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BANC D'ARGUIN NATIONAL PARK MAURITANIA

The Banc d'Arguin has the largest winter concentration of wading birds in the world. It is also the most important breeding area for birds on the Atlantic seaboard and the richest fishery and fish nursery area off the west African coast. The Park comprises sand dunes, coastal swamps, small islands and a wide expanse of shallow coastal waters. The austerity of the desert and the biodiversity of the marine zone result in a strongly contrasting land and seascape. There are several species of sea turtle, also of dolphin, with which fishermen have traditionally cooperated in harvesting shoals of fish.

Threats to the site: The Banc is threatened with licensed unsustainable over-fishing by international industrial-scale exploitation of the Banc's waters outside the Park and by neighboring pirate fishing fleets within it. Fishing by traditional sustainable methods is permitted within Park limits to the local Imraguen people but the foreign competition is driving them to over-fish also.

COUNTRY
Mauritania

NAME
Banc d'Arguin National Park

NATURAL WORLD HERITAGE SERIAL SITE
1989: Inscribed on the World Heritage List under Natural Criteria ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE
The UNESCO World Heritage Committee issued the following Statement of Outstanding Universal Value at the time of inscription:

Brief Synthesis
The Banc d'Arguin is one of the most important zones in the world for nesting birds and Palearctic migratory waders. Located along the Atlantic coast, this Park is formed of sand dunes, areas of coastal swamps, small islands and shallow coastal waters. The austerity of the desert and the biodiversity of the marine area results in a land and seascape of exceptional contrasting natural value.

Criterion (ix): Banc d'Arguin National Park is an ecosystem rich in biodiversity of nutrients and organic matter due to the vast expanse of marshes covered with seagrass beds, and an important windblown sediment addition from the continent and the result of the permanent upwelling of the Cap Blanc. This wealth ensures the maintenance of a marine and coastal environment sufficiently rich and diverse to support important communities of fish, birds and marine mammals.

Criterion (x): Banc d'Arguin National Park comprises the most important habitat of the Western Atlantic for nesting birds of west Africa and the Palearctic migratory waders. The vast expanses of marshes provide shelter to more than two million limicolous migrant birds from northern Europe, Siberia and Greenland. The nesting bird population is also remarkable in terms of diversity and number: between 25,000 and 40,000 pairs belonging to 15 bird species. The shallows and island area is also the centre of intense biological activity: there are 45 fish species, 11 species of shellfish and several species of mollusks. The property also contains several species of marine turtles, notably the green sea turtle (*Chelonia mydas*) on the IUCN Red List of Threatened Species. Among the mammals, there are still some remnant populations of Dorcas gazelle (*Gazella dorcas*). The bottlenose dolphin and the Atlantic hump-backed dolphin are frequently sighted in the property.

Integrity

The rectilinear boundaries of the property suggest that they were not based on ecological parameters, but more likely correspond to administrative requirements. The eastern limit extends inwards to a desert zone, in places up to 50 metres, and constitutes a wide band where activities incompatible with the conservation of the property may be conducted. Certain revisions to the southern limit, to exclude the village of Cape Timiris and the military base, would not detract from the value of the property and could eventually be envisaged. The marine boundary forms, also, a straight line and crosses the shallows of the property through the centre. It would be particularly justifiable that the whole shallows zone be included in the property. The satellite reserve of 200ha located at Cap Blanc constitutes the habitat for a monk seal colony and presents issues as regards its integrity. First, the reserve boundaries encompass the habitat of the 100 monk seals found in the region, the remainder using the area to the north known as the *Côte des Phoques*. This means that the condition of integrity that requires sufficient area to ensure continuity for the species is not satisfied. Second, the extension of the Cap Blanc Reserve to encompass the key breeding and nursery area at *Côte des Phoques*, is not possible as the international boundary in this area of the Western Sahara remains to be determined. For this reason, the World Heritage Committee decided to inscribe the property and exclude the Cap Blanc Reserve, the inscription of which can only be envisaged after the resolution of the issue of boundary limits and when the part of the *Côte des Phoques* could be included. The main threat to the property are projects likely to alter the traditional activities of local fishing. The introduction of new technologies and an increased catch could affect and seriously disturb the fish life of the region.

