressions that protect them against various stresses. In the region of Mopti where lakes and floodplains dominate, these habitats are used as refuges. In the deeper places rich in *Echinochloa stagnina*, shells and clay, the manatees find the food resources they need.

Powell (1996) stated that manatees are found throughout the hydrological network of the River Niger in Mali, but they are threatened by hunting, which occurs mostly during the rainy season.

According to fishermen, manatees were abundant in the Niger waters over 50 years ago, but have decreased over the years, as a result of direct threats, such as hunting and fishing and indirect threats such as low levels of floods, drought, sand deposition and habitat loss (Kone & Diallo 2002). Between 2000 and 2002, an upward trend was noted in the regions of Koulikoro, Segou and Mopti, while in the regions of Timbuktu and Gao manatees are in decline. According to fishermen of the Niger River interviewed by Kone & Diallo (2002), the reasons for increases in certain areas reflect the traditional beliefs that protect manatees and the good feeding conditions, but overall the species is in decline due mainly to hunting and accidental capture in fishing nets.

Kone and Diallo (2002) provide detailed information of manatee status in the Niger River. They found that manatees were in decline in most areas, but identified the villages of Kayo, Soubou, Koulikoro, Dinan, Marka, Kenenkou, Koumani, Ségala and Nyamina in the commune of Koulikoro as areas where natural manatee sanctuaries were found. This appeared to be due in part to the presence of natural refuges, such as depressions caused by rocks in the river. In the Inner Niger Delta, manatees spend the dry season in areas of deep water in the main river and in the deeper lakes, such as Lake Débo (Kienta 1982).

6.13.3. Manatee values, beliefs and threats in Mali

There are many mysteries surrounding the manatee in Mali. In the recent past, catching a manatee provided great pride to young Somono and Bozo people, not only because of the myths around its capture, but also the quality of its meat and its value in traditional medicine. To kill a manatee, one must have the required age and be initiated. It is believed that once the animal is killed, the head should not be cut first, otherwise the one who cut it dies immediately. Further, when cooking the manatee meat, the utensil used should be hermetically closed, for the heat emanating from it transmits an incurable disease to man. There are many traditional uses for different parts of the manatee, including use of bones to treat otitis and anaemia, the skin to treat dermatosis, the lungs to treat asthma and the sex organs to treat sterility and impotence (Kienta *et al.* 2006)..

According to fishermen in the communities of Kayo and Koulikoro, manatees are not easily observed today because, although it protects the manatee, the community no longer respects the traditional practices of the water spirits (Kone & Diallo 2002). Supposedly, in times when people were still making sacrifices to the spirits, traditional chiefs just had to bring kola nuts and other offerings, and immediately after the ritual, two or three manatees could be seen coming to the water's surface. The manatee is feared by fishermen because it is protected by the water spirits. Its presence at a given place indicates the presence of spirits.

Manatee hunting is practised by all ethnic groups along the river, employing various hunting methods, such as large-meshed nets, spears, hooks, platforms, baited traps, firearms, lines with hooks and through traditional hunting practices continue today, but they are apparently losing ground, as manatee meat shows up rarely in local markets. It is not clear whether this is due to the strengthened legal protection, a decrease in the demand in meat, or a reduction in the manatee numbers.

Lack of food and low levels of floods are believed to be the main threats in the region of Koulikoro, whilst in Segou, Mopti, Timbuktu and Gao, the causes most frequently cited are incidental catches in fishing nets, hunting, the search for medicines and lack of food (Kone & Diallo 2002). Minor threats reported are illness (appearance of small red pimples on the skin referred to as a type of mange by fishermen) and migration. Hydro-agricultural works, especially dams, pose threats to manatees in Mali, and prevent their movements between different parts of the river. Major dams in Mali include the Manantali on the River Senegal and the Sélingué and Markala on the Niger, whilst there are proposals for dams on the Bani River. There are also numerous small dams and other hydro-agricultural developments within the river basin.

6.13.4. History of manatee research

Some preliminary research on manatees has been carried out in the Inner Niger Delta, including in 1985/86 around Youwarou under an IUCN

project, and in 1996/1997, with surveys conducted Kienta and Niagaté (1997) along the Niger and Bani rivers. Manatees were captured for the Bamako Zoo, where they were monitored to some degree. Studies on manatees and capture attempts were made in Lake Debo by an Italian team of Terra Nuova in 2001.

Kone & Diallo (2002) conducted a preliminary survey of manatees in the Niger River, covering the administrative regions of Mali along the River Niger: Koulikoro, Segou, Mopti, Timbuktu and Gao. The aim of this project, supported by Wetlands International under the umbrella of the Niger Basin Initiative, was to establish the manatee's status in the Malian section of the Niger River, notably its habitat, numbers, threats, uses and conservation measures.

The main technique employed was the use of interviews: in total, 479 people were interviewed in 50 communes and 162 villages along the Niger River in May and June 2002, and a significant body of information was amassed. The statistics obtained for the Koulikoro region were not a continuous series, although this was found to be a region with high manatee density.

In 2005, manatees were captured at Mopti, and a young female was reared in semi-freedom at Lagon, Bamako.

6.13.5. Institutional and legislative framework and availability of information

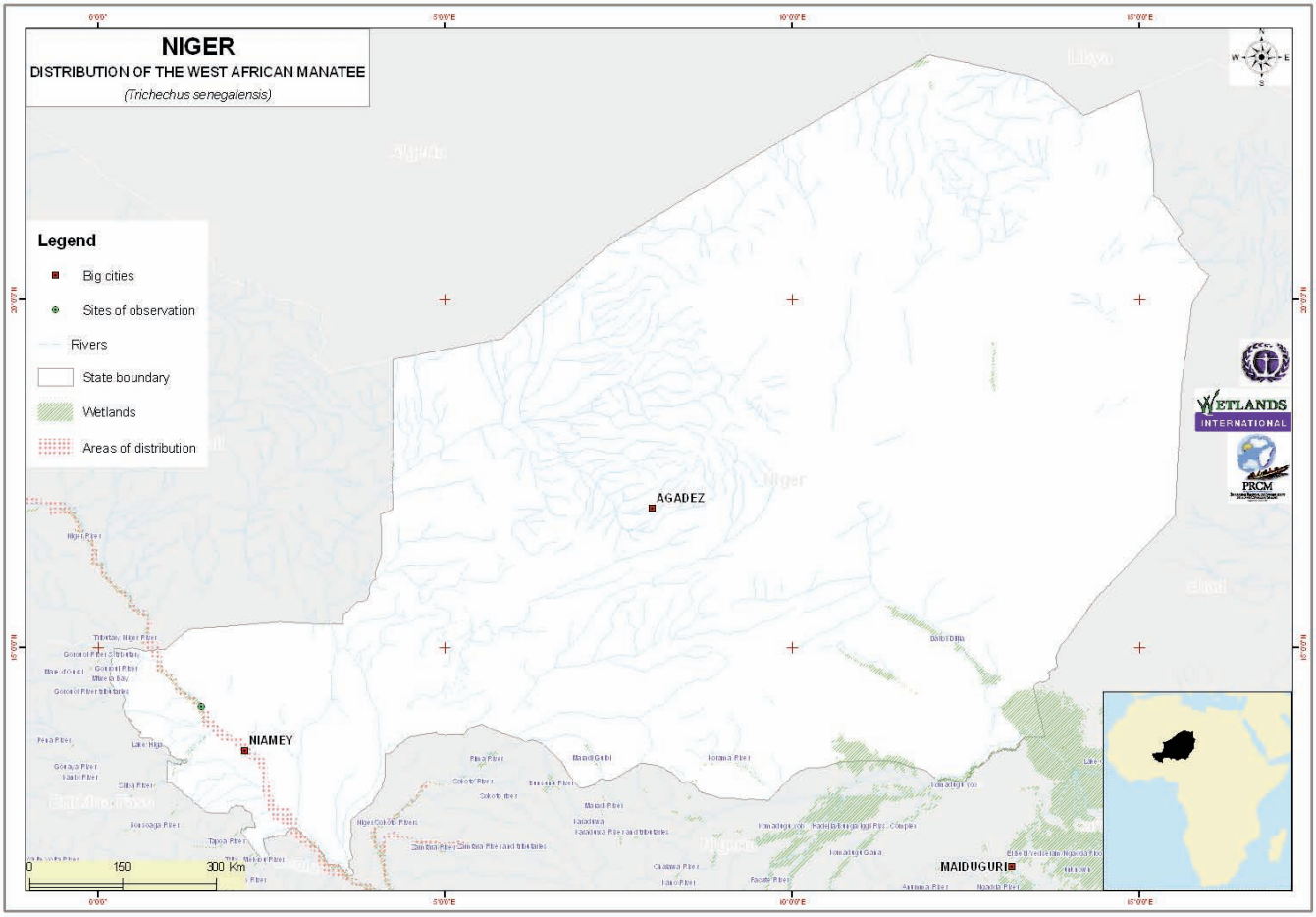
In Mali, Law n° 95-031 of 17th February 1995 on the conditions for the management of wildlife and its habitat, classes the manatee in Annex I as a fully protected species (Article 23). The manatee is thus protected by law against harvesting, except for scientific purposes. Authorisation for its exploitation is given by the Minister of Environment upon technical advice of the Director of Nature Conservation, and under exceptional circumstances, either to protect the species' existence or for a scientific purpose. In addition to its forestry laws, Mali has signed and ratified conventions for the conservation of fauna in general, and the manatee in particular, including:

- African Convention on the Protection of Nature and Natural Resources (Algiers, 1992)
- Convention on the Conservation of Migratory Species of Wild Animals, or Bonn Convention (1987)
- Convention on Wetlands, or Ramsar Convention (1987)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora, or Washington Convention (1993)
- Convention on Biological Diversity.

6.13.6. Prospects and recommendations

Manatees still populate certain areas of the River Niger and tributaries and the River Senegal in Mali, and deserve much conservation attention. Priority conservation actions are:

- Determine an accurate picture of the distribution and status of manatees in Mali, and identify isolated populations.
- Identify sites with strong potential to serve as manatee refuges, in cooperation with local communities directly linked to manatee exploitation.
- Restore habitats that still host manatees.
- Carry out a biological research programme in the Inner Niger Delta, including the radio-tracking of manatees to determine their seasonal and other movements and behaviours.
- Promote improved and equitable management of water resources of the Niger River, especially the control of flow from the Selingué and Markala dams taking ecological aspects into close account.
- Promote improved water resources management in the Senegal River.
- Establish an education, information and awareness programme on the manatee, especially its threats, and protection and conservation measures. If possible identify sites where the manatee can be observed for educational purposes.
- Establish and strengthen a network of technical agents for manatee monitoring, research and conservation management.
- Implement legislation relating to the manatee and other aquatic species, in collaboration with local


NIGER
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
AGADEZ
NIAMEY
MAIDUGURI
0
150
300 Km
WETLANDS
INTERNATIONAL
PRCM

6.14. NIGER

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6.14.1. General presentation of the area

Niger is a land-locked country with a land area of 1,267,000Km^2. The country has one main river: the Niger located in the far west, with a stretch of 550km in the country. It has several tributaries such as the Gorouol, the Dargo, the Sirba, the Goroubi, the Diamongou, the Tapoa and the Mékrou. The River Niger has an abundant biodiversity and shelters almost all the fish species of Niger. The hippopotamus, Nile crocodiles and manatees are found in the river, which is also the last place of refuge for a population of white-cheeked otters. The middle Niger is considered as site of international interest because of the migratory waterbirds it receives every year. There is diverse aquatic vegetation, with species such as *Oryza longistamina, Ipomoea aïtoni, Polygonium senegalensis, Nymphea lotus, Ipomoea asarifolia, Echinochloa stagnina, Cyperus bulbosus, Eichhornia crassipes* and *Echinochloa colona*.

Most of the ecosystems are fragile and vulnerable. They are threatened by drought, desertification, and human pressure. Presently, more than 60% of the national territory has reached the critical level of destroyed habitats, and more than 20 species have disappeared or are endangered, including the manatee, which faces unprecedented competition and is condemned to disappearance if urgent measures are not taken.

6.14.2. Manatee habitats and distribution in Niger

Gratiolet (1901) indicated the presence of manatees outside Sinder, downstream of Tillabery. Poche (1973) considered that manatees had totally disappeared in the Niger West region in the 1970's. However, more recent research indicates that manatees occur along the length of the Niger River in Niger (Ciofolo & Sadou 1996; Louis 2003). Manatees live in the Niger section of the transboundary W Park, although they are limited to the Niger River channel. Using information from extensive interviews, Ciofolo & Saidou (1996) reported that manatees occurred along the entire length of the River Niger in Niger from Yassane, at the Mali border to Dolé at the Nigerian border. Recent surveys carried out in 2006 have identified about ten sites where manatees permanently live, which have the potential to be designated as manatee sanctuaries (Table 6).

Table 6: Key sites for manatees in Niger

Sections	Main sites	Characteristics / Notes
Ayorou region	Yassane Malla (Kandaji potential dam site) Karamabou Tounga Farie	There is aquatic vegetation during all the year notably bourgou. Movements have been observed in the direction of Yassane. Poaching occurs on a large scale, as evidenced by the number of manatee skulls found by research missions.
Park W (75km) section	Gnougou Makoni Haoussa Tafa Tondi Darou Bossia	The manatee was formerly considered absent from the W region, but the accidental capture of a female adult in 2002 alerted researchers to the manatee's presence.
Boumba-Gaya section	Kainé kouara Gardédjé Mombey Tounga, Gatawani	In this area, manatee refuges can be seen during the period of low water level. A manatee was captured on 14th January 2004, and died of muscular dystrophy on 28th January 2004.

Manatees are often seen in small groups in certain parts of the river, and mate during high waters, around October, when group sizes increase; courting animals are much easier for hunters to kill, as they mate and group together at the surface (Ciofolo & Sadou 1996). Seasonal movements occur, and during the dry season manatees seek out areas of deeper water (Ciofolo & Sadou 1996).

6.14.3. Manatee values and threats in Niger

Manatees have a particular spiritual and cultural interest in Niger that contributes to the local protection of the species, through taboos. In some regions of the Niger River valley, the manatee is subject to worship linked to a Dogon myth. One of the main characters of this myth is the Faran river master Maka Boté who has the power to master aquatic animals particularly the manatee. Thus, traditional knowledge about animals is reserved to a caste of initiated fishermen, the Sorkos. However, this protection is often broken due to conditions of poverty under which fisherman may find themselves.

