STATUS OF THE MEDITERRANEAN MONK SEAL (*Monachus monachus*) ON THE COASTLINE BETWEEN *CAPE CORVEIRO* AND *CASTILLETE DE LA MESA* (MOROCCO),

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Summary

The Mediterranean monk seal is among the ten most endangered mammals in the world. Its largest population, and the only one that maintains a colony structure, is on the Atlantic coast of the Cabo Blanco peninsula (Morocco/Mauritania). However, despite years of study and conservation efforts made mainly by the team of the CBD-Habitat Foundation, the coastline to the north of the colony (between Cabo Corbeiro and Castillete de la Mesa) has remained practically unexplored, mostly due to its inaccessibility problems. Previous expeditions to this area performed in the last twenty years (Soriguer 1976; Marchessaux *et al* 1988; El Amrani *et al* 1992) showed the possible presence of monk seal individuals along this coastline, although their exact locations and the population size couldn't be determined.

In May (2005), within the framework of the International Monk Seal Recovery Plan in the Eastern Atlantic, developed by Morocco, Mauritania, Portugal and Spain (Convention on Migratory Species, UNEP/CMS), most parts of the coast were surveyed on board the R/V "*Song of the Whale*" of the International Fund for Animal Welfare (IFAW). The objective was to locate monk seal individuals and gather information about the conservation status and threats of the species in the area.

The whole coastline between Cape Corveiro and Castillete de La Mesa was surveyed. Although no monk seals were observed during the survey, questionnaires conducted with local fishermen and Moroccan military personnel, confirmed several sightings in recent years, implying that the area is used by seals. It was not possible to determine the degree of occupation or use of the coast, but areas and caves were identified that could potentially be used by seals. Human threats were also identified, most of them related to illegal fishing and collection of crustaceans, as well as an increase of human disturbance, which leads us to include some preliminary recommendations in the present document.

Introduction

The Mediterranean monk seal is one of the most threatened mammals in the world (red list, IUCN 1996). Its global population is estimated to be less than 400 animals separated in fragmented and isolated populations (Action Plan for the recovery of the Mediterranean Monk Seal in the Eastern Atlantic 2005). One of the largest populations, and the only one that maintains a colonial structure, is located in the Cabo Blanco Peninsula (Morocco/Mauritania) (Marchessaux 1989; Gonzalez *et al*. 1997). The colony animals are located along the western coast of this peninsula from its southern tip (20º40'N) to Castillete de la Mesa (21º11'N) (Map 1). This coastline is characterised by a series of cliffs in the northern and southern part, and sandy beaches in its central area. The largest concentration of animals takes place in "Las Cuevecillas", where animals from all the age-classes are present throughout the year. In this cliffy area, seals haul-out and breed on the inner beaches of two caves. To the north and south of those caves, there are two locations where adult males gather and defend aquatic territories. Those two locations are Cabo Blanco and Castillete de la Mesa. These adult males can also be observed in the breeding caves of "Las Cuevecillas".

In 1975, Ramón Soriguer found a cave with seals a few kilometres north of Castillete de la Mesa (Soriguer 1976, Soriguer, pers. comm.). Since then, and due to problems related to the accessibility to the area as a consequence of the armed conflict, there have been only two expeditions to this coastal area north of Castillete de la Mesa. Marchessaux and Aouab (1988) performed a survey in 1988 with a helicopter between Cape Barbas and the Moroccan border with Mauritania, to the South. During this survey, they sighted five monk seals, four of them in the Vialobos la Vieja (D'Khila) area. In 1990, El Amrani *et al* (1992) carried out a marine expedition from Cabo Barbas to the monk seal colony of Las Cuevecillas. The expedition was performed from inflatable boats, surveying caves. No monk seals were sighted until they arrived to Castillete de la Mesa, where, as mentioned above, male adults from the Cabo Blanco breeding caves defend aquatic territories. Since then, the section of the coast north of Castillete de la Mesa has remained unexplored. Only minor expeditions of a few kilometres north of Castillete de la Mesa from inflatable boats have been performed by the team of CBD-Habitat Foundation, responsible for the monitoring of the Cabo Blanco colony; no seals have been observed.