Protection and Management Requirements

Protection of the property is regulated by the statute for protected reserves. The property has a management plan. The main threats to the property are most linked to unregulated development of maritime activities and coastal infrastructures. Fishing activities have considerably increased and the material and methods of fishing have changed as have the species targeted. Consequently, protection of the marine resources against over-exploitation is essential. To mitigate the problem, the implementation of a surveillance programme on the risks to marine resources, including illegal commercial fishing. The risk of pollution by hydrocarbons on the international maritime route of western Africa and from the petroleum industries is also considerable. Urgent planning to cope with the eventuality of an oil spill, is required for the property and its surrounds. Another important issue in the management of the property is the prevention of poaching and logging causing the degradation of the terrestrial part of the property. As for the maritime part of the property, a full terrestrial surveillance programme is required. The possible impacts of climate change must also be studied.

INTERNATIONAL DESIGNATION

1982: Designated a Wetland of International Importance under the Ramsar Convention (1,200,00 ha).

IUCN MANAGEMENT CATEGORY

Banc d'Arguin National Park:

II National Park

Cap Blanc Integral Reserve (Baie du Lévrier + Las Cuevecillas):

Ia Strict Nature Reserve

BIOGEOGRAPHICAL PROVINCE

Western Sahel (3.12.07)

GEOGRAPHICAL LOCATION

The Park, including the Ile de Tidra and the Ile d'Arguin, occupies two thirds of the northern half of the Mauritanian coast in a gulf between Cap Timiris 145 km north of Nouakchott, and Pointe Minou, with an outlier 35 km west on the tip of Cap Blanc across the mouth of the Baie du Lévrier. The boundary extends halfway across the Banc, 50 km out to sea, and an average of 35 km into the Sahara. Located between 19° 21' to 20° 50'N and 16° 00' to 17°15'W

DATES AND HISTORY OF ESTABLISHMENT

1976: The Park created by Decree 74 176/P/G; 2000: confirmed, Law 24-2000;

1978: The Park made directly dependent on the Presidency of the Republic;

1982: Designated a Ramsar Wetland site;

1986: Cap Blanc Reserve added (210 ha). This consists of the former *Reserve Intégrale de la Baie du Lévrier* on the inland coast of Cap Blanc and the *Reserve Intégrale de Las Cuevecillas* on the *Côte des Phoques* (the seal coast) on the Atlantic side of Cap Blanc;

2000: Law passed restricting all non-traditional activities within the Park;

2001: The Park dedicated as a 'Gift to the Earth'.

LAND TENURE

State in Nouadhibou and Azefal provinces. Administered by the Banc d'Arguin National Park Authority under the Office of the Prime Minister in collaboration with an NGO, the Banc d'Arguin Foundation.

AREA

1,200,000 ha, (1,173,210 ha in the nomination). The Park is half terrestrial and half marine, and extends 50 km out to sea at its maximum. The Reserve (210 ha) is formed of a 4.2 km coastal strip 100m wide inland and extending 400m out to sea.

ALTITUDE

5m below sea-level to 15m.

PHYSICAL FEATURES

The Park is an example unique in Africa of a transition zone between the Sahara desert and Atlantic Ocean. It is also the largest marine park in Africa: a gulf some 180 kilometers long with a shallow coastline of windblown sand dunes, marshes and mangrove swamps, tidal mudflats, mazes of channels and creeks, sandbanks and islets. The submarine bank extends up to 80 km from the coast, two-thirds of it within the Park. The gulf includes the Ile de Tidra, the largest island at 8 km by 35 km and 14 other islands up to 1km wide and 5 km long, four being rocky outcrops. The prevailing trade winds between Cap Blanc and Cap Timiris sculpt the coastline into sandy bays between capes of rock. The coast is very shallow, being at low tide only 5m deep even far offshore, with 63,000 ha of mudflats (Hughes & Hughes, 1992). The range of spring tides is 2.1m, of neap tides 0.6m, and of normal tides, 1.2 -1.7m.