In Niger, manatees are known as not having natural predators. Thus the main threats are hunting (although prohibited by laws), and habitat destruction, notably sand deposition causing the blocking of river beds. This is due to huge aeolian sand deposits, exacerbated by the general desertification process of the region, and hydro-agricultural developments along the banks of the river.

Results from surveys carried out in 58 Sorko villages along the Niger between the Malian and Nigerian borders indicate that manatees are hunted for:

- Prestige linked to tradition: A man who kills a manatee receives privileges and will be highly respected and esteemed by the entire village. The most beautiful girl will be given to him, and he will be considered as being among the great descendants of Sorkos. He is among the favourite ones expected at the head of Sorkos. Someone who kills a hippopotamus joins the descendants of the Sorkos Head guards.

- The annual Sorko celebration, when manatee and hippopotamus hunting trips are organized, with only a harpoon used as weapon. For Sorkos, the annual celebration is an occasion for them to be in contact with their ancestor Fara Maka Boté, who helps them choose their future leader through manatee hunting. It is also an opportunity for tourism that could potentially attract many people if well organized, although it would not fit well with the current vogue for ecotourism.
- Traditional medicine: A manatee's organs are recognized for their healing properties.

The manatee is certainly highly valued in Niger for its meat and organs. A male can be swapped for a 10 metre long boat with an engine costing about 200,000 CFA francs, whilst its hide can fetch 5000 CFA francs, bones 4500CFA francs, and the genitals between 40,000 and 50,000 CFA francs (Louis 2003); (1000 CFA francs is approximately €650).

Manatees are recognised in some areas as pests. In agricultural areas irrigated rice fields cover the highest parts of the river banks to avoid manatee access to pasture areas during seasonal water level rises. Another threat is intensive bourgou harvesting, as bourgou (floating grasses) is an important part of the manatee's diet in Niger. Trade of its body parts and meat is a threat, especially if demand increases. Manatees may also be trapped accidental in fishing nets.

6.14.4. Institutional and legislative framework and availability of information

Hunting has been regulated in Niger since 1962 (Law 62-28 of 04-08-1962) with a list of protected species including the manatee in Annex 1 (absolute protection). This has been superseded by a new legislation defining the regulation of hunting and wildlife protection in Niger, law n° 98-07 of 19th April 1998, which maintains the manatee in Annex I, thus affording it full protection. The hunting of manatees is a punishable offence carrying heavy penalties ranging from two to six months imprisonment and a fine ranging between 40,000 and 4,000,000 CFA francs (or by one these two penalties only). There is a lack of resources, however, for enforcing this legislation. The manatee has full protection in the 75km section of the river in the W National Park, which is also a Ramsar site (since 1987), a central area of a transboundary biosphere reserve (1996) and a World Natural Heritage site (1996).

Some exceptional authorizations of capture are permitted, in relation to cultural and symbolic local uses. Nevertheless, captures have not stopped, due, undoubtedly, to demographic pressure and rural economic hardship, and the manatee is considered a threatened species throughout its distribution area in Niger. The national chart and the constitution of the Republic of Niger aim to protect the environment and its wildlife resources. Since 1992, the declaration of the Niger Development Strategy has focused on the management of natural resources. Among the seven strategies, two concern manatees: riparian rehabilitation and biodiversity conservation. The Wildlife, Fishing and Pisciculture Division (DFPP), within the Department of Hydraulics, Environment and Combating Desertification, is the institution in charge of species management.

6.14.5. Manatee conservation initiatives

Manatee research has been promoted by the Protected Ecosystem Project of Sahelian Africa (ECOPAS) in the transboundary W Park, through the manatee section of the Niger national component. Survey missions have been largely carried out by the Wildlife, Fishing, and Pisciculture Department (DFFP) and ECOPAS agents. Current initiatives for manatee conservation in Niger include routine missions of the DFPP and monitoring performed by its decentralized services, the regional Park program W (ECOPAS) through its manatee component. A manatee network has been set up in more than 58 riparian villages that participated in interviews during a survey in 2003 (Louis 2003). Specific manatee surveys have been carried out in Niger in 1995 (Ciofolo & Sadou 1996), 2002 (Issa 2002) and 2003 (Louis 2003).

6.14.6. Recommendations for the species conservation

The following recommendations are made for manatee conservation in Niger:

- Conduct a thorough inventory of manatees in Niger, including in the tributaries of the Niger, for which information is lacking.
- Conduct in-depth research on manatee ecology in the Niger River in order to better understand the conservation requirements in relation especially to food, seasonality and dry season refuges.
- Restoration of manatee habitats.
- Conduct awareness programmes on threatened and vulnerable species and ecosystems, involving local populations.
- Enforce legislation that aims to protect the manatee and other threatened species.
- Enhance the application of CITES in Niger and eradicate manatee trade.
- Enhance the manatee network through training, capacity building and other activities.

6.15. CAMEROON

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6.15.1. General presentation of the area

Cameroon is a large country stretching from Lake Chad in the north to the Gulf of Guinea in the south. It has a varied coastline, comprising large estuaries, mangroves and rivers, beaches and several areas where the tropical forest meets the sea. The coastal area has several important wetlands, and also hosts some major towns and cities, notably Douala, which has a busy port. Much of the coastal area is thus under some form of land use pressure. Oil exploration also takes place in the coastal zone. The north of the country is Sahelian and contains internationally important wetlands, especially the Logone floodplains. The River Benue rises in northern Cameroon, and flows into Nigeria, eventually joining the River Niger; a tributary, the Mayo Kebbe, enters Cameroon from Chad.

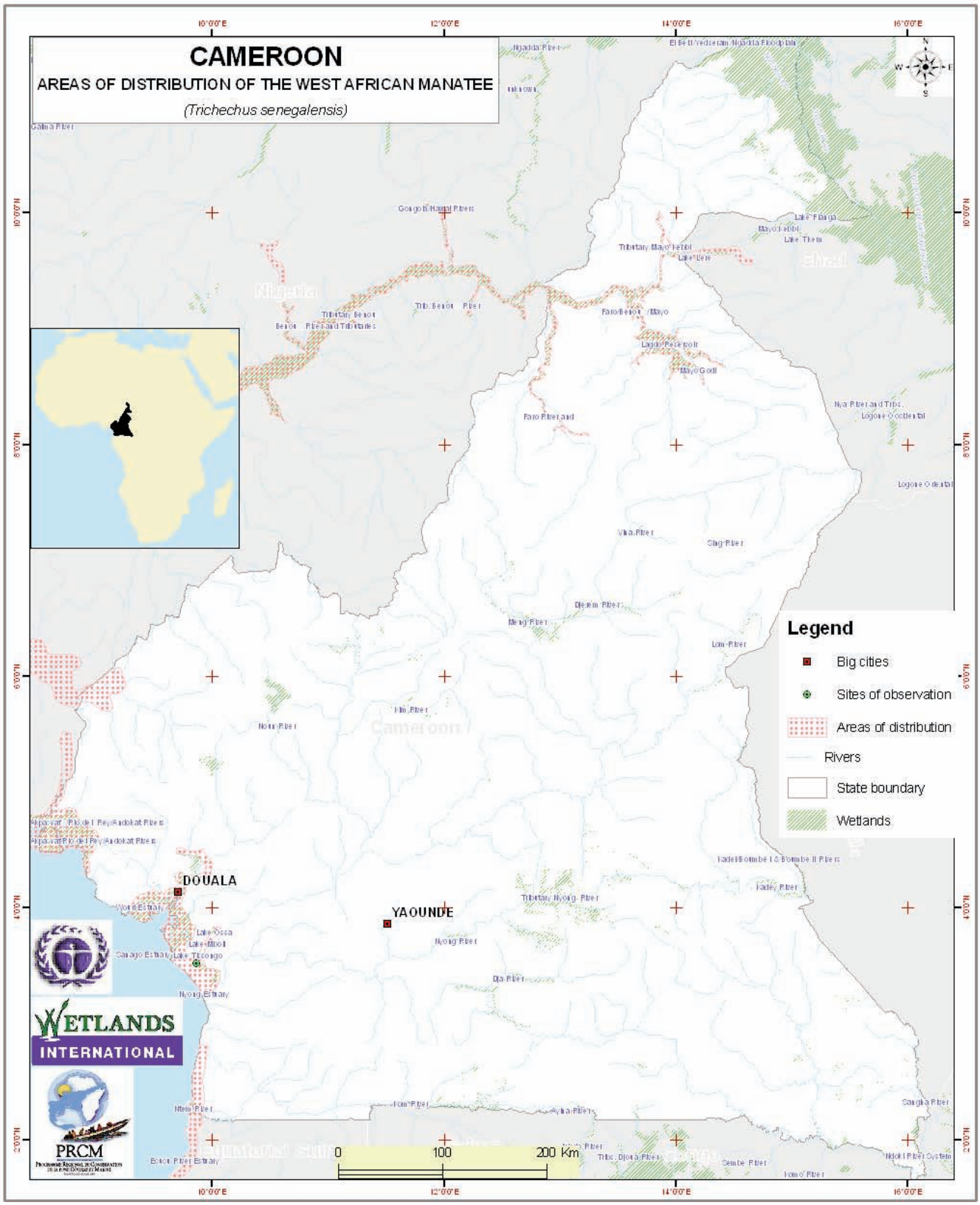
6.15.2. Distribution area and cultural importance

A survey via a questionnaire undertaken in 1989 with the financial support of WWF-USA and the Wildlife Conservation Society reveals that manatees are still abundant in the country and their density, based on frequency of reported sightings, appears to be high in certain areas of Korup, Mamfe, and Edea (Grigione 1996). Manatees occur throughout the coastal region of Cameroon, from the extensive mangroves and estuarine waters of the Ndian Delta and Bakassi area in the west to the Wouri and Mungo Rivers and the Cameroon Estuary, and south to the Sanaga River and the lower sections of the Nyong and Ntem Rivers (Powell 1996). The Douala-Edea Wildlife Reserve on the south bank of the Sanaga River mouth in the Congolese coastal forest ecoregion, which extends some 35km inland, is a key site for manatees, including Lake Tissongo. From here, they may enter flooded forests to feed, and they occur further upriver as far as Edea, where there is a dam and rapids, and in Lake Ossa (connected to the Sanaga), which may provide a dry season sanctuary (Powell 1996). Inland, manatees are found in the upper Cross River, especially around the Munaya-Cross confluence, whilst they also occur in northern Cameroon from the Benue River, from the Faro River mouth to Lake Léré (Powell 1996).

The main ethnic population of the coastal area is the Sawa. Sawa rites glorify water powers and mysterious beings living in those waters. The Sawa consider that the manatee is as a manifestation of invisible water forces which is always favourable to the members of the tribe and to all their benefactors, but which is terrifying for all the enemies of the tribe.

6.15.3. Threats

The threats to the manatee are related to the modification of its habitat by pollution. Indeed, the coastal area of Cameroon receives pesticides and fertilisers used in vast industrial plantations (mainly rubber, palm oil and banana plantations). Products from these plantations drain towards the mangroves and can bring about eutrophication and proliferation of algae which hamper the transformation of the mangrove. In addition there is pollution due to oil extraction. Unfortunately, the mangroves of Cameroon are not protected at all. The only small area that was protected by virtue of its situation is the northern part of the


CAMEROON
AREAS OF DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Areas of distribution
Rivers
State boundary
Wetlands
DOUALA
YAOUNDE
0
100
200 Km
WETLANDS
INTERNATIONAL
PRCM

wildlife reserve of Douala-Edea is today subject to an intensive oil search activity. Pollution is a further cause for concern when considering that waste and other toxic products from the cities of Douala and Edea are carried into this fragile ecosystem.

The exploitation of natural resources by local populations is in many cases anarchic and without concern for future generations. This attitude is extremely harmful to the protection of natural resources in general, and particularly to sensitive species such as the manatee, for which loss of habitat is an important threat.

Poaching and the trade of manatee meat and by-products are also major threats. For instance, the meat and oil of the manatee are subject to illegal trade between Chad and Cameroon, whilst manatee meat is regularly sold at the Wouri River and in markets in Douala during the rainy season (Powell 1996). However, manatee exploitation does not appear to be common due largely to human attitudes and perceptions towards the manatee rather than laws protecting the manatee (Grigione 1996).

6.15.4. Legal status

Cameroon belongs to the group of countries where manatee populations are still relatively abundant and have good prospects of survival. Authorized hunting has been reduced due to the negative behaviour of some local populations towards the manatee. The manatee, which is a vulnerable species, is wholly protected in category A of the Law 94/01 of 20th January 1994, relating to the system of forests, hunting and fishing and its implementing decrees.

The texts governing forests, wildlife, fishing and environment are recent and derive from the forest law N° 94/01 of 20th January 1994. The implementing decrees 95 466/PM of 20th July 1995 and 95/531/PM of 23rd August 1995 aim to promote the wise exploitation of renewable natural resources and the conservation of ecosystems, with the involvement of local populations. The law 96/12 of 5th August 1996 defines the legal framework for environmental management in Cameroon.