In addition to the general lack of knowledge about the presence of seals on this part of the coastline, little is known about the effects of the 1997 mass mortality, when the Cabo Blanco colony was reduced by two thirds. Similarly, little is known about the possible impact of the establishment of artisanal fishing settlements in Vialobos la Vieja (D'Khila) and Vialobos la Nueva (Corbeiro), between 1998 and 2003. These two settlements have been destroyed and eradicated since 2003, and fishermen were displaced to the north, by a local decision taken by the authorities following a recommendation made by the INRH – Dakhla aiming at preserving the monk seal population and its habitat.

The lack of information, the urgent need to determine the presence of monk seals in the area, in order to be able to adopt conservation measures, and the possibilities provided by the Action Plan for the Conservation of Monk Seals in the Eastern Atlantic (CMS/UNEP), are the main reasons to carry out an expedition in the area. It was performed by sea using the research vessel "*Song of the Whale*" from the International Fund for Animal Welfare (IFAW). The expedition was jointly organized and carried

out by the CBD-Habitat Foundation, the international organization IFAW, the Institute National de Recherche Halieutique (INRH - Morocco), and the local Moroccan association Nature Initiative.

Methods

Study area

Given the large study area between Cabo Barbas and Castillete de la Mesa (around 130 km), the frequent presence of bad sea conditions in the season designated for the survey (May), and the limited time availability of the research vessel, it was decided to establish priorities for the study areas in order to concentrate efforts on coastal sections which offer higher possibilities to be used by the seals (Map 2). Areas designated in this work as low priority refers only to the mentioned constraints.

We adhered to the following criteria to establish priorities: number of recent monk seal sightings recorded in the area, human pressure on the coastline, the level of difficulty to access to the coastline, and the type of coastal habitat. The coastal section between Cabo Barbas and Roque Chico (Lamhiriz) currently holds a much higher level of human pressure than the rest of the areas (Lamhiriz is the site used to gather and settle fishermen displaced from the south). This is mainly due to the relatively easy access to this area, which is even visited by tourists, and the presence of the fishing settlement of Lamhiriz, which holds more than 350 artisanal fishing vessels. In numerous interviews performed by CBD-Habitat and Nature Initiative with fishermen of Lamhiriz, no information about recent monk seal sightings in this area were obtained (CBD-Habitat, own data). Therefore, it was considered that the probabilities to perform observations of seals in this area were low and it was considered as a low priority area.

The coastline between Lamhiriz and the southern part of Santa Ana Bay was not identified by Marchessaux and Aouab (1988) as potential habitat for monk seals, so it was also considered a low priority area.

The area around Vialobos la Vieja (D'Khila) and Guerguerat cliffs to Castillete de la Mesa were considered as high priority areas, due to the existence of information about sightings recorded in interviews previously performed with fishermen (CBD-Habitat, own data), the difficult access to the coastline (as it is a military area), and because Marchessaux and Aouab (1988) described the area as a cliffy coast with caves suitable for seals.

The survey efforts were therefore focused on the coastline between the southern part of Santa Ana bay (21º50.284'N 16º57.196'W) and Castillete de la Mesa (Map 2).

Data collection

The information about the status of the monk seal between Castillete de la Mesa and Cabo Corbeiro was obtained through a preliminary terrestrial expedition between Puerto Nuevo (21º42.388'N 16º58.919'W) and El Camello (21º27.754'N 17º00.161'W), and through a marine survey of the whole study area on board the "*Song of the Whale*" (Map 2).

a) Land expedition between Puerto Nuevo and El Camello.

This expedition was performed to determine the type of habitat in the different sections of the coast (*i.e*. the presence of cliffs and caves) in order to facilitate the following surveying work of the SOTW. The degree of human threats for the seals on the coastal area was also determined, mainly based on the presence of fishing gear illegally set and of fishermen and goose barnacle pickers that work from the coast. To do so, after obtaining the necessary permits, a four-wheel drive vehicle was used to cover the area between Puerto Nuevo and El Camello, with access to the shoreline at some points to gather the aforementioned information.

b) Sea expedition using the "Song of the Whale".

The goal of this sea expedition was to determine the presence of seals in the area, mostly adult males at the base of the cliffs, or animals from other age-classes. For this, a Zodiac from the "*Song of the Whale"* (SOTW) was used with a driver and one or two observers who slowly went over the coast as close to the shoreline as possible. The observer(s) recorded information related to the type of coast (beach, cliffs, height of the cliffs, etc.), presence of caves and their characteristics (presence of internal beach, entry tunnel, exposure to waves, accessibility from land, etc.), presence of illegal fixed fishing gear or pirogues, presence of human activity on land (fishermen and goose barnacle pickers), and other relevant information.