The origin of the shallows is a combination of ongoing aeolian transport from the desert on top of alluvium from relict estuaries which nourishes the 3,100 ha of mangrove swamp (SCBA, 1993). There are 3,100 ha of tidal swamps on either side of Baie de St-Jean near Cap Timiris, 19,000 ha of tidal swamps and marshland around the Ile de Tidra and some 37,000 ha of tidal marshes in the northern half of the reserve (Hughes & Hughes, 1992). The arid inland is mainly sand hills and sandstone cliffs which rise to 15m, with some *sebkha* (salty mud pans). At its northern end the gulf becomes the long Baie du Levrier, the mouth of which is 35 km wide, formed by the Nouadhibou peninsula. At the tip of the increasingly eroded sandstone and limestone headland, are the islets and outcrops of Cap Blanc where caves harbour a population of monk seals.

CLIMATE

The bank lies on the boundary between temperate and tropical climates. There is great contrast between the coastal air cooled by ocean water and the hot desert temperatures inland. The prevailing northeast trade winds from the Sahara, and from the northwest over the ocean, strongly influence the currents and climate of the bank. Winds up to 8m/sec have been reported. Those blowing offshore continually push the surface waters out, inducing upwelling mineral-rich currents of cold water. The rainfall is irregular and very low, averaging 34-40mm per year (24mm at Cap Blanc). Because of the high evaporation, the bank's salinity increases towards the coast. Tempered by the sea, temperatures are fairly stable all year. The cold season, January to May, has a mean minimum in December of 8°C. The hot season from August to October has a mean maximum in September of 34°C (Monod, 1977).

VEGETATION

The Park lies on the boundary between the Afrotropical and Palaeartic biogeographic realms on a coast of nutrient-rich offshore waters teeming with phytoplankton. 190 plant species have been recorded. The vegetation of 60,000-80,000 hectares of shallow water is vast expanses of seagrass, especially the eelgrass *Zostera noltii* in the intertidal zone and *Cymodocea nodosa* with *Halodule wrightii* in the subtidal zone. These anchor the mud substrate, produce oxygen and shelter huge communities of algal epiphytes and a rich invertebrate fauna, especially molluscs and crustaceans, which provide the biggest fish feeding and spawning area in west Africa (PNBA, 1987; Ramsar, 2001).

The vegetation of the saline coastline, mudflats and islands is halophytic, predominantly *Sesuvium portulacastrum*, *Salsola baryosma*, *Salicornia senegalensis*, *Suaeda fruticosa* and *Arthrocnemon* species. There are some 1,400 ha of white mangrove swamp *Avicennia africana* [*germinans*] on emergent mud-banks on the tip of Ile de Tidra and 1,700 ha in bays on the mainland near Cap Timiris. There are also a few specimens of buttonwood *Conocarpus erectus*. These are the northernmost mangrove stands in the eastern Atlantic, on muds dating from the time when coastal wadis carried fresh water from the Sahara (Ramsar, 2001).

The most southerly cordgrass *Spartina maritima* marsh on the west coast of Africa, grows behind the mangroves; both *Ipomea pes-caprae* and *Sporobolus virginicus* grow on the margins of the saltmarshes (Hughes & Hughes, 1992). The terrestrial vegetation is Saharan with a limited Mediterranean influence. The sand dunes are dominated by *Stipagrostis pungens*, *Cornulaca monacantha*, *Euphorbia balsamifera* and *Calligonum comosum*. Tree species include *Acacia raddiana*, *Balanites aegyptiaca*, *Maerua crassifolia* and *Capparis decidua*; herbaceous species are *Panicum turgidum*, *Cassia italica*, *Pergularia tomentosa* and *Heliotropium bacciferum* (PNBA, 1987; Ramsar, 2001).

FAUNA

The bank has a very high productivity of pelagic phytoplankton offshore and of benthic forms near the shore which provide the energy source for the countless numbers of birds and fish. There are thousands of fiddler crabs *Uca tangeri* on the upper beaches, and cockles *Cardium edule* with detritivorous gastropods *Cymbium* and *Cornus* spp. on the mudflats (Ramsar, 2001). Of the estimated seven million shorebirds which use the East Atlantic flyway, approximately 30% winter at Banc d'Arguin. It has the world's largest concentration of wintering shorebirds and extremely diversified communities of some 15 nesting species of piscivorous birds (Hoffmann, 1988). At least 249 bird species have been recorded, from both Palaearctic and Afrotropical realms, several species from each being at the limits of their distribution (IUCN/WWF, 1989). The area is classified by Birdlife International as an Important Bird Area.