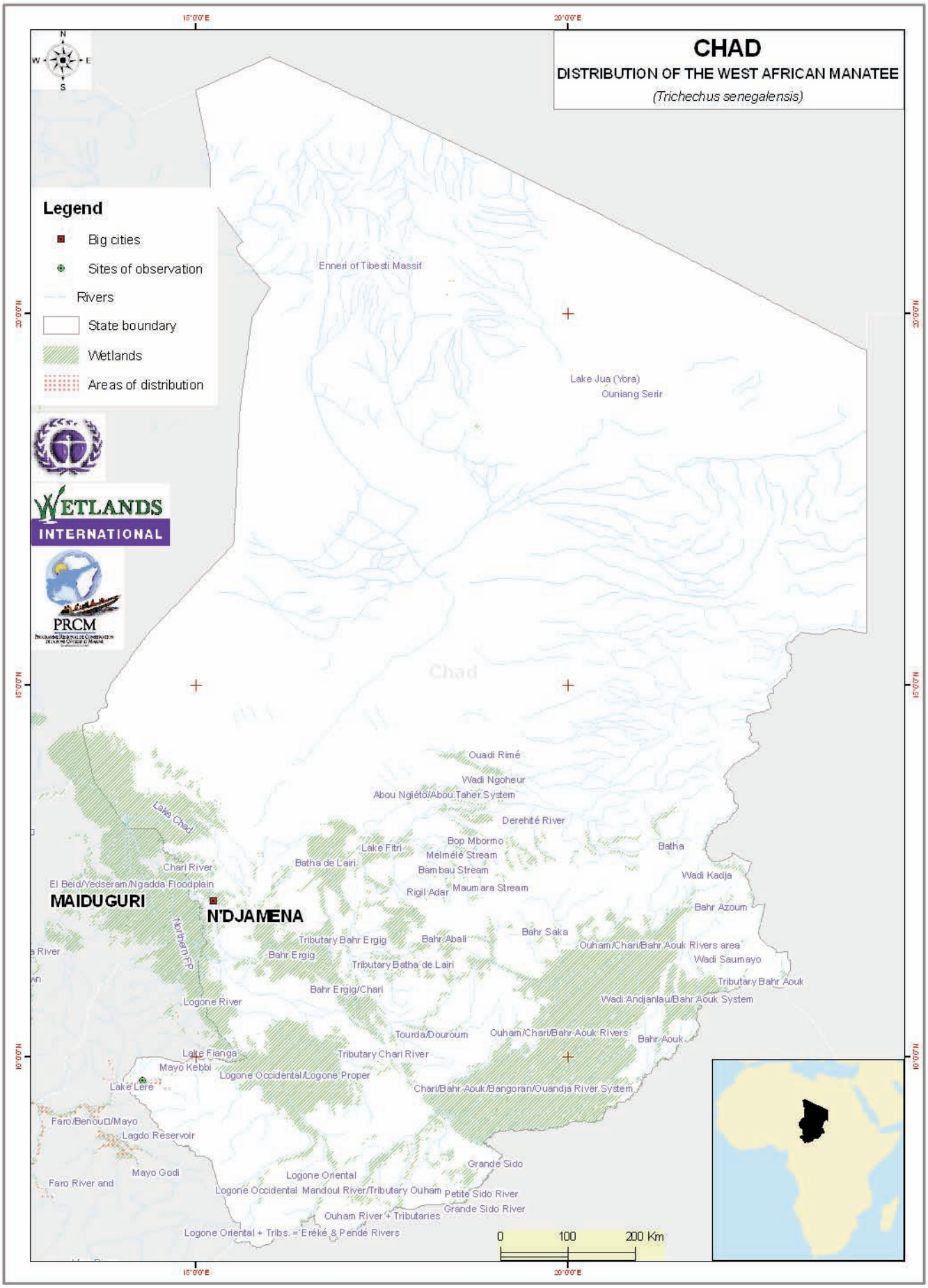
6.15.5. Manatee conservation initiatives in Cameroon

During June-August 1989, a survey of manatee distribution and status in Cameroon was undertaken by conducting land and boat surveys of four regions: Korup, Mamfe, Edea, and Kribi (Grigione 1996). Like other protected areas of the country, the conservation of the wildlife reserve of Douala-Edea is assured to some degree by the State. Nonetheless, some conservation actions benefit from the support of local NGOs, organizational bodies supervising populations. However the supports remain insufficient to guarantee a promising future to the reserve. There is a strong need to structure the support to conservation of this important reserve where the manatee is the flagship species. Well protected and conserved, the wildlife reserve of Douala-Edea could become in the future a sanctuary of manatee.

6.15.6. Recommendations

The following recommendations for manatee conservation in Cameroon are proposed:

- Incorporate manatee research into regional conservation efforts, so as to improve the chances of conservation success, and to strengthen sustainability of local efforts.
- Develop a manatee conservation programme building on integrated actions of sustainable management of resources in the Cameroonian coastal area.
- Develop an ecological monitoring system of manatees in the Cameroonian coastal area and beyond with the use of modern identification tools and the control of activities.
- Determine the status of manatees in the Benue River in northern Cameroon and identify key sites and potential refuges in this area for the species.
- Undertake a development study of ecotourism potential of the species.
- Fight against coastal pollution and the degradation of manatee habitat.
- Develop a participatory approach towards the participation of rural communities in the management of manatee populations in Cameroon.


CHAD
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
WETLANDS INTERNATIONAL
PRCM
Ennedi of Tibesti Massif
Lake Jua (Yora)
Ouniang Serir
Chad
Ouadi Rimé
Wadi Ngoheur
Abou Ngiéto/Abou Taher System
Derehité River
Bop Mbormo
Melmélé Stream
Bambau Stream
Rigil Adar
Maumara Stream
Lake Fitri
Batha de Lairi
Batha
Wadi Kadja
Bahr Azoum
Bahr Saka
Bahr Aballi
Ouham/Chari/Bahr Aouk Rivers area
Wadi Saumayo
Tributary Bahr Aouk
Wadi Andjanlau/Bahr Aouk System
Bahr Aouk
Lake Chad
Chari River
El Beid/Yedseram/Ngadda Floodplain
MAIDUGURI
N'DJAMENA
Tributary Bahr Ergig
Bahr Ergig
Tributary Batha de Lairi
Bahr Ergig/Chari
Logone River
Tourda/Douroum
Ouham/Chari/Bahr Aouk Rivers
Lake Fianga
Tributary Chari River
Mayo Kebbi
Logone Occidental/Logone Proper
Lake Léré
Chari/Bahr Aouk/Bangoran/Ouandja River System
Faro/Benoué/Mayo
Lagdo Reservoir
Mayo Godi
Faro River and
Logone Oriental
Logone Occidental Mandoul River/Tributary Ouham
Grande Sido
Petite Sido River
Grande Sido River
Ouham River + Tributaries
Logone Oriental + Tribs. = Eréké & Pendé Rivers
0 100 200 Km
15°0'0"E
20°0'0"E
20°0'0"N
15°0'0"N
10°0'0"N

6.16. CHAD

MAHAMAT HASSANE IDRISS

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E-mail: mhi1962@yahoo.fr / mhthassan@hotmail.com

6.16.1. General presentation of the area

Chad is a large land-locked Sahelian country, with Lake Chad in the west, which receives water from neighbouring countries, notably from the Chari and Logone rivers to the south and the Kano River and Hadejia-Nguru Wetlands to the southwest. There are major floodplains associated with the lake and these rivers. The Niger Basin is represented in southwest Chad by the Mayo Kebbi River and its drainage basin, which includes lakes Léré and Tréné. These lakes form a part of the Binder Léré Faunal Reserve, which has an area of 135,000ha. Lake Léré measures approximately 14.5x4km and a dry season area of 4,100ha, whilst Lake Tréné is smaller, being some 6kmx2km in size (Hughes & Hughes 1992). However, the lakes expand considerably in the rainy season, when the total wetland area may be some 40,500ha for Lake Léré and 7,000ha for Lake Tréné (Burgis & Symoens 1987; PGCRN/GTZ 2000).

6.16.2. Habitats and distribution of the manatee

There are several reports of manatees from parts of the Chad Basin in Chad during the earlier part of the 20th Century, with records from the Chari, Bamaingui, Bahr-Kieta and Logone rivers (Hatt 1934; Powell 1996). There were also records from north-eastern Chad in the Niger Basin, in the Mayo Kebbi and associated lakes and tributaries, and these areas still support manatees; however the Chad Basin population appears to be extinct (Salkind 1998). It thus seems that the manatee now occurs only in Lakes Léré and Tréné and nearby wetlands in southwest Chad. Both lakes are fed by the River Mayo Kebbi, the main tributary of the right shore of the Bénoué. Sites visited by manatees include the villages located around these lakes: Fouli, Mourbamé, Dissing, Labzayé, Tezoko, Doué and the areas of Lake Léré where fishing is prohibited. All these places have dense aquatic vegetation. Around thirteen manatees were observed in a recess of Lake Léré on 10th and 13th July 1995 close to the village of Doué (Salkind 1998). The villagers asserted that this place was visited by manatees every morning. A manatee was found dead in Léré in 2005.

6.16.3. Manatee values and threats

As in other areas, the manatee in southwest Chad is associated with various traditional beliefs. The local population is predominantly the Moundang, whose chief, or *Gong*, is the most powerful traditional figure in the lakes region. Much Moundang folklore and tradition is built around their interactions with the manatee; they are concerned with the manatee's future and feel that the animal plays an integral role in their cultural identity (Salkind 1998). One belief is that young bachelors cannot approach a captured female manatee for fear to see her genitals, which legend has it will cause him to lose his virility!

The major threat is poaching exercised by the Hausa ethnic group originating from Nigeria, some of whom are semi-nomadic, whilst there are also Hausa settlements in the villages of Fouli and Dissing, resulting in manatees being poached in those areas. Poaching is undertaken in other

localities by fishermen of Dissing and Labzaye. Out of 108 people interviewed in 1998, 68 admitted having killed a manatee in their village. It is more difficult to kill a manatee for its meat than to hunt a gazelle or steal a goat or a cow. However, manatee hunting is more rewarding. According to different sources reported by Salkind (1998), one litre of manatee oil can fetch up to 150,000 CFA francs (ca. €225), with some 10-15 litres of oil being derived from an average manatee. Manatee oil is highly prized for its alleged effectiveness as a traditional curative. Sales of this oil can generate substantial income for the impoverished Chadian people.

The meat is widely considered as a first rate meat, and the best parts are traditionally given to the *Gong*, and in Léré so are the genitals, which have a high value in traditional medicine. The meat is not sold locally but dried and exported to Cameroon or Nigeria.

6.16.4. Institutional and legislative framework and availability of information

The manatee population of Chad is fully protected by the ordinance 14/63 of 28th March 1963, which regulates hunting and nature protection. The law n°14/PR/98 of 17th August 1998 defines the general principles of environmental protection and the accountability of populations in the protection of the environment. The decree n°088/PR/MEE/98 of 8th March 1999 relates to the closing of hunting in the territory of the Republic of Chad, elaborated to tackle widespread poaching and the absence of means of the State to remedy it. There is also a regime relating to forests, wildlife and fishing, which defines that wildlife and other resources of the national patrimony must be managed in a wise, balanced and sustainable way in the interest of and in participation with the population. The Environment and Water Ministry through the Wildlife Conservation Division is responsible for the management and protection of manatees. Killing a manatee can attract a hefty sentence if a person is charged; a Hausa man was arrested in 1993 for killing manatees and fined 500,000 CFA francs (ca. €750) and sentenced to ten months in prison (Powell 1996).

The key manatee sites of Chad are found within the Binder Léré Wildlife Reserve administered by a Sector Head in charge of Wildlife Conservation and Protected Areas under the authority of the Wildlife Conservation and Protected Areas Direction. Monitoring is ensured by supervisors of national parks with the assistance of villagers organized by a project for the protection of natural resources. Thus, there are protected areas of lakes which fishermen cannot access.

6.16.5. Manatee conservation initiatives in Chad

A club named Les Amis du Lamantin (Friends of the Manatee) was formed by local people of the Lake Léré area in 1994/95, which established as its objectives the education of the local villagers about manatee conservation, and the observation of activities concerning manatees. A conference was also held at the Centre National d'Appui à la Recherche (CNAR) in the capital, N'Djamena to raise awareness among high-level government officials, the international donor community, scientists, university students, and the press, whilst also serving as a means of promoting the cause and acceptance of the Léré based conservation club (Salkind 1998). A manatee research project took place in 1995 to determine the presence or absence of the manatee in the Chari and Mayo Kebbi rivers, to define their living conditions in these rivers, to characterize the nature and importance of threats, to assess their needs and consider the possibilities for long term research, and to tissue samples for genetic analysis (Salkind 1998). Ten manatee samples were obtained in Chad and compared with samples from other areas; preliminary results indicated that the manatee samples of Chad were genetically distinct from a manatee sample from Ghana, but similar to a manatee sample from Cameroon (Salkind & Parr 1997).

Since 1998 local populations of the area of west Mayo Kebbi have established initiatives for the conservation and management of natural resources. The organisational basis builds on local decision and orientation bodies gathering representatives of all the relevant villages. Their management is based around inter-village charters and local conventions, and a number of activities

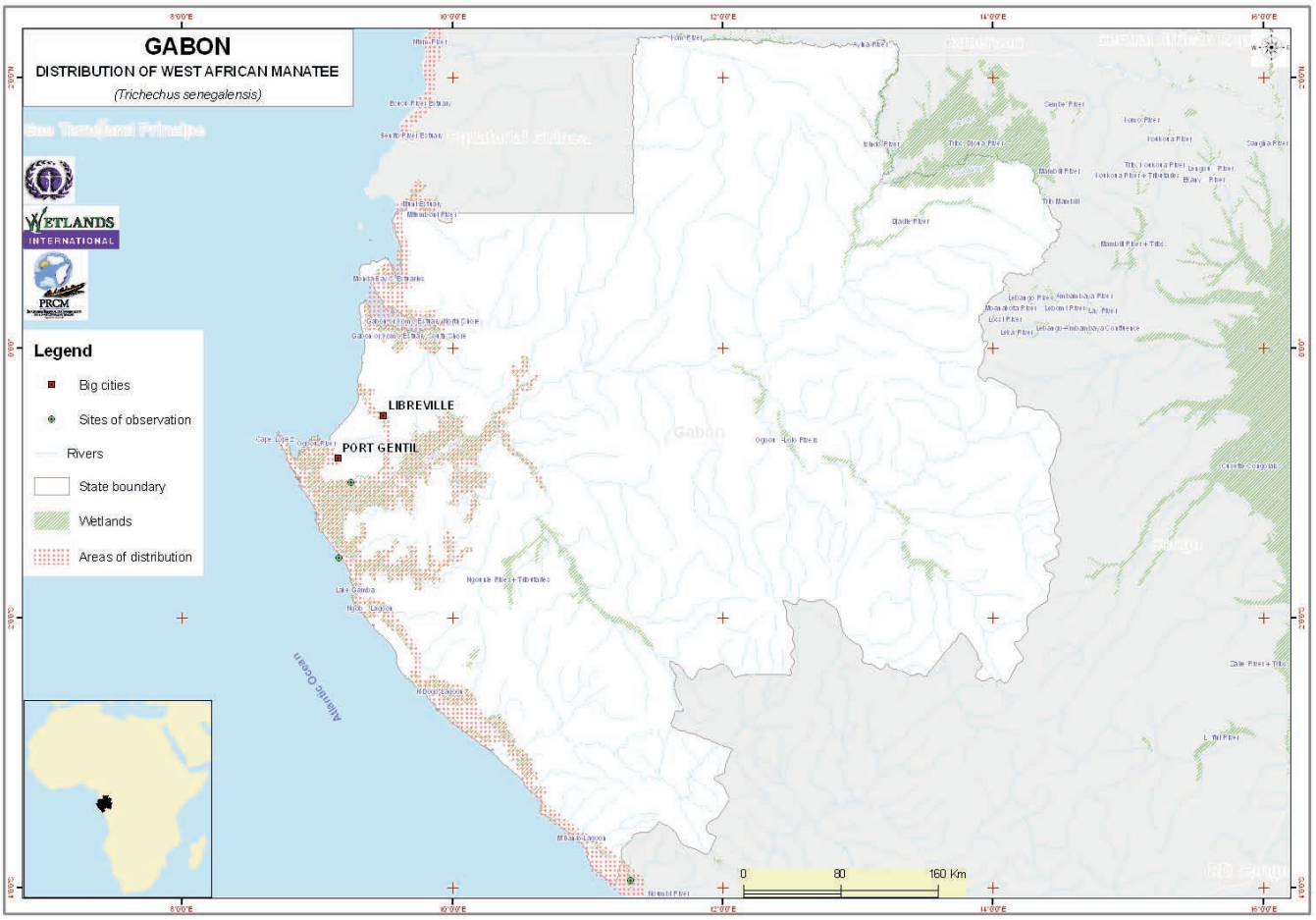
have taken place through the support of the Project for the Management and Conservation of Natural Resources/GTZ. As a part of this project some protected areas have been identified in the lakes for manatees, where they can find refuge and breed. Although manatees have declined and possibly been extirpated from the Chari River and its tributaries, the population centred around lakes Léré and Tréné may be slightly on the rise thanks to these recent conservation initiatives.