While the Zodiac was surveying the coast, the SOTW navigated in parallel at about 1-2 nautical miles offshore with an observer on an elevated platform (5 m eye-height).

Results

On May 6 2005, the land expedition was carried out, covering the coast between 21º42.388'N 16º58.919'W (Puerto Nuevo) and 21º27.754'N 17º00.161'W (El Camello).

Due to bad sea conditions during most of May, the survey by Zodiac and the SOTW could only be performed on May 8, 11, 18 and 19. Fortunately, it was possible to explore the whole shoreline during those days between 21º50.284'N 16º57.196'W (north of Cabo Corbeiro) and 21º10.955'N 17º03.099'W (near Castillete de la Mesa). Only one section of the coast about 3.4 km long, between 21º20.278'N 17º02.055'W and 21º18.461'N 17º01.887'W, could not be explored due to the unsuitable weather conditions.

The coast was classified into various sections based on its geomorphology (Map 3):

a) Section 1. Southern part of bay of Vialobos la Nueva (21º50.284'N 16º57.196'W) and Castillete Picudo (D'Khila) (21º46.113'N 16º57.610'W)

This area was only surveyed by sea. It contained a variation of low cliffs (less than 5 m) and middle cliffs (5-10 m), and some occasional open beaches. Some beaches are protected by high or middle height cliffs.

Twelve caves were found, three of which had an interior beach protected from the waves, and two of them were also not accessible by land (less vulnerable to disturbance from humans by land). The area contains few caves that can be used by seals, since most of the cliffs were quite low.

No seals were observed in this area.

A camp of goose barnacle pickers and fishermen formed by several local tents (khaimas) was observed at the position 21º46.693'N 16º57.908'W. Two artisanal fishing vessels from the Lamhiriz fishing village were observed fishing illegally in the area on the position 21º50.284'N 16º57.196'W (Map 4).

b) Section 2. From Puerto Nuevo (21º42.388'N 16º58.919'W) to El Roquito –also known as Playa Salek - (21º35.363'N 16º58.897'W).

This section of the coast was surveyed once by land and twice by SOTW using the Zodiacs. This area is called "El Kiran" by the locals and cliffs are quite abundant and variable in height between 5 and 15 meters.

More than eight caves were observed there with an interior beach, inaccessible by land. According to the testimony of the fisherman who served as guide for the team, there was a group of seals seen around one of these caves in 1996. It is located in an area with 10 m cliffs and quite similar to "Las Cuevecillas", where the monk seal population currently known is found. The cave has an interior beach, although quite small, and is protected to the north by a jut of land that are quite common along that part of the coast, creating small bays with caves protected from the waves.

No seals were observed in this area nor any caves with signs of use. However, fishermen and military personnel gave some indications about the presence of seals in this area. One fisherman reported that he had seen seals in March-April 2005 to the south of Puerto Nuevo, but could not specify further. Another fisherman of one of the camps found, said that he had seen a greyish seal about a year earlier in Vialobos la Vieja (D'Khila).

Two camps for fishermen and goose barnacle pickers were located (at 21º41.479'N 16º58.823'W and 21º40.179'N 16º58.589'W) (Map 4), as well as the remains of their activities along the whole coast. Around the second camp, there was fishing gear set between one point of the coast to another, closing the small bays that were protected from waves and with presence of caves with good conditions to be occupied by seals. Likewise, a group of barnacle pickers working in the area around the cave has been witnessed where the guide reported having seen seals in 1996. Also fishing gear was found set, very close to the cliffs, possibly gillnets for fishing green lobster (*Panulirus regius*), similar to those used in the Moroccan landing site of Lamhiriz and in the Mauritanian ports of Las Ballenas, La Guera and Nouadhibou. They had obviously been abandoned for some time since the buoys at the ends were covered with algae.

c) Section 3. From El Roquito (21º35.363'N 16º58.897'W) to the beginning of Guerguerat cliffs (21º26.477'N 17º00.740'W).

This is a section with series of beaches with interceding juts and rocky platforms between them. There is presence of low cliffs (around 5 m high) in some areas.

There exist caves in the rocky juts and low cliffs, although they did not appear to be caves that could be used by seals, mostly due to their high exposure to swell and their ease of access and human disturbance by land.