The wintering shorebirds number over two million: hundreds of thousands of dunlin *Calidrus alpina*, bar-tailed godwit *Limosa lapponica*, knot *Calidris canutus* and curlew sandpiper *C. ferruginea*, and tens of thousands of greater flamingo *Phoenicopterus ruber*, ringed plover *Charadrius hiaticula*, redshank *Tringa totanus*, Eurasian curlew *Numenius arquata*, whimbrel *N. phaopus* and black-bellied plover *Pluvialis squatarola*. The 40,000 pairs of breeding birds include white pelican *Pelecanus onocrotalus*, three subspecies of reed cormorant *Phalacrocorax africanus*, European spoonbill *Platalea leucorodia leucorodia* and a range of terns: Caspian, *Hydroprogne caspia*, royal, *Sterna maxima*, little *S. albifrons*, bridled *S. anaethetus*, gull-billed *S. nilotica* and common, *S. hirundo*; also gulls: white-headed *Larus cirrocephalus*, slender-billed *L. genei*, lesser black-backed *L. fuscus*. There are several species or subspecies with an African distribution, such as the endemic grey heron *Ardea cinerea monicae*, Eurasian spoonbill *Platalea leucorodia balsaci*, western reef heron *Egretta gularis* and Nubian bustard *Neotis nuba* (IUCN, 1987; Ramsar, 2001). At Cap Blanc, ruddy turnstone *Arenaria interpres*, Sandwich tern *Sterna sandvicensis* and corncrake *Crex crex* are also seen.

Mammals include about 200 dorcas gazelle *Gazella dorcas* (VU), mostly on the Ile de Tidra, jackal *Canis aureus*, fennec fox *Fennecus zerda*, sand fox *Vulpes rueppelli*, sand cat *Felis margarita*, African wild cat *Felis silvestris lybica*, genet *Genetta genetta*, African striped weasel *Poecilogale albinucha*, ratel *Mellivora capensis* and striped hyena *Hyaena hyaena*. A small population of about 130-150 of one of the world's rarest animals, the Atlantic monk seal *Monachus monachus* (CR), lives on the Cote des Phoques at Cap Blanc, their survival threatened by the collapse in 1982 of their breeding caves (Reijnders *et al.*, 1988) and by disease in 1997 when 70% of the population died off. This Atlantic population is one of the only two populations found outside the Mediterranean. Marine mammals regularly seen are Atlantic hump-backed dolphin *Sousa teuszii* (VU), common dolphin *Delphinus delphis*, rough-toothed dolphin *Steno bredanensis*, bottle-nosed dolphin *Tursiops truncatus*, Risso's dolphin *Grampus griseus* and killer whale *Orcinus orca*. Fin whale *Balaenoptera physalus* (EN) and common porpoise *Phocoena phocoena* have also been sighted.

Because of its high productivity, sheltering seagrass beds and the variety of marine biotopes, the gulf is a major fish spawning and nursery ground for the whole west African coast. 145 species are known to be

fished. There are three main categories of fish living on the bank: shallow water fish - mudskippers *Periophthalmus* spp. on the mudflats, with gobies *Gobiidae*, seahorses *Syngnathidae* and rays *Batoidea* in the seagrass beds; juveniles of species such as sea perch *Lutjanus* spp., croakers *Argyrosomus* spp. and sea bass *Centropristus* and *Dicentrarchis* spp. in the nursery seagrass beds; and various mullets, especially striped *Mugil cephalus* and white mullet *Mugil curema*, which with groupers *Epinephalus* spp. and sea bream *Sparus* spp. are the basis of the traditional fishery. Migrant pelagic fish include tunnies *Thunnus* spp., smalltooth sawfish *Pristis pectinata* (EN) guitarfish *Rhinobatos* spp., and smooth hammerhead shark *Sphyrna zygaena* (VU) (PNBA, 1987; Ramsar, 2001). Two endangered species of turtle breed in the Baie du Lévrier: hawksbill *Eretmochelys imbricata* (CR) and green *Chelonia mydas* (EN); three other species have been seen: loggerhead *Caretta caretta* (EN), leatherback *Derموchelys coriacea* (CR) and olive ridley *Lepidochelys olivacea* (VU).