6.16.6. Recommendations for manatee conservation in Chad

Whilst some initiatives have taken place, they remain insufficient to assure conservation of manatees in Chad, and the following recommendations are provided:

- Carry out a thorough inventory of manatees in lakes Léré and Tréné, and define their living conditions in these lakes.
- Characterise the nature and importance of threats to manatees.
- Evaluate the needs and considerations for a longer term research programme, and carry out further applied research into manatee behaviour and life history.
- Train wildlife researchers in specialisation of manatees.
- Organise regional information and exchange workshops on manatees and build greater awareness about the vulnerability of manatees at local and national level.
- Carry out further studies to determine if manatees may still exist in the Chari River and its tributaries, and, if it no longer lives there, to establish the history of its extinction, which can have important lessons learned.

A potential future consideration might be the reintroduction of manatees into the Chari River.


GABON
DISTRIBUTION OF WEST AFRICAN MANATEE
(Trichechus senegalensis)
WETLANDS INTERNATIONAL
PRCM
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
LIBREVILLE
PORT GENTIL
Atlantic Ocean
0
80
160 Km

6.17. GABON

MARTIAL AGONDOGO

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Email: martial.agondogo@laposte.net

6.17.1. General presentation of the area

The geographic situation of Gabon and the fact that it belongs to the Great Marine Ecosystem (GME) of the Guinea Gulf, make it significant in the development of this coastal ecosystem. In the north of Gabon, the coast alternates between rocky, sandy and swamp areas. Between Port Gentil and the Congolese border in the south, there is a sandy coast interspersed by major lagoon areas such as Fernand-Vaz, Iguéla, Ndougou and Banio. These great lagoons are contact areas between fresh waters of rivers coming from the inland of the country and marine waters.

The Gabonese coast is influenced by the Benguela current from south of the equator, and the Guinea, current. These currents are rich in nutrients and participate in the development of phytoplankton and algae and animals (zooplankton, shellfish and fish). In addition, the coastal upwellings play a particularly important role in the nutrient intake for halieutic resources.

6.17.2. History of research works, habitats and distribution of the manatee in Gabon

Like most West African coastal countries, research work concerning the manatee is only recent. Although a number of researchers are unanimous about the presence of manatees in the lakes and lagoons of Gabon, only a few past works have briefly mentioned them (e.g. Malbrant & Maclatchy 1949; Powell 1996). For the establishment of protected areas in Gabon, exploratory works were undertaken in the Ogooué basin in August 2001 to evaluate the population of manatees there (Mbina 2001). The surveys carried out in 2006 supported by Wetlands International and the Abidjan Convention bring together for the first time the scientific evidence of the presence of manatees across the country (Agondogo 2006).

Gabon is a country which is mostly covered by fresh water, supporting a presumption that there are important manatee populations in its territory. Powell (1996) considered that Gabon may support one of the highest densities of manatees in Africa. Preliminary evaluations of the size of manatee populations in all the waters of Gabon suggest significant numbers, but a thorough inventory is required to confirm this. On the other hand, it is certain that each year, numbers diminish due to accidental capture and intensive hunting.

Manatees have been recorded in the Gabon River and Mondah Bay and in the Ogooué River and interconnecting lakes of the lower Ogooué between Port Gentil and Lambaréné, as well as in the coastal lagoons of Nkomi, N'Dogo and Sounga and the southern reserves of Setté Cama, Gamba and Petit Loango (Powell 1996).

6.17.3. Manatee values and threats

Some ethnic groups consider the manatee as a family totem, which has an affiliation with the fresh water spirit. For these people, some rituals are dedicated to the animal during the year, and respect is afforded to the sites where manatees can be found. The water spirit for some lake and lagoon people is the provider of good health and is also responsible for women giving birth to twins. The current status of the manatee in Gabon is potentially critical due to unsustainable and

intensive hunting. During the last decade, captures have considerably increased in all places and seasons. Manatee meat is traded freely in local markets. Mbina (2001) reports of various hunting methods and tools used in the Ogooué basin:

- A harpoon is the most common hunting tool. The harpoon is made of long stems of wood bound to a rope that ends in a float, with the tip consisting of a metal hook (see picture 2 below). Once the animal is seen by the hunter, it is quietly tracked until the moment when he can launch the harpoon. Most fishermen will carry such a harpoon at all times in their canoe.
- The *lambou* is a special large-mesh net locally manufactured by villagers. It is erected in the feeding areas of manatees and in small arms of rivers and lakes, and generally used when the water level rises.
- The cage is a very old hunting method, and not regularly used. It consists of a trap with a door made of bamboo that the manatee triggers shut when it enters. This method is used during the dry season, when food is scarce.
- Manatees are also shot with a rifle at times.
- Manatees are caught sometimes in fishing dragnets. Whilst fish are the main targets, if a manatee becomes entangled in the net, it immediately becomes the principal target, being of significantly higher value than fish.

Manatees also appear to suffer from predation in Gabon, and some specimens found in domestic markets bear scars at the back and scratches on their tails which imply attacks by animals such as sharks or crocodiles; this is also mentioned by fishermen. However, predation by man is much more significant and intensive at times, and risks causing the disappearance of the species from Gabonese wetlands in the near future. It is noteworthy that Gabon has the highest rate of bushmeat consumption per head of population in Africa (Agondogo 2006). It will require significant investments in awareness and other programmes to prevent widespread depletion of wildlife, including manatee due to the bushmeat trade.

6.17.4. Institutional, legislative framework and availability of information

The political commitment of Gabon to ensure a sustainable management of natural habitats and species is expressed through strict legal measures taken in order to conserve endangered species. These measures were taken in the 1930's and have been in effect up to now. Gabon has signed and ratified different international conventions related to environmental protection, notably the Biodiversity Convention in May 1997, the Climate Change Convention in April 1997, the Ramsar Convention ratified in April 1987 and CITES ratified in May 1989. The manatee is fully protected by the law 1/82 of 22nd July 1982, related to wildlife protection in Gabon.

Day to day wildlife monitoring is the responsibility of the Wildlife and Hunting Division of the Forest Economy Ministry, which has brigades throughout the national territory. Donors, organizations and international NGOs support these initiatives based on the approach set out in the Biodiversity Convention strategy, incorporating ecological, economic and social aspects in the activities related to sustainable conservation and exploitation.

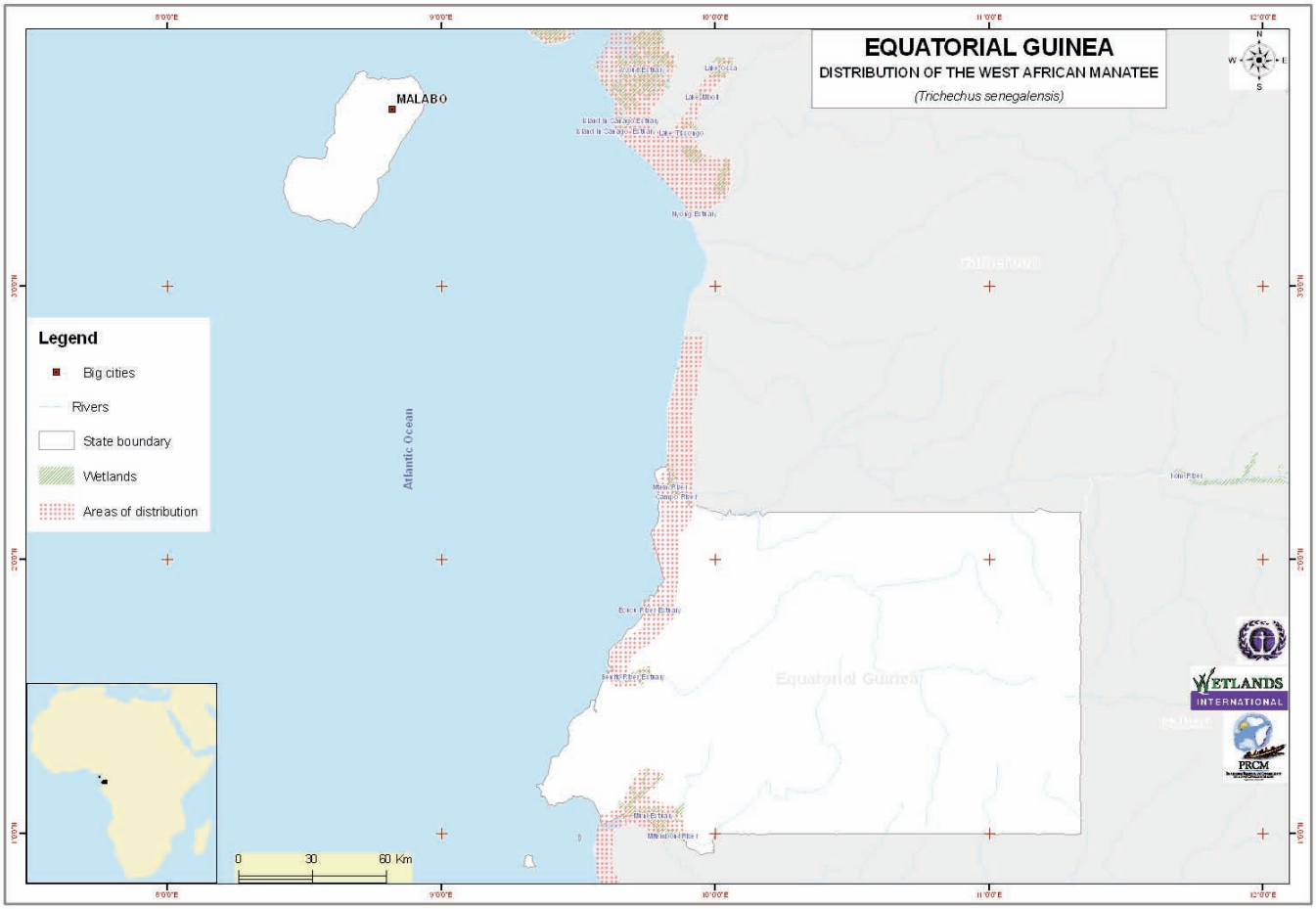
6.17.5. Recommendations for manatee conservation in Gabon

Under the auspices of the Wetlands International / Abidjan Convention project, the Gabonese government has developed a draft National Strategy for conservation of the manatee. This enables all actors to discuss the aims and implementation methods and identify the current gaps in the required capacity and knowledge for the development of an optimum strategy for long term sustainable management of this threatened mammal. Some key recommendations for inclusion in the strategy include:

- Reinforce the laws protecting the manatee.
- Undertake biological studies of the manatee, which remains poorly known.
- Identify all threats and potential dangers to the

manatee and develop appropriate conservation measures for their mitigation.

- Encourage eco-tourism projects at a local level.
- Initiate conservation programmes in the areas where the manatee occurs.
- Involve riparian communities in the management and conservation of manatee populations. This requires a strong awareness component, and the scale of hunting and trade in meat and other products needs to be addresses.
- Develop a legal framework aimed at ensuring manatee conservation.


EQUATORIAL GUINEA
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
MALABO
Legend
Big cities
Rivers
State boundary
Wetlands
Areas of distribution
Atlantic Ocean
Equatorial Guinea
0
30
60 Km
WETLANDS
INTERNATIONAL
PRCM

6.18. EQUATORIAL GUINEA

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6.18.1. General presentation of the area

Equatorial Guinea occupies 28,050 km^2, comprising the islands of Bioko in the Bight of Biafra, the oceanic island of Annobón and several offshore islands including Corisco o Mandyi and the Elobey Islands, as well as Rio Muni on the African continent, which has a coastline of 265km with three major estuaries of the Rio Campo (Ntem) on the northern border, the Rio Mbini (San Benito) in the centre, and the Rio Muni at the southern border (Hughes & Hughes 1982). As rainfall is high, there are many streams emanating from the highlands of the interior of Rio Muni, which mostly drain into the main rivers or directly into the Atlantic. At such areas where rivers or streams meet the coast, there are pockets of mangroves, though much of the coastline is quite high, so mangroves are mainly confined to the three major estuaries, where they extend inland and form tidal forests (Hughes & Hughes 1982). The coastal mangroves are composed largely of *Rhizophora racemosa* and *Avicennia africana*, whilst sea grasses occur on the mudflats. The coastal flora is rich, and included dense submerged beds of vegetation, which could provide suitable feeding areas for manatees.

6.18.2. Habitat and distribution of the manatee in Equatorial Guinea

West African manatee is present in the coastal areas of Equatorial Guinea on mainland Africa; it is absent from Bioko and Annobón and other offshore islands. The main areas of occurrence are in the Muni and Cogo estuaries, and it most likely occurs in the Rio Woro estuary and the Rio Ecucu near Bata, where one was captured in 1988 (República de Guinea Ecuatorial 2005). Machado (1998) considered that the Rio Muni area contained prime habitat for the manatee. Bolobo (2001) reported that the Rio Muni supported an appreciable population of manatees. Manatees are also likely to occur in the lower reaches of the Mitémélé River (Powell 1996).