No seals were observed, although the guide said that he had seen seals in that area in the 1990s. A fisherman from one of the camps in El Kiran reported that he had seen three large grey individuals close to the coast, three months earlier (January-February 2005). Similarly, a military officer posted in the area said that he had seen a black animal with a moustache on several occasions when fishing from the coast, possibly an adult monk seal male around 21º 30´559 W 16º 59´540. The last sighting was in September-October, 2004.

No illegally set fishing gear was found in this area nor evidence of any other human activity from land.

d) Section 4. From Guerguerat (21º26.477'N 17º00.740'W) to Castillete de la Mesa.

This section of the coast has a series of cliffs varying in height between 5 m and 25 m high. There exist a high number of caves but most of them are not suitable to be occupied by the seals. More specifically, the shoreline is quite exposed to high swell and most part of the caves lack an interior beach. Similarly, there exist many caves which have collapsed completely or partially, and that makes them not suitable for the seals or more vulnerable to disturbance by land.

No observations of monk seals were made in the area.

In the northern side, no illegal fishing activity was detected either from land or from the sea. From Castillete Alto to Castillete de la Mesa, illegally set fishing gear is abundant. Inside a small bay located on 21º17.627'N 17º01.749'W, two pirogues from a Mauritanian port were observed fishing illegally. Similarly, a few hundred meters to the north of Castillete de la Mesa a camp of goose barnacle pickers was located at 21º11.144'N 17º03.052'W (Map 4).

Discussion

Monk seal status

The observations presented in this report, with respect to cave occupation by monk seals in 1996, are likely to indicate that a small population of seals was present in that region during that time. In the present mission, the lack of sightings to the north of Castillete de la Mesa did not provide conclusive evidence that the seals have disappeared from the region. Although the methodology used to detect seals on the

coast was adequate (as demonstrated by previous trials performed in the area around Las Cuevecillas), the duration of the study was cut short due to bad weather conditions, which can partly explain the lack of sightings. Nonetheless, the massive die-off of seals in 1997 in Las Cuevecillas could have affected the abundance of monk seals in other areas and reduced their numbers, to a point where individuals are now very difficult to detect. In addition, between 1997 and 2003, two artisanal fishing settlements were established in Castillete de Vialobos la Nueva (fishing settlement "Corbeiro") and in Vialobos la Vieja (D'Khila). Similarly, there has been a fishing settlement in Roque Chico (Lamhiriz) since 1995, which was already in use at the beginning of the 1980s by fisherman from Senegal and Mauritania (CBD-Habitat unpubl. data). In those settlements, different fishing gear were used to capture target species (octopus, fish, lobsters, etc.; Bensbai *et al* 2004), some of them being potentially dangerous for the seals, such as trammel nets and gillnets for fish and green lobster (*Panulirus regius*) (CBD-Habitat unpubl data). Thus, the presence of many artisanal fishing boats in the area using fishing methods that can cause incidental captures of monk seals, could have also seriously affected the population of monk seals in the area.

Nevertheless, although no sightings were made in the present expedition, current testimonies from fishermen and military personnel indicate that there are still monk seals between Cabo Corbeiro and Castillete de la Mesa. However, it is not yet possible to determine the degree of habitat use without further monitoring.

Habitat availability

The terrestrial habitat available for monk seals (*i.e*. caves that can be occupied) in the study area is not distributed uniformly. There are two areas made up of cliffs with caves that have the necessary conditions to be used by a colony of seals. Those areas are the surroundings of Vialobos la Vieja, (D'Khila) between Cabo Corbeiro and El Roquito (El Kiran), and the cliffs of Guerguerat. The former offers a better quality of habitat, since there are more caves with an interior beach, protected from the waves and not accessible by land.

It does not appear that land habitat is a limiting factor for the presence of seal colonies on this coast. The amounts of caves that could be occupied, even if not abundant, are more than enough for the installation of colonies of a similar size as those that occupy the Cabo Blanco Peninsula. Similarly, the amount of beaches protected by cliffs and rocks could make it feasible for the seals to recolonize old habitats occupied by the species when it was more abundant in the region.