CONSERVATION VALUE

The Banc d'Arguin is the richest fishery of the West African coast. In winter it has the largest concentration of wading birds in the world and is the most important breeding area for birds on the Atlantic seaboard, with a great number and diversity of birds: 25,000 to 40,000 pairs from 15 species (IUCN /WWF, 1989). It lies in the Sahelian upwelling marine ecosystem between the Canary Islands and Guinea-Bissau, which has the highest priority for marine conservation in Africa. Its wealth of organic life creates the wide range of marine and littoral environments which support the huge populations of fish, birds and marine mammals. The region's mild climate, absence of human disturbance due to lack of fresh water, the shallowness of the sea and the vast expanses of mudflat provide over two million shorebirds from northern Europe, Siberia and Greenland in one of the world's most important refuges for migrants.

CULTURAL HERITAGE

Neolithic archaeological sites and vestiges of the Almoravid civilisation are found on some of the islands. The local people, the Imraguen (*Amrig*), relate many of their customs to the natural environment: their name means 'the ones who gather life'. Until the 1990's these tribesmen still maintained age-old life styles, based almost exclusively on harvesting the migratory fish populations using traditional sail boats and techniques unchanged since first recorded by 15th century Portuguese explorers, such as a collaboration with wild dolphins in catching schools of mullet. The notorious wreck of the *Méduse*, depicted by Géricault, occurred off the bank in 1816.

LOCAL HUMAN POPULATION

Some 1,000 *Imraguen* live in seven villages within the park, many at Cap Timiris, dependent on water supplies collected outside the boundary and on the yellow mullet. Nomadic camel and goat herding has much decreased owing to desertification. Traditional subsistence methods of fishing are under pressure from fishermen, mainly from Senegal, in hundreds of motorised pirogues based in the Baie du Lévrier and Nouadhibou. These hunt with gill nets for shark and ray fins, the overfishing of which is unsustainable because of their long reproductive cycles. Overfishing by international fleets with factory ships just outside the Park boundaries is even more serious: in 2001 334 foreign trawlers had permits to work in Mauritanian waters (Afrol, 2001). Competition and the high prices given by seafood dealers for shark and ray fins drew some Imraguen in the past to take up motorised shark hunting themselves.

VISITORS AND VISITOR FACILITIES

The area was opened to nature tourism in 1988. In 1991 the Wetland Conservation Fund gave CHF 45,000 to develop a plan for limited tourism and the Park is now featured by several international touring agencies though there are no hotels or restaurants and entry must be authorised by the Park administration (Ramsar, 2001). Only some 100 visitors are assumed to visit annually (IUCN, 1997).

SCIENTIFIC RESEARCH AND FACILITIES

The earliest research dates from the 1950s (Kane & Campredon, 1988). Past research has focused on ornithology and oceanography, including inventories of species, study of the phytoplankton biomass, and studies of the reproductive biology of the white pelican. The Netherlands Ornithological Mauritanian Expedition of 1980 gathered comprehensive data on waders, crustacea, and other fauna (NOME, 1982; Wolf *et al.*, 1991). Surveys of the monk seal population were made by D. Marchessaux for the WWF and

IUCN 1985-1988. Publication of flora collection records by Monod have been proposed (PNBA, 1987). A full review of research opportunities is given in the masterplan by the Scientific Council of the Banc d'Arguin (SCBA, 1993). A field station is based at Cap Iwik, with an outstation at Oued Chibka, equipped for six researchers and four support staff; it has three Zodiac boats, one motor launch, a radio station and is accessible by four-wheel drive, motor launch or light aircraft. Research is sponsored by the *Fondation Internationale du Banc d'Arguin* (FIBA) and there is co-operation with both French and Dutch authorities: the government of the Netherlands supported a major past research programme and in 2008 research into the grasslands led to employment of a pastoral ecologist to prepare a grasslands management plan (UNESCO, 2009).