6.18.3. Threats

The manatee is subject to ritual hunting by inhabitants of coastal villages of Equatorial Guinea (República de Guinea Ecuatorial 2005). It is also threatened by fishing activities (C. Obama, *in litt.*). Mangroves are exploited to some degree mainly for firewood and building materials. In the Rio Muni estuary there is much settlement of fishermen, often from other countries, particularly Nigeria, which has led to an escalation of fishing activities and the destruction of mangroves, principally for wood (Obama 2005).

6.18.4. Conservation initiatives

The organisation INDEFOR (Instituto Nacional de Desarrollo Forestal y Manejo del Sistema de Areas Protegidas) was created by governmental decree number 60/2002 on 8th May 2002, and carries responsibility for the conservation and wise use of natural resources in Equatorial Guinea (Obama 2005). Other relevant government legislation includes the law 1/1997, a part of which concerned the creation of a national protected areas network (SNAP). A number of protected areas were subsequently established, including at least two which provide habitat for the West African manatee – Rio Campo and Rio Muni estuary; the West African manatee is considered as one of the key species at Rio Muni (Obama 2005).

6.18.5. Recommendations

Due to the general lack of information concerning manatees in Equatorial Guinea, it is recommended to carry out a preliminary survey of their status and distribution, focusing especially on the coastal estuaries and rivers. Such a survey should include extensive questionnaires of fishermen and other coastal inhabitants. Follow-on activities could also take place, such as awareness campaigns, but these can only really be developed when there is a clearer picture of the occurrence of manatee in the country. Activities only need focus on the continental section of the country.

6.19. REPUBLIC OF CONGO

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6.19.1. Summary

The exact status of the West African manatee in Congo is not well established, but it is known from at least three sites in the coastal zone, the Conkouati lagoon, Lake Nanga and the Loémé River. It is threatened by local communities who value its meat highly, and as a consequence a lucrative and growing trade is maintained. Manatees concentrate in lakes and deep water areas of the main rivers during the dry season, but migrate into seasonally flooded areas during the rains and high floods. To ensure sustainable management in most sites, a coordinated action with all the stakeholders is the ultimate goal, putting at the disposal of local government an attractive education programme focusing on the environment and sustainable development.

6.19.2. General presentation of the area

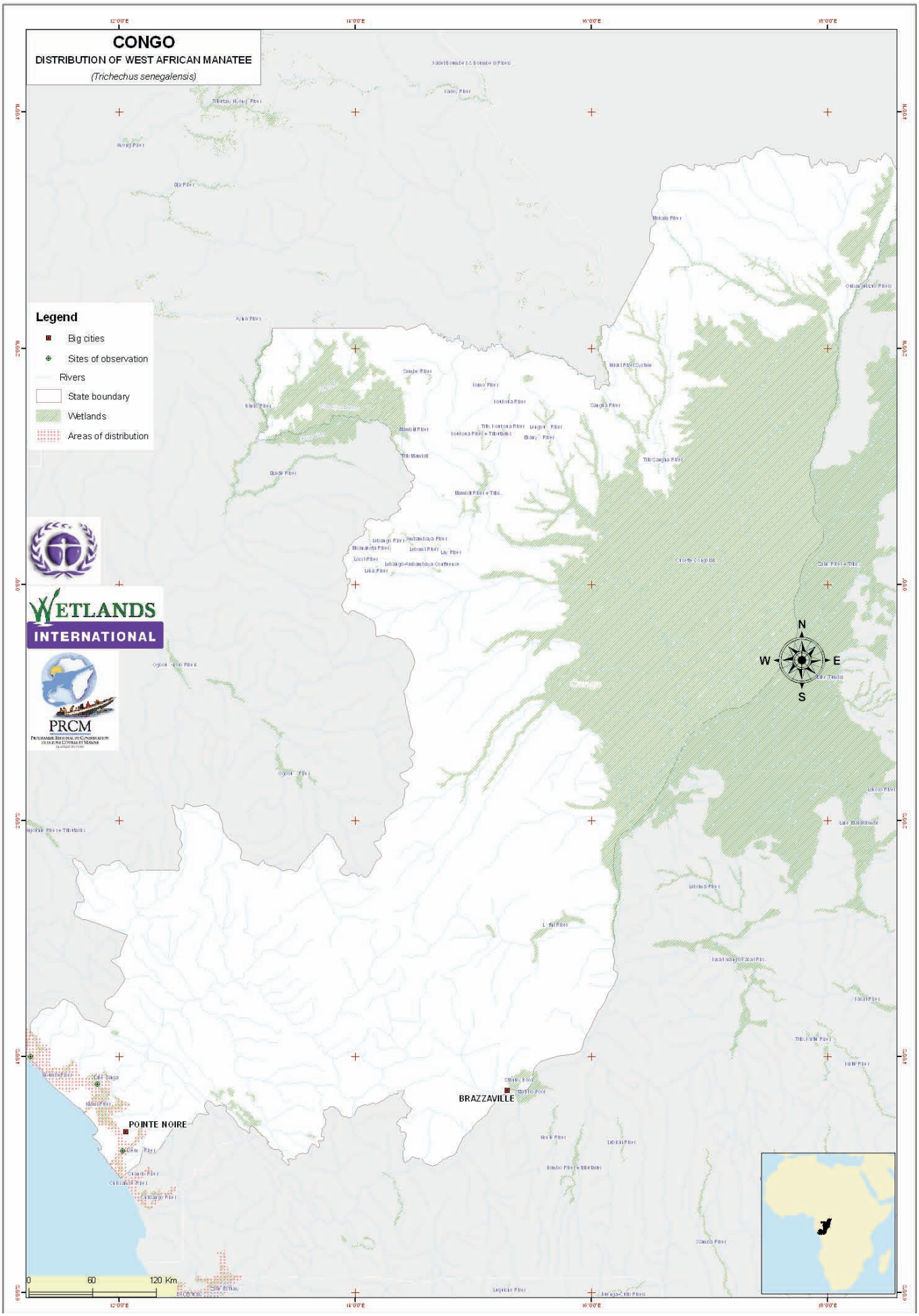
Congo covers 342,000km² from the Atlantic to the heart of central Africa. The Congolese marine area is situated in a convergence region of three ocean currents: the Gulf of Guinea, the South-Equatorial and the Benguela. The flow depends on the seasonal movement of cold and salted deep waters (upwellings). Thanks to frequent flows from areas regularly inundated by tropical rainfalls, Congo has numerous and powerful rivers. Beside the rivers Congo and Kouilou-Niari, there are thirty other navigable rivers and streams such as the Kouilou, Niari, Bouenza, Alima, Ngoko, Sangha, Likouala-Mossaka and Likouala-aux-Herbes, through all of which water flow throughout the whole country.

6.19.3 Habitats and distribution of the manatee in Congo

There have only been brief studies of manatees to date in Congo in the Conkouati Lagoon in 1994 (Akoi 1994) and in the same lagoon, plus other coastal wetlands, notably Lake Nanga in the sub-prefecture of Madingo-Kayes in 2005 (Dodman *et al.* 2006), and also in the Loémé (Kaya 2005). Manatees occur in three types of ecosystems of the Congolese coast:

- The Conkouati lagoon in the sub-prefecture of Nzambi near the border with Gabon. This site is a protected area, and may well shelter a sizeable population of manatees;
- Lake Nanga in the sub-prefecture of Madingo-Kayes;
- The river Loémé south of Pointe-Noire.

The areas where manatees live differ according to sites and vary according to seasons and accessibility of food. Fishermen make frequent reports of manatee sightings at least once a month at feeding areas. At Conkouati they are reported in Lake Yangala which flows into the Ngongo, and in Lake Tchimba; they appear to be most numerous near the mouth of the main lagoon and at certain sandbanks where they rest by day, mainly coming out to feed at night (Dodman *et al.* 2006). In April 2005, Dodman *et al.* (2006) found much evidence of manatee feeding in different areas of the lagoon system, especially on floating banks of d'*Echinochloa pyramidalis*, with the stems freshly eaten, and concluded that this is an exceptionally suitable site for the West African manatee.


CONGO
DISTRIBUTION OF WEST AFRICAN MANATEE
(Trichechus senegalensis)
Legend
Big cities
Sites of observation
Rivers
State boundary
Wetlands
Areas of distribution
WETLANDS
INTERNATIONAL
PRCM
N
W
E
S
BRAZZAVILLE
POINTE NOIRE
0
60
120 Km

Floating grasses eaten by manatees in Conkouati Lagoon (T. Dodman)

Manatees are observed at Lake Nanga, which is boarded by large beds of floating grasses, by fishermen several times per year (Dodman *et al.* 2005). The lake receives water from Lake Koubambi, with water flowing then to the River Kouliou. There are several channels and seasonally flooded areas between these lakes and the main river channel, though some routes appear to be blocked now by thick beds of papyrus, as well as *Salvinia molesta*. Manatees certainly utilise this network of wetlands, which explains their seasonal absence from Lake Nanga, but it is not clear whether they are still able to reach the main river or not. It is most likely that manatees occur in the Kouliou River, but further investigations are needed to verify this.

In the Loémé, manatees live principally in the lower river and its estuarine areas; they move to and fro between areas of Cyperus spp., Vossia spp. and floating mats of vegetation made up of dense papyrus and other plants (Kaya 2005). Some fishermen reported that manatees occur in Lake Kayo, south of the Loémé, in the dry season, when they enter from the river near the Tiabi village, though others declared them to be absent from the lake (Dodman *et al.* 2005).

6.19.4. Socio-economic and cultural values

The Vili, who are the landowners of the coastal area of the Kouilou know the manatee well. It is considered as a species with a high food value for the supply of protein. Most of the time, its capture is a godsend and mobilizes the whole village in cultural events (folklore, dance, prayers of gratitude, etc.). In the village of Mbouyou near Lake Nanga, the manatee is protected in some clans because it represents an ancestor and is considered as a genie of the lake akin to a mermaid, which periodically gives throughout the year great captures of fish, depending on the satisfaction of its whims. But additionally, along the Loémé, hunting is directed towards trade in the

markets of the principal coastal town, Pointe-Noire. Consumers like its meat, which is sold in prices ranging between 500-1000 CFA francs for about 400g.

6.19.5. Threats to the manatee in Congo

Local governments have informed enquirers that small manatees are often victims of predation by crocodiles, although presently it is very difficult to assess this threat. In Conkouati, human pressure is a factor of disturbance of its habitat and lifestyle, because of the intensive fishing activities in the parts of the lagoon. In Lake Nanga and in the Loémé, capture rates are high, and possibly unsustainable. At N'Bouyou village on Lake Nanga between one and four manatees are caught each year, either trapped in a net or hunted using a harpoon, and three specialised hunters are resident in the area (Dodman *et al.* 2006). Experienced hunters have settled along the Loémé River to hunt the animal, where new capture techniques (the harpoon) have been introduced with the arrival of people from the Democratic Republic of Congo and elsewhere (Kaya 2005).

6.19.6. Legislative and institutional framework

Hunting is strictly prohibited in accordance with law 48, and the manatee is classified in Annex A by the code of conservation and exploitation of wildlife and Annex II of CITES. At an international level, Congo is a signatory of the conventions of CITES, of Biodiversity and of Ramsar. At a national level, there are three laws governing the species:

- Law 48 of 21st April 1983, defining the conditions of conservation and exploitation of wildlife in the Republic of Congo,
- Law 49 of 21st April 1983, determining slaughter taxes per species,
- Implementing decree n° 85/879 relating to permits and licenses.

In the Conkouati-Douli Park, its conservation is certain thanks to the vigilance of ecoguards, and all recalcitrants are liable to sanctions provided by the Congolese law. On-the-spot fines are set by the Departmental Director of Forest Economy, and punishment may extend to sentencing to imprisonment. In the other sites, manatees are exposed to human predation, as these locations are subject to hunting of wild animals. The reasons for the progress of this hunting activity are deep, mainly related to the degradation of the social and economic fabric of society, with unemployment due to the closing of several firms and the search for income, pushing some people towards illegal lucrative activities in their attempt to satisfy family needs.

A draft agreement for the management of the manatee has been initiated, in order to remove some fishing practices which disturb the animal in its habitat and cause numerous captures. They relate to articles 2, 8 and 9 of the Charter relating to the co-management of natural resources in Congo. The order n° 3863/MEF/SGEF/DCPP determines the animals wholly and partially protected by the law 48/83 of 21/04/83 and defines the conditions of conservation and exploitation of wildlife. In this last case, some provisions have been stipulated:

Release the animal when it is found alive and make a declaration to the management body.
When the animal is found dead in the fishing net, organize a traditional ritual and the manager of the protected area or the CID officer must record it.
Any individual who does not comply with the provisions of article 7, or poaches the manatee will be subject to the existing provisions and texts in this respect and will be liable to a fine of 15,000 CFA francs for the first and second time, and 30,000 CFA francs for the third time.

The Environment and Forest Economy Ministry is the custodian of the management of the species. The protected areas division is responsible for its direct management, but there are other insufficiencies, the main one being the failure to take into account manatees populating lakes outside protected areas. Thus, manatees outwith Conkouati-Douli remain vulnerable to capture by man.