Human Threats

The existence of several camps for fisherman and goose barnacle pickers, mainly in the areas surrounding Vialobos la Vieja (D'Khila), the area with the best quality of habitat available for seals, has important consequences on the degree and quality of habitat use. These camps provide a permanent human presence (at least during some seasons of the year) and therefore, a constant source of disturbance on beaches, and cliffs, as well as in the interior of accessible caves, collapsed caves, beaches protected by cliffs, etc. where it is possible to collect these sought after crustacea. At the same time, the placement of fishing gear between the two extremes of the small bays in the area between Vialobos la Vieja (D'Khila) and El Roquito (playa

Salek) (effectively closing them off), limits access to the beaches and caves and greatly increases the danger that seals get tangled in the nets when trying to reach the protected caves in these small bays.

The illegal fishing gear set between Castillete de la Mesa and Castillete Alto, and around Vialobos la Vieja (D'Khila), is a constant threat, mainly when it is placed near caves used by seals. The control of illegal fishing by the Moroccan Royal Navy effectively controls industrial fishing boats, but small artisanal boats belonging to the sites of Lamhiriz in Morocco and Nouadhibou in Mauritania requires specific surveillance measures.

Through conversations held in Dakhla with local and regional authorities, it is likely there will be an important increase in human presence in the short and medium term on the coast around Cabo Barbas, due to the progressive occupation of the recently created city of Bir Gandouz (Map 1). This city is located 15 km to the SSE of the fishing settlement of Lamhiriz (Roque Chico) and 38 km to the NE of Vialobos La Vieja (D'Khila). Its occupation will increase human presence in coastal areas already occupied or that could be re-colonized by monk seals. Only permanent legal protection of the suitable habitat for monk seals will be able to avoid this permanent source of disturbances and threats. Similarly, the proposal to create the new city of La Güera around the cliffs of Guerguerat or in Vialobos la Vieja (D'Khila), is an example of the human pressure in the area that was, until recently, uninhabited and unexplored, as well as the irreversible consequences that this will have for the seals and the quality of its habitat (Map 4).

Recommendations

As a consequence of the conclusions of this expedition, a series of urgent recommendations are provided below that are necessary for the conservation of the monk seal in the area.

- The removal of the fishermen and goose barnacle picker's camps established around D'Khila, as well as the reinforcement of the surveillance measures in the area to control the illegal fishing activities on the coastal area.

- Creation of a surveillance team (similar to the ones used around the breeding caves of the seals in "Las Cuevecillas"), that would work permanently to survey between Vialobos la Vieja and Guerguerat, with the following objectives:

  - To control and document seal sightings
  - To inform local and regional authorities about illegal fishing activities
  - To dissuade further disturbance.

  In the same sense, the provision of a small vessel for the patrol to complement the work carried out on land will allow to perform sea expeditions in support of the efforts by the Royal Moroccan Navy.

- Establishment of an autonomous station at Vialobos la Vieja (D'Khila) to serve as an operation base for permanent surveillance in the area.

- Carry out campaigns to remove land mines in collaboration with military authorities to facilitate access to some key areas allowing the control and monitoring of the area in safer conditions for the patrol. This will mean a more efficient, rapid and safe completion of the surveys.

- Perform a campaign to remove the large amount of abandoned fixed fishing gear.

- To enforce the protection that forbids all kind of artisanal fishing activity south of Roque Chico (Lamhiriz), as well as to establish any other fishing settlement, at the same time that works to declare the area a National Park or other protected are continue.

- To inform authorities about the problematic and negative impacts that the creation of New Guera can have on the locations proposed, Guerguerat and Vialobos la Vieja (D'Khila), proposing alternative locations.

- Campaign to inform and increase awareness of the local population in Dakhla and in the new city of Bir Gandouz about the existence of a monk seal population in the area, as well as about it' conservation and threats.

- Perform a campaign to remove the numerous abandoned nets.

In addition to these actions, which should be carried out urgently, the team should continue to promote the legal protection being developed under the framework of the International Monk Seal Recovery Plan in the Eastern Atlantic (UNEP/CMS) for the creation of a National Park in the area that will ensure the survival of the monk seal populations in a medium term.