6.19.7. Perspectives and recommendations

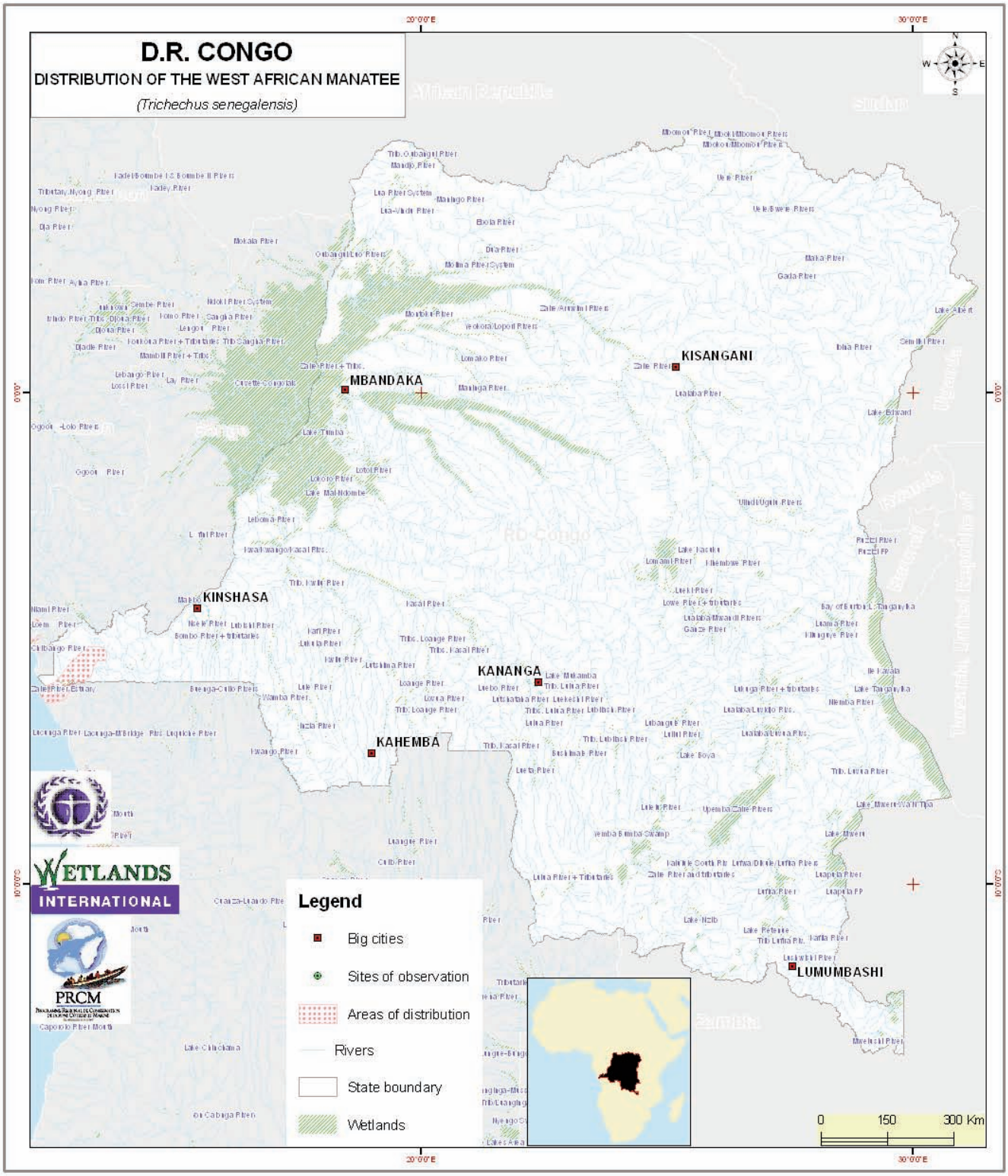
Given that we are at an early stage of research, the following recommendations are proposed for the

protection and knowledge of manatee in the Republic of Congo:

- Undertake more lengthy exploratory visits in all the lagoons, lakes and rivers of the coastal belt in order to ascertain the presence and status of manatees.
- Step up protection measures of the species at the local level by initiating integrated development plans.
- Establish an education programme in schools located around manatee sites and for the general public.
- Initiate compensation packages for hunters and traders of this species for loss of revenue, and provide rewards for releasing manatees accidentally caught in nets and reported.

Commit MPs in the strengthening of a specific text for the valuation of this species.

Conkouati-Douli National Park has all the conditions for good conservation of the manatee (abundance of fodder, currently limited human pressure, and excellent quality of the water). It is necessary to identify and set aside manatee sanctuaries within the lagoon system as areas where fishing and other activities are prohibited, so as to guarantee survival of the species (Akoi 1994). This policy will be more successful if participation and engagement of the population is increased, as part of a community management plan, where the community would perceive their interest.


D.R. CONGO
DISTRIBUTION OF THE WEST AFRICAN MANATEE
(Trichechus senegalensis)
KISANGANI
MBANDAKA
KINSHASA
KANANGA
KAHEMBA
LUMUMBASHI
Legend
Big cities
Sites of observation
Areas of distribution
Rivers
State boundary
Wetlands
0 150 300 Km
WETLANDS INTERNATIONAL
PRCM

6.20. DEMOCRATIC REPUBLIC OF CONGO

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6.20.1. General presentation of the area

The only part of this large country where the manatee is known to live is the lower Congo River between Boma and the Atlantic Ocean in the province of Bas-Congo. The area is dominated by the Congo River, with Cabinda (Angola) to the north and Angola to the south. The river is wide and tidal, and flanked by mangroves and swamps backed by coastal savannah and forest. At the river mouth is the Parc Marins de Mangroves, a protected area and Ramsar Site of 65,800ha in Muanda district. The park contains productive wetland habitats, including mangroves, swamp forest and temporarily flooded forests, as well as banks of sedges along waterways, including *Hibiscus tiliaceus, Canavallia maritima, Dalbergia ecastaphyllum, Echinochloa pyramidalis, Phragmites mauritanius, Drepanocarpus lunatus, Cyperus papyrus, Pandanus butayei* and *Sporobolus virginianus* (REFADD & ICCN 2006). One of the tributaries of the River Congo in the province of Bas-Congo is the River Lukanga.

6.20.2. Habitat and distribution of the manatee in the Democratic Republic of Congo

The West African manatee is only present in the small coastal area and tidal waters of the lower Congo River. Derscheid (1926) reported it to occur from the river mouth as far as Boma, but its presence further upriver was prevented by rapids. There have been past reports of manatees in the upper reaches of the Congo Basin, especially from the Mbomu, the Uele and Kibali (Dersheid 1926), but these have never been verified, and are considered by Powell (1996) to be erroneous, especially as fishermen interviewed near the Uele-Mbomu confluence in 1993 did not know about manatees. Manatees have also been reported from Stanley Pool near Kinshasa (Nishiwaki *et al.* 1982), but this also seems unlikely, given the large number of cataracts between Kinshasa and Boma. A manatee was captured in the Lukanga River in 1954 (Gijzen 1963).

The main habitats of manatees in the lower reaches of the Congo River are mangrove-flanked river waters, estuarine areas and riverine swamps.

6.20.3. Threats

Derscheid (1926) reported that manatees were appreciated for their meat in DR Congo (then the Belgian-administered Etat Indépendant du Congo) and he considered them threatened with extinction in the region, further stating that the Belgian authorities was not implementing any measures to control manatee hunting in the state. Fortunately manatees have not disappeared from the area, but they continue to be exploited. Fishermen within and around the Parc Marin des Mangroves do still capture manatees, as well as marine turtles, whilst there is also quite intensive cutting of mangroves for charcoal production, some of which is exported to Angola (REFADD & ICCN 2006). The main threats given by Tshibasu (no date) at the Parc Marins de Mangroves are:

- Habitat destruction, notably the deforestation of mangrove areas;
- Poaching: manatee is one of the key target species for illegal hunting, which threatens to exterminate manatees from this area;
- Pollution: this area falls within an internationally important zone for oil exploitation and exploration, and oil pollution from various sources is not uncommon. Pollution has impacts on the ecosystem and also has potential direct impacts on the manatee itself.

There has been legislation in the lower Congo concerning the manatee since the decree of 29th April 1901 under the London Convention (Derscheid 1926). However, this and subsequent legislation has not been adequately enforced, and, despite their apparent tenacity, the conservation status of manatees in DR Congo remains unfavourable.

6.20.4. Recommendations

The principle recommendations are:

- Reinforce conservation legislation in the Parc Marins de Mangroves.
- Carry out surveys for manatees in the lower Congo region and establish its extent of occurrence, seasonality and assess threats.
- Building on results of surveys, determine the key sites for manatees in DR Congo, and develop a local conservation action plan, which is likely to include elements of awareness-raising, capacity-building, law enforcement and further ecological surveys.
- Conduct interviews in areas of the upper Congo Basin from where past records of manatees have been claimed, in order to verify the presumed past and present absence of manatees from these areas, or otherwise.

6.21. ANGOLA

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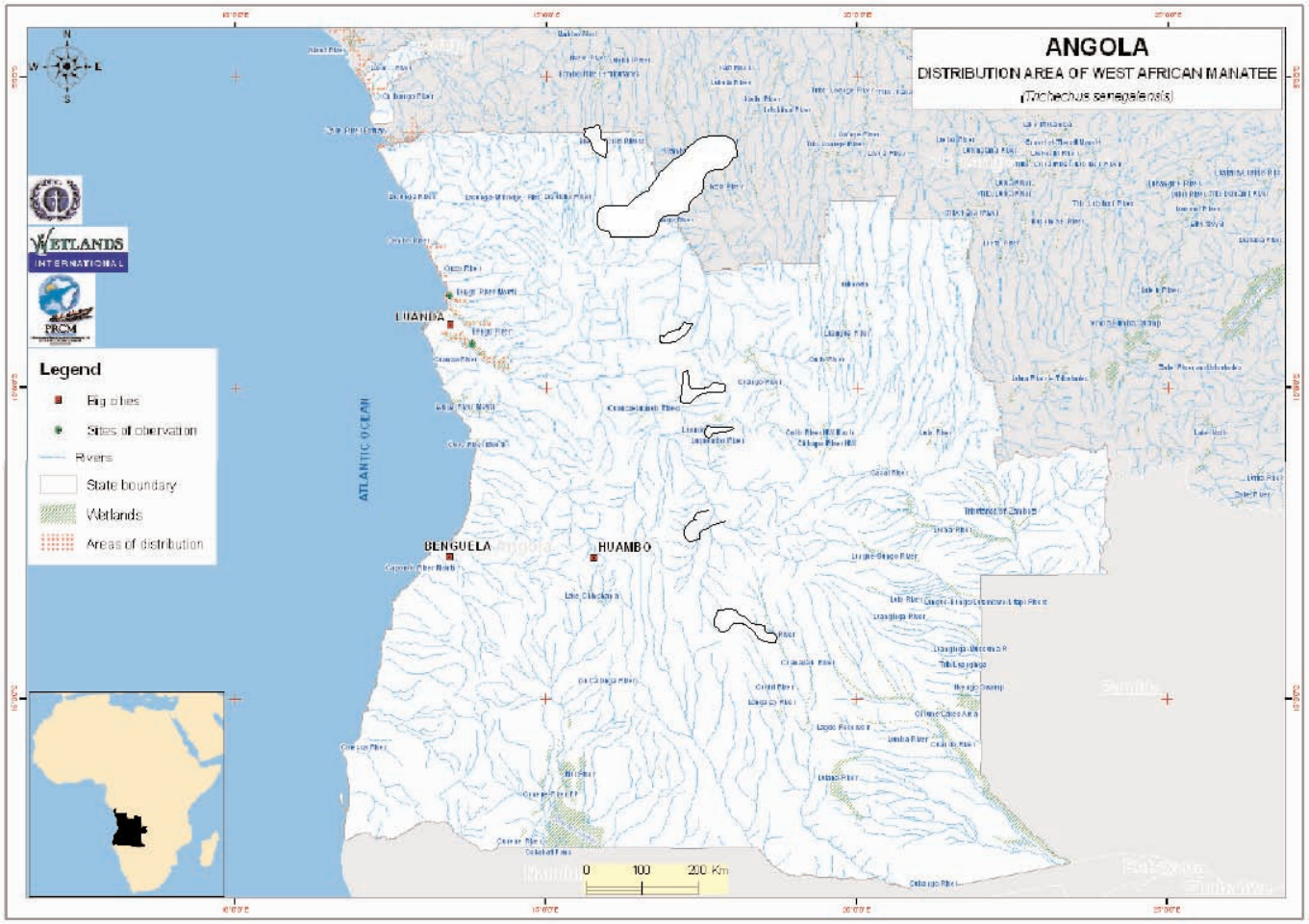
6.21.1. General presentation of the area

Angola is a large country in southwest Africa with a long Atlantic seaboard. At the coast, it has a tropical moist climate in the north, and a semi-tropical arid climate in the south. The enclave of Cabinda is at the coast north of the River Congo between the Democratic Republic of Congo and the Republic of Congo. It contains several coastal lagoons and smaller rivers, and the there are mangroves as well. Mangroves also occur further south, becoming less numerous. There are several shallow coastal bays, the largest of which is the Baie de Mussulo close to the capital, Luanda. At Mussulo, mangroves have been depleted, but the bay contains sea grasses and is a productive area, especially for shellfish. The Cuanza River, south of Luanda, is a long meandering river, with mangroves in its lower reaches (both *Rhizophora* and *Avicennia* species). Upstream the river is flanked by floating grass beds and other aquatic vegetation. Plants fringing, submerged in or floating on the river include semi-aquatic beds of *Panicum maximum, Urochloa* spp., *Sorghum*, *Brachiaria*, *Oryza* and *Eleusine* spp., swampy meadows of *Echinochloa pyramidalis*, *E. crus-pavonis* and *Oryza stapfii*, fringing



plants such as *Indigofera*, *Crotalariatipes* and *Mimosa pigra* and communities of *Cyperus papyrus*, *Pistia steatites*, *Ludwigia sedioides*, *Nymphaea lotus*, *N. caerulea* and *Eichhornia crassipes* (Morais 2006). The southern bank of the river forms the northern boundary of the Quiçama National Park for a length of approximately 100km. There are a few more bays and rivers south of the Cuanza, but the river Cuanza is generally taken as the southernmost limit of the West African manatee.

Coastal productivity is heavily influenced by the Benguela Current, which brings nutrients from further south. The coastal waters of Angola support important fisheries, and also serve as breeding areas for humpbacked whale. The coastal zone, especially between Cabinda and Luanda, is also rich in oil reserves, and much exploration is underway, with exploitation of oil, liquefied natural gas and other associated products.

6.21.2. Habitat and distribution of the manatee in Angola

Hatt (1934) reported the West African manatee to occur in the Loge, Dande, Bengo and Cuanza rivers. They are also reported to occur along the entire coast and in the Kisama National Park (Cuanza and Longa rivers) and in the Cunene River in Iona National Park (Powell 1996). Their likely distribution is from Cabinda in the north as far south as the Cuanza River and its tributaries, and the Longa River south of which there is not really appropriate habitat for sustainining manatee populations. There is good habitat in the shallow coastal bays, which contain sea grass beds, such as Mussulo Bay (Powell 1996). Morais (2006) found that manatees were distributed the length of the Cuanza River and its tributaries and lagoons from the river mouth to Cambambe dam, which, prior to construction of the dam, was characterised by steep rapids that also presented a natural barrier.

Distribution of manatees in the lower Cuanza River basin (Morais 2006)

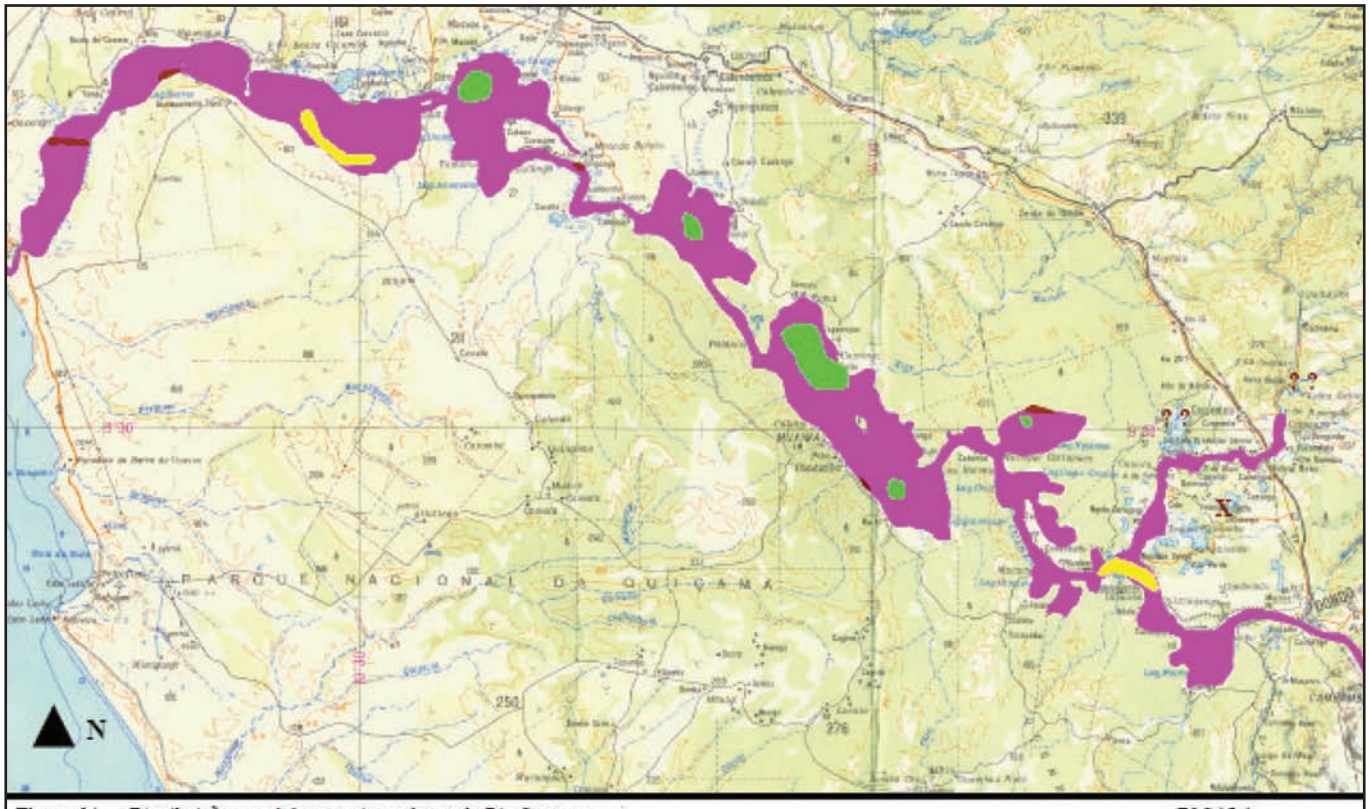


Figura 24 : Distribuição actual do manatim ao longo do Rio Cuanza ; Observação comum , Observação frequente ; Ausência de manatins X ; Incerteza na presença ?.

ESCALA
0.5 cm equivale a 3 km

Mapa adaptado da carta Nº SC-33/C-I 1:500 000 do Instituto de Geodesia e Cartografia de Angola (1986)

The manatee's distribution also extends up the Lucala River (a main tributary on the north bank) for at least 30km upstream from the Cuanza River. Key sites of the river basin include areas at and around Cauigia Lagoon, Cabemba Lagoon, the Tôa Lagoons, Quissungo Lagoon and a small extension of the Ngolome Lagoon, as well as in the Caua River and in the Massangano region (Morais 2006).

6.21.3. Socio-economic and cultural values

The manatee is highly valued in the Cuanza River basin as a source of meat, and over 99% of people interviewed along the river in 2005 had eaten manatee meat at least once (Morais 2006); meat is also traded, selling for about $2 per kg in markets in Luanda, although manatee oil appears to be less valued than in the past.

Various traditions and rituals have been associated with the manatee among traditional fishing communities of the Cuanza River basin, but these traditions are somewhat eroded by large influxes of people from across the country due to displacement of people during the long periods of war and civil instability (Morais 2006).

6.21.4. Threats

Morais (2006) considers that there has been a significant decrease in the population of manatees living in lagoons and rivers in Angola where there is a greater number of marginal fishing communities. A fisherman from a village at a lagoon on the Bengo River reported 77 manatees killed during 1998, and also indicated strong pressure on manatees in the Cuanza river (Ron 1998). The main threats to manatees in the Cuanza River basin (Morais 2006) are:

- Illegal hunting, especially at the beginning of the flood and towards the end of the dry season, using dedicated manatee nets and spears. Barriers made of sticks were employed in the past to trap manatees in small lagoons that dried up at the end of the dry season. Hunting pressure has increased along with immigration to the area of people displaced by war.
- Stranding of manatees in small pools at the end of the dry season, also through control of water flow from the Cambambe dam; this renders manatees very vulnerable to hunting.
- Habitat destruction, notably the deforestation of mangrove areas in the lower reaches of the Cuanza River.
- Incidental capture in fishing nets.

A further potential threat to manatees of Angola is pollution, due principally to the increasing levels of oil exploration in the coastal zone, whilst an industrial area is also being established on the Cuanza River.

6.21.5. Conservation initiatives

The manatee is listed on Appendix I of Angola's Hunting Law and in the Aquatic Biological Resources Law, and as such is fully protected by law, with a penalty attached of around $1,000 for its slaughter (Morais 2006). Angola has ratified a number of international conventions, but by 2007 had not ratified the Convention on Wetlands (Ramsar, Iran, 1971). There is a reasonable protected area network in Angola, including the Quiçama National Park, which caters for manatees in its stretch of the Cuanza River.

Through fieldwork and extensive questionnaires, Morais (2006) conducted a manatee survey in 2005 of the lower Cuanza River basin from Cambambe in the east to the river mouth at Barra do Cuanza, covering a 200km long section of the river plus a number of tributaries. This resulted in some significant recommendations for conservation of manatees in Angola (see below).

6.21.6. Recommendations

Morais (2006) recommends the following measures for the conservation of manatees in the Cuanza River basin, all of which should involve good stakeholder participation:

- Environmental education programme of at least three years covering all riparian communities, involving governmental and local administrations, environmental organizations, churches and the private sector; include the creation of a community-based pilot 'manatee project'.
- Improve enforcement of legislation relating to manatee protection, including the review and publicising of fines.
- Creation of at least one manatee nature reserve in an area that supports a higher density, such as the great Tôa Lagoon between Cacua and the small lagoons of Caquengue region.
- Programme of applied research to determine in particular manatee movements and habitat use, to evaluate the quantity and quality of available habitat, and to better ascertain the size and status of the population as well as the impact of mortalities.
- Evaluate the effectiveness of the current protected areas network for manatee conservation.

The most immediate requirements are efforts that actively contribute to a reduction in hunting pressure.

7. West African Manatee Conservation Strategy

The overall objective of this conservation strategy is to provide management recommendations for the conservation and protection of the West African manatee and its habitats, by building on the most reliable existing scientific data and by taking into account the environmental, socio-economic and cultural aspects of the species' distribution region. The aim is that these recommendations will be endorsed by and help to guide governments, civil society, stakeholders and the general public to take active measures to protect and manage this unique species for future generations. Based on the national status reports and the regional workshop of December 2006 (Wetlands International 2007), the Strategy outlines four specific objectives, with recommended actions and expected outcomes defined for each.

Strategic Objective:	**Improve the conservation status of the West African manatee across its range**

The strategic objective of the strategy is to significantly improve the manatee's conservation status in West and Central Africa, to make sure that no populations are lost and that the manatee's future survival is assured for many generations to come. There may be future global influences such as climate change impacts, that render some parts of the plan unachievable in the long term, but it should be feasible to significantly improve the manatee's conservation status, so that it stands a good chance of survival in the face of ongoing pressures and development. The strategy recognises the important role that the manatee has played and continues to play in the cultural fabric of the region. It is appropriate to ensure survival also of these cultural aspects, and that the traditional values of the manatee are not eroded.

The specific objectives address the main areas of legislation, species conservation and research, habitat restoration and management, and awareness. Although some actions are cross-cutting between these, they all contribute to overall strategic objective of assuring an improved conservation status of this special animal.

Specific Objective 1:	**Improve policies and legislation for manatee protection, and strengthen their implementation**

The West African manatee has long been considered as a threatened species since it has been 'known to science'. Even in 1901 the London Convention recognised the need to protect the 'African sirenians', after which the Independent State of Congo included the manatee on a list of animals that could only be killed in restrained numbers and only by those carrying a license delivered by the Governor General (Derscheid 1926); in the case of the manatee, the maximum number permitted to kill (with a license) was two. The West African manatee is currently listed at an international level as Vulnerable in the IUCN red list of endangered animals, designated according to criteria A3cd and C1 (Powell & Kouadio 2006). The stated justifications are given in the box below:

Criteria for Vulnerable status of the West African manatee (Powell & Kouadio 2006)

Criterion A3cd: This species is data limited with little new information since the previous assessment. Inference of a single generation time of up to 30 years in an unexploited population is based on data from the assessment for *T. manatus latirostris*. The level of threats, particularly hunting and incidental catches, appears to be continuing to increase throughout range with locally high rates and near extirpation in some regions. Lack of protein and continued poverty, and limited enforcement of national laws, are expected to drive increasing hunting levels. Destruction of coastal areas from mangrove harvesting, siltation and dams are resulting in reduced habitat. We estimate a high probability that a 30% or greater reduction in population size will result within a 90 year three generation period.

Criterion C1: Using survey information from Côte d'Ivoire, Guinea-Bissau, The Gambia, portions of Senegal and Cameroon, and inferring what is known about manatee habitat in other range states and manatee density data for *T. manatus*, it is estimated that there are fewer than 10,000 manatees in West Africa. A population decline of at least 10% is anticipated based on continuing and increasing anthropogenic threats.

The West African manatee is also listed in Appendix II of CITES (Convention on International Trade of Species of Wild Fauna and Flora). Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. A recent attempt to transfer the manatee to Appendix I[1] of CITES failed due to a lack of information about the trade of this mammal. However, it is clear from the national reports presented in this publication that there is an active trade in the West African manatee, notably for its meat and oil and its body parts for traditional medicine and other uses. Most of the trade takes place at a local or national level, and improved national legislation and policies are required in some countries for stemming this trade. However, most countries already have appropriate legislation in place, but have difficulties to enforce it. Wildlife trade enforcement is costly, requiring patrols and investigations in rural areas, whilst a heavy-handed approach does not always work well. Nevertheless, it is clear from the national reports that manatees are in decline in many countries, and some national-level advances in implementing policies that favour manatees form an essential component of a conservation strategy.

Whilst most trade is local or national, there are cases of international trade across porous borders. A good example is the export of manatee meat and oil from southwest Chad into Cameroon and Nigeria. International trade in live manatees has occurred in the past though infrequently. A pair of manatees was exported in 1996 from Guinea-Bissau to the Toba aquarium in Japan (Asano & Sakamoto 1997). Whilst the capture caused some controversy, it was preceded by population and feasibility surveys (Feron 1997).

Most range states are signatories of many international conventions and agreements promoting the conservation of threatened species, notably:

[1] Appendix I lists species that are the most endangered among CITES-listed animals and plants (see Article II, paragraph 1 of the Convention). They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial (see Article III), for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an import permit and an export permit (or re-export certificate). Additionally Article VII of the Convention provides for exemptions to this prohibition and these requirements.

- The African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968);
- The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1987);
- The Convention on Wetlands (Ramsar, Iran, 1971);
- The Washington Convention on Endangered Wild Fauna and Flora (1993);
- The Convention on Biological Diversity (1992); and
- The Abidjan Convention for Cooperation in the Protection and Development of the Coastal and Marine Environment of the West and Central African Region (1984).

Despite the technical support brought to signatory countries by the secretariats of these conventions, it must be recognised that their implementation is generally weak, due largely to the limited means of government departments. For instance, the Convention on Wetlands requires countries to adopt the wise use principle for the conservation of wetlands, but some wetlands in West Africa are still being destroyed or degraded. Often, the legislation that aims to benefit wildlife and natural resources is weaker than other government policies. For example, oil exploration has recently been taking place in Congo's Conkouati-Douli National Park, a prime site for West African manatee, and also a Ramsar Site.

At a regional level, the West African manatee was classified for the first time as a 'fully protected species' on 18th November 1947 in the whole territory of French Western Africa by decree N°47-2254 by the President of the Overseas Council of Ministers. Today, the manatee benefits from legal protection in most range states. However, there are disparities between countries in their effectiveness and implementation. As with legislation concerning trade, the laws that prohibit the killing or capture of manatees are equally hard to enforce, if not harder. In The Gambia, for instance, where the species 'enjoys' total legal protection, it is still commonly hunted. It is also protected in Sierra Leone, but is still largely sought after as a source of protein and hunted by the Mande who accuse it of devastating their ricefields.

Habitat degradation is another threat to the West African manatee, as detailed in earlier sections of this report. The manatee lives in a fragile environment, which is being exploited and/or degraded across much of its range. Some of the habitat threats include exploitation of oil reserves and pollution in coastal lagoons, sand deposition in rivers, construction of dams and degradation of mangroves leading to wetland loss. These issues also need to be addressed through legislation and improved implementation of national policies and the targets of international conventions.

Expected Outcome 1.1: Effective policies are established for manatee conservation at regional and national levels, and mechanisms are in place for their implementation in all range states

Recommended actions

- Conduct a critical review of existing regional and national policies related to manatee conservation.
- Incorporate specific manatee conservation measures into relevant existing regional and national policies.
- Establish strong regional policies for manatee conservation, and, where necessary, provide strategic support for strengthening of national policies.
- Establish practical mechanisms that facilitate implementation of policies at the regional and national level.