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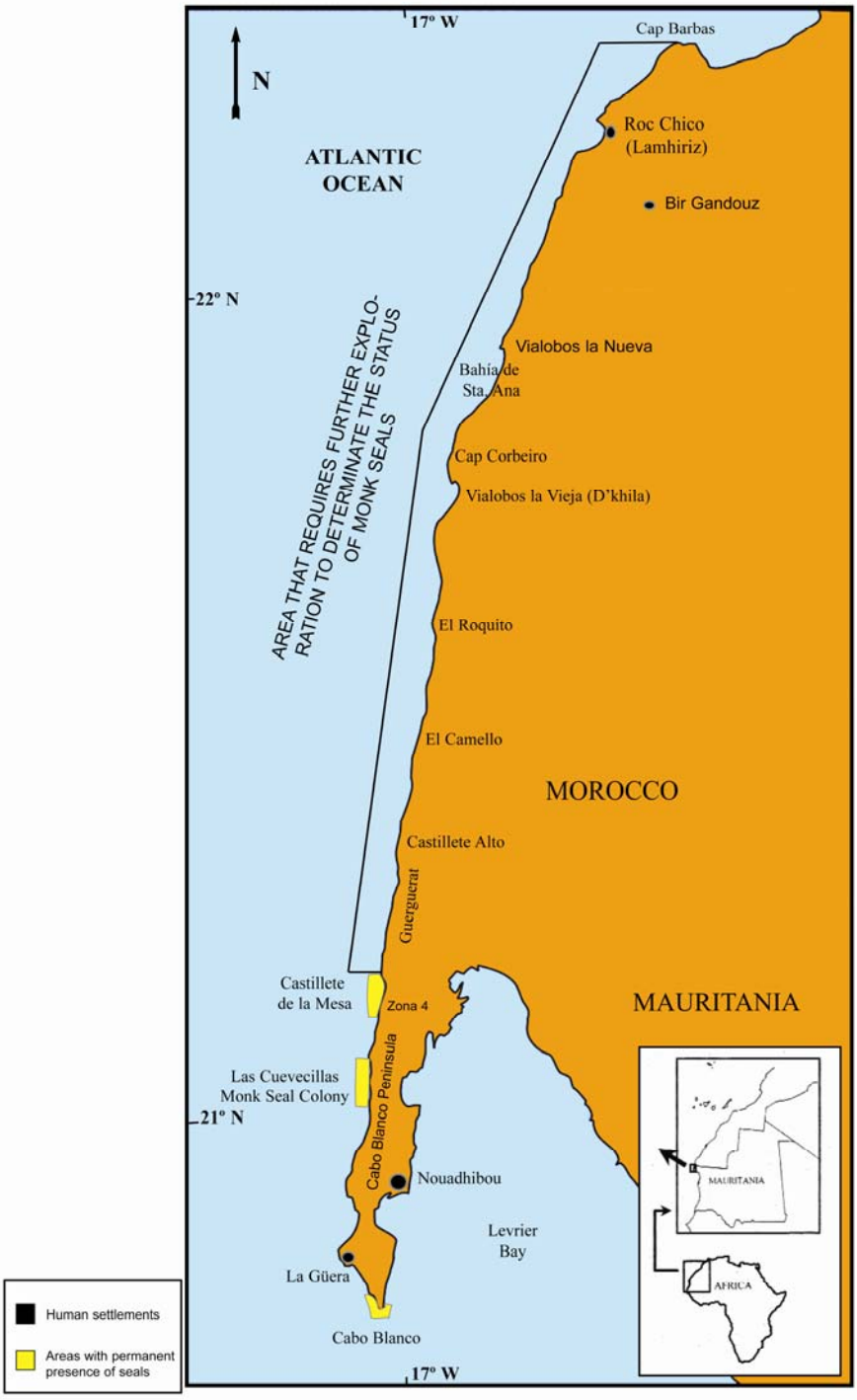
Acknowledgements

The authors are completely grateful to all the members of IFAW's "Song of the Whale" Team, Richard McLanaghan, Magnus Danbolt, Paul Leeming, Claire Lacey, Oliver Boisseau who participated in the survey, as well as to the IFAW members that participated in the organization, mainly Anna Moscrop and Bridget Jones. Also to Mulaye Ould haye and Ana Maroto from CBD-Habitat (Spain), who participated in the survey, as well as Jilali Bensbai from the INRH and Mohamed Noaman from the Haut Commissariat aux Eaux et Fôrest et la Lutte contre la Desertification de Maroc (Morocco). It is essential to mention the contribution to this work to all the personnel of the Dakhla local NGO Nature Initiative. We are also very grateful to the Wali of the Oued-Eddahab-Lagouira Region (based in Dakhla), to the military authorities of Southern Sector of Morocco, to the General Director of the Institut National de Recherche Halieutique (INRH), and the General Secretary of Fisheries Department (Morocco), for their full support to get easily all the necessary permissions for the survey to be successfully carried out in the Moroccan waters. It is also necessary to mention the contribution of Dawn Smith and Ian Robinson to the realization of this survey, particularly at its initial steps.Without the full involvement and efficient contribution of this entire people, this survey couldn't have been possible.