Expected Outcome 1.2: Effective legislative frameworks are established for manatee conservation in all range states

Recommended actions

- Conduct a critical review of existing legislative instruments at national and local levels (e.g. codes of conduct).
- Revise existing legislation and, where necessary, develop new specific legislative measures for manatee protection (e.g. incentives and sanctions).
- Incorporate specific manatee conservation measures into relevant legislative instruments at the national and local level in cooperation with relevant stakeholders.

Expected Outcome 1.3: Policies and legislation relating to manatee conservation are widely adopted and well known to stakeholders

Recommended actions

- Sensitise decision makers, local authorities and local communities about political and regulatory provisions for manatee conservation, and encourage their implementation.
- Develop capacity of agencies responsible for enforcing legislation related to manatee conservation.
- Build wide awareness of policies and legislation relevant to manatee conservation within all stakeholder groups.
- Develop appropriate information and awareness tools to promote manatee conservation, especially for local use.

Expected Outcome 1.4: Wide enforcement of legislation relating to manatee conservation

Recommended actions

- Promote application of legislation relating to manatee conservation at a regional level through implementation of international conventions and trans-border regulations.
- Enforce legislation relating to manatee conservation at a national level, especially at unprotected sites.
- Promote enforcement of legislation as widely as possible, especially in relation to manatee hunting and trade.

Specific Objective 2: Improve understanding of the West African manatee and use information for its conservation management

The West African manatee remains the least known of the living sirenians. Its biology is not well described compared to the manatees of Amazonia or the West Indies, both of which have benefited from numerous research works that have enabled the establishment of appropriate conservation programmes, notably in Florida and Brazil (Akoi 2000).

Whilst Nishiwaki *et al.* (1982) and Powell (1996) have presented regional overviews of the status and distribution of the West African manatee, only a handful of scientists have undertaken focused research about the species. Both regional overviews and the limited site-based research report on increasing threats to manatees in Africa and a general reduction in the size of populations. These findings are supported by the recent analyses, as presented in preceding chapters of this publication. All countries and earlier reports also underscore the need to undertake more research in order to understand better the habitat and other requirements of the West African manatee, vital information for successful management of dwindling populations. In addition, prior to the short-term initiatives described in the preparation of this strategy, there has never been a coordinated regional programme on the West African manatee in which relevant national agencies have been involved. Thus, despite its large size, its wide distribution and the high public interest it generates across its range, the West African manatee remains one of the least known of the larger African mammals.

A fundamental information gap concerns the difficulty in gauging the sizes and trends of populations of the West Africa manatee. Contradictory reporting and variations in observer accounts about manatee numbers and other information can cause confusion (Ciofolo 1996), whilst the troubled waters of some African wetlands present a real obstacle to estimating manatee populations (Silva *et al.* 1999). However, without having a reasonable idea about population sizes and range, it is hard to determine population trends and to highlight areas where manatees are at greatest risk of local extinction. Lack of knowledge about diurnal and nocturnal habits and of their migratory and seasonal behaviours further heightens the difficulties in determining the conservation status of manatee populations. Information is also needed on the risks of genetic isolation and vulnerability. Sustainable harvest levels need to be understood in areas where manatee capture is likely to continue into the future.

Overall, there is much that the scientific, conservation and water resource management communities, as well as other stakeholders need to learn about the West African manatee in order to work towards its conservation and wise use. Given the manatee's extraordinary range, research needs to be widespread, so that the conservation requirements of manatees in different habitats and facing different threats should be determined. Further, there is much to be gained from a regional approach, so that results from different areas may be compared in order to build up a sound picture of this enigmatic species across its range.

Expected Outcome 2.1: Improved knowledge of the West African manatee achieved through national and regional research initiatives

Recommended actions

- Develop and harmonise methodologies and protocols for research and monitoring of the West African manatee.
- Conduct applied research programmes on the West African manatee focusing on identified knowledge gaps, especially for enabling successful species conservation and management.
- Carry out regular monitoring of manatee populations, especially at key sites.
- Determine important areas for manatees, especially relating to movements, feeding and mating, and develop mechanisms to reduce manatee pressures in these areas.
- Establish a scientific and socio-economic database on the West African manatee.

Expected Outcome 2.2: Successful management and conservation mechanisms are established for the West African manatee

Recommended actions

- Establish site-based applied research and management programmes for the demonstration of appropriate conservation mechanisms.
- Evaluate and improve manatee conservation and management mechanisms at different levels (i.e. regional, catchment and community levels).
- Identify key sites for manatee conservation, and develop proposals for their designation and management.
- Identify key habitat requirements for manatees in different areas, and establish mechanisms for preventing the destruction and degradation of these habitats.
- Design and avail practical tools, such as monitoring manuals and standardised forms, for strengthening regional capacity in the monitoring and management of West African manatee populations.

Expected Outcome 2.3: Establishment of a functioning regional manatee network strengthened through capacity development and exchange initiatives

Recommended actions

- Establish a regional manatee network with active engagement of appropriate institutions and resource persons for information sharing and exchange at national, regional and international levels.
- Develop and run training and capacity building programmes for actors involved in the management and monitoring of the West African manatee.
- Identify and resource a regional centre for provision of expert advice on the West African manatee, capacity development and information exchange, with a regularly updated website, database and other facilities.
- Organise regional exchange workshops on research outcomes.
- Develop and organise inter-state and community exchange visits.

Specific Objective 3: Reduce pressures on the West African manatee through the restoration and safeguarding of its habitats

As the manatee's main habitats are productive wetland ecosystems, this naturally brings them into contact with man. Hunting and use of manatees are thus deeply rooted in the culture of many communities. Despite widespread legal protection, the manatee is still hunted across its distribution area for its meat, leather, oil and other body parts (e.g. Powell 1996; Reeves *et al.* 1988).

The destruction or loss of habitat is also a great danger for manatee populations. Coastal wetlands in some areas have been seriously damaged and

remain threatened. The great droughts of the 1970's and their consequences have disturbed the functioning of coastal and inland ecosystems where manatees live. One consequence is the fragmentation of its habitat, which can lead to the isolation of populations. Decreases in water levels can cause the beaching of manatees on shores and in shallow water, when they become easy prey for fishermen and other people of riparian communities.

Hydro-agricultural developments along the banks of rivers and estuaries also impact manatees. In coastal regions, destruction of mangroves has negative impacts on manatees, reducing habitat and food supply. The deforestation of mangroves brings about increasing sedimentation in coastal lagoons and estuaries. Riverine wetlands are impacted by desertification affects and infrastructural developments, such as the construction of dams and the abstraction of water for irrigation.

The reduction of water flow due to the building of dams can also contribute to a diminution in freshwater supply in the lower reaches of rivers and in estuaries. This can lead to low water levels and a general increase in salinity, which affects the growth of plants. The wetlands near the lower Volta have dried up in some areas, consequently reducing the manatee's habitat and limiting its movements to the swamps of River Tordzie.

Manatees are also susceptible to pollution. In some coastal areas of Cameroon surface water bears pollutants coming from municipal and industrial drains, sediments, pesticides and fertilisers that may be harmful to manatees. In Ivory Coast, 25% of the human population lives in wetland areas, yielding effluents that concentrate in estuaries and rivers and affect the health of manatees, which are sensitive to environmental pollution. Upstream dams in Ivory Coast (e.g. Kossoy on the Bandama and Buyo on the Sassandra), the pollution of the Ebrié lagoon in Abidjan, and indiscriminate fishing methods, all contribute to water pollution and/or an excessive salinity, and manatees have thus become totally absent in the lagoon waters around Abidjan.

Overall, there are many and diverse threats on the West African manatee's aquatic habitats across its range, and efforts are required to mitigate these significant threats. The outcomes and actions recommended are as follows:

Expected Outcome 3.1: Designation of sites providing key manatee habitats as sanctuaries and through national and regional initiatives

Recommended actions

- Create a series of sanctuaries that provide excellent habitat and refuge areas for the West African manatee (e.g. community based sanctuaries and Marine Protected Areas), both at the coast and in each river basin.
- Develop and implement conservation plans for the West African manatee at the ecoregional level (e.g. PRCM, Niger Basin) and national level and at specific key sites (e.g. protected areas).

Expected Outcome 3.2: Rehabilitation of West African manatee habitats

Recommended actions

- Develop and implement habitat restoration plans at degraded sites in important manatee zones, in collaboration with local stakeholders.
- Where feasible, rehabilitate obstructed waterways that currently prevent the free movement of manatees.
- Promote management options at hydraulic works that enable the passage of manatees, at least seasonally.
- Ensure that key sites for manatees are protected from the negative impacts of pollution.
- Promote restoration of forests in basin headwaters in order to alleviate siltation of rivers and sand deposition.
- Develop long-term strategies to protect manatee habitats in relation to climatic changes.

Expected Outcome 3.3: Reduced exploitation and capture of the West African manatee

Recommended actions

- Reinforcement of control measures of hunting;
- In cooperation with local communities at sites where manatees are hunted, develop alternative income generation activities (such as ecotourism, livestock breeding, aquaculture and bee-keeping) and train hunters in such disciplines, to encourage a reduction in manatee hunting.

- Provide community-based incentive packages for communities that elect to refrain from manatee hunting.
- Encourage the use of manatee-friendly fishing techniques in order to reduce the incidental capture of manatees in fishing nets.
- In collaboration with local communities at key sites for manatees, establish no-fishing zones in particularly important areas, in order to reduce the incidental capture of manatees in fishing nets.

Specific Objective 4:	**Instil a wide appreciation of the West African manatee and its ecological and cultural values through targeted communication, education and public awareness**

The West African manatee is a valued component of the wetlands of West and Central Africa, on an ecological, economic and cultural level, and as such is appreciated in many areas for these diverse values. However, as some traditions become eroded and as threats increase along with modernisation, human population growth and habitat conversion, so there is a need for a wider appreciation of the manatee. The main recognised values, which provide strong justification for strengthening awareness are given below:

a. Ecological values

As a herbivore, the manatee contributes to the control of plant growth in rivers and other waterways, such as clearing channels of their overabundant vegetation (Bertram & Bertram 1966; Lowe 1992; Ajayi 1971). It has even been proposed as a form of biological control against the proliferation of water hyacinth in West African rivers and streams. The potential role of manatees to fight water hyacinth proliferation has been considered in Niger (Ciofolo & Sadou 1996), although this aquatic weed does not appear to be one of the manatee's favoured food items in Africa. In some areas, however, there may be a positive relationship between the presence of manatees and an increase in fisheries productivity, due to the enrichment of water by manatee dung (Ciofolo & Sadou 1996).

b. Economic values

For a long time, manatees have been valued economically for their meat and other products, especially for items used in traditional medicine. However, this has led in many areas to over-hunting, with populations declining across the range. The meat and oil are also subject to illegal trade, with trafficking taking place for instance between Chad and Cameroon. In Ivory Coast, a killed manatee is valued at between 150,000 and 170,000 CFA francs. The meat is sold per portion of 400g at between 4500 and 5000 CFA francs. In parts of Nigeria a male manatee may be exchanged for a 10 metre long boat and an outboard motor. In Guinea-Bissau a pair of manatees was sold to a Japanese aquarium in 1997, and they are even offered for sale on the internet from this country. It is thus a highly valued species for local consumption and use and commercial trade.

c. Cultural values

As reported in the national overviews in this publication, the West African manatee is also widely respected or venerated by many cultures and traditions across its range. It is an emblematic totem for the Mandé in Niger, whose name is even derived from the manatee (*ma* being 'manatee' and *ndé* meaning 'son of'). For the Diolas and Mandingos of Casamance, it is forbidden to attack this inoffensive mammal. In some villages of the Congo, the manatee is known under the name 'Mami Watta' and is believed to be a spirit of the ancestors living in lagoons, its mythical appearance being that of a mermaid (Akoi 1994). The morphological resemblance between the woman and the female manatee raises veneration, respect and prohibition. Traditionally, the Peul of Sahelian Africa believe that the ancestor of the manatee is a Peul woman, who transformed herself into a manatee while taking a bath in the river (Bessac & Villiers 1948). In Guinea, the manatee marks the collective imagination of Baga and Soussou populations of the Dubreka and Sangareya region.

The manatee has a therapeutic mythical interest for various ethnic groups in the areas it is found. Generally, all the parts of the species are considered useful, and several body parts (such as bone, blood and skin) are used in traditional medical practices, each part having a particular medicinal function. For example, oil is used in some cultures to treat otitis, skin serves as a remedy against dermatoses and fat cures tetanus and fever.

However, in some areas the manatee is perceived as a disruptive animal due to occasional accidents with pirogues and its feeding in flooded rice fields. Some riverine communities report that the manatee is responsible for the disappearance of catch from fishing nets. Such accounts can lead to resentment towards the manatee, and some local communities in Guinea wished for the disappearance of the species from their waters (PRCM 2005).

Overall, respect for the manatee needs to be restored widely across the region, and awareness spread about its ecological and cultural values in particular. This should be achievable through targeted communication, education and public awareness, underlined by the following expected outcomes and recommended actions:

Expected Outcome 4.1: Education and awareness materials relating to manatees, especially their values and threats, are developed and used widely throughout the West African manatee's range

Recommended actions

- Integrate manatee conservation into training programmes of schools, universities and training centres.
- Develop training tools relating to manatees and wetlands for schools, universities and training centres.
- Provide community based organizations with resources, practical training and animation tools for communicating the threats to and values of manatees.
- Develop communication media (including web-based resources) relating to manatees and wetlands, especially for use by national and local press.
- Encourage wide availability of all media and materials in appropriate local languages, and disseminate them in all range states

Expected Outcome 4.2: Attitudes and actions favourable to manatee conservation are encouraged through awareness campaigns

Recommended actions

- Collaborate with radio and television stations to broadcast information about manatees and wetlands.
- Produce reports and documentaries about community efforts to conserve manatees.
- Organise special campaigns (such as 'Save the manatee' days and manatee clubs) to build awareness about issues important for manatee conservation.
- Collaborate with the press to foster public awareness of the values and threats to manatees.
- Organise seminars and other events to make decision makers aware about manatees and their conservation needs.

Expected Outcome 4.3: Manatee conservation is integrated into existing communication, education and awareness programmes

Recommended actions

- Build manatee communication, education and awareness components into management plans for sites and catchments where the West African manatee occurs.
- Integrate the challenges facing the manatee and related conservation solutions into existing environmental awareness programmes at the national and catchment / basin level (e.g. the Niger Basin Authority).
- Develop mechanisms to integrate the manatee into national environmental education programmes.

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