Appendixes

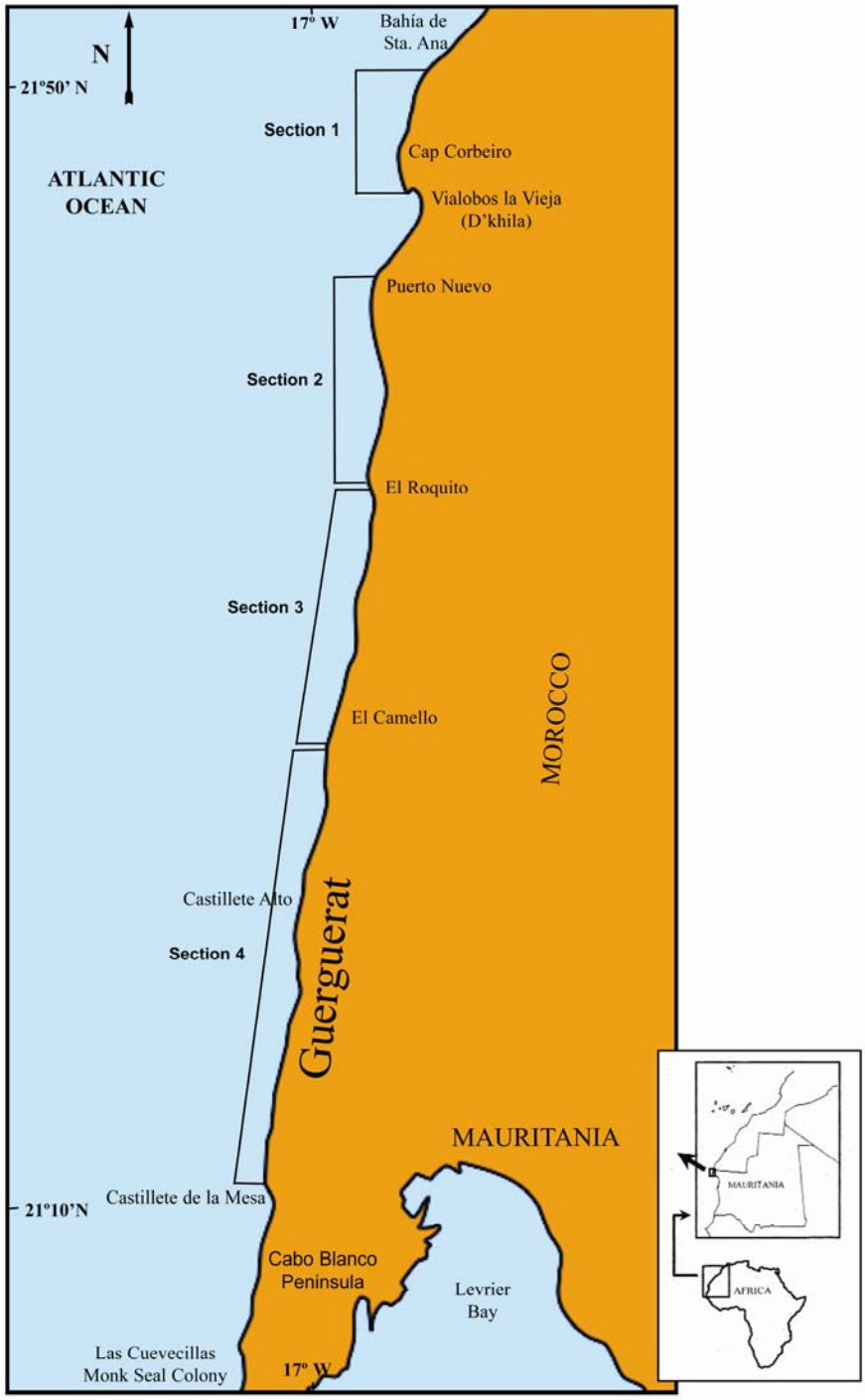
APPENDIX 1. CARTOGRAPHY

MAP 1. MONK SEAL DISTRIBUTION



MAP 2. STUDY AREA

MAP 3. COASTLINE EXPLORED



MAP 4. COASTLINE EXPLORED