At Cap Blanc the Park contains the world's largest and perhaps only viable colony of monk seals (25% of the world population), extensive seagrass meadows which are major fish nurseries, nesting sites for two threatened species of marine turtle, and relict populations of dorcas gazelle (PNBA, 1987). Justification for establishment includes an outstanding example of traditional human interaction with the environment; the area also clearly exemplifies ongoing superficial geological processes (Elouard, 1976; Rosso *et al.*, 1977). The sites contain a Ramsar Wetland and lie within a WWF Global 200 Marine Eco-region.

MANAGEMENT

The Park was established to protect the natural resources, scientific sites and the valuable fisheries of the Banc, half of which lie outside the Park. This resource contributes two-thirds of the country's annual revenue, much of it from government licenses to foreign industrial-scale fishing companies (Hoffmann, 1988; Afrol, 2001). Half a million tonnes of fish are taken by foreign trawlers in these waters each year. (Pearce, 2001). According to Article 2 of the establishment decree, the following are prohibited within Park boundaries: all forms of hunting, low-altitude aircraft, forestry, agricultural and mineral exploitation, pastoral activities and unauthorised removal of stones, sand, earth, leaves and all forest products. Article 4 prohibits without authorisation by the relevant service all forms of fishing, prospecting and construction, modifications of the landscape or vegetation, all activities which could pollute the water, introduction of zoological or botanical species, access by people other than tourists or visitors and any activity which could disturb flora and fauna (Ramsar, 2001). Within the property the total catch has grown from 411 tons in 1997 to 2,879 tons in 2007 using trawls and beach sein though sharks and rays may no longer be targeted (UNESCO, 2009).

A preliminary management plan was published in 1984 by WWF, IUCN and the Belgian Royal Institute of Natural Sciences. In 1986 the *Fondation Internationale du Banc d'Arguin* (FIBA), a supporting NGO, convened sixteen international organisations to support the Park. The WWF has helped the Mauritanian government to implement successive revised management plans, the latest being for 2005-9. A separate management plan for the Cap Blanc monk seal reserve was drawn up in 1986 by FIBA. UNEP and the WWF again helped the government to put it into practice (Marchessaux, 1986; PNBA, 1987). A program is needed to monitor threats to marine resources, and an emergency plan to cope with oil spills (IUCN, 2008). The huge area makes surveillance a challenge, so the French remote sensing agency MDT may supply satellite imagery for monitoring and management (UNESCO, 2009).

The Park rangers patrol the area to prevent illegal fishing and disturbance to nesting waterfowl. Permanent entry points control access into the Park and are used for survey work. The wardens, based at Iwik, with a secondary base at Oued Chibka, undertake maritime patrols and control access to the islands (PNBA, 1987). An eight man camel patrol is used to limit hunting, and boundary markers and signs have been set up. The law of January 2000 gives the *Imraguen* the exclusive right to use the reserve's fishery in order to ensure the maintenance of their traditional stewardship, aid their economy and allow the heavily depleted fish stocks to recover. It mandates sustainable development under the Fishing Code, Law 2000/025, prohibiting the use of dragnets in the Mauritanian exclusive economic zone; it also mandates environmental impact assessment of development, and participation of the *Imraguen* in taking management decisions, a policy which co-opts the people to guard their own resources (PNBA, 1987; Ramsar, 2001). Relations with the *Imraguen* are good.

This policy elicited an honorific WWF designation as a 'Gift to the Earth'. There are also proposals to liaise with National Park authorities in Senegal and Guinea-Bissau which are suffering similar pressures (PNBA, 1987); and to increase protection, staff of the Ramsar Convention and the Commission on Migratory Species are also cooperating. In 2002 however, the WHC requested from the State a full environmental impact assessment (EIA) for a proposed 470 km coastal road in place of the study done; also that it submit to the IUCN a GTZ study on the legality of oil exploration in the Park; and that it protect its marine resources better from international predation and increase the extent of the traditional *Imraguen* fishing grounds (IUCN, 2002; UNESCO, 2002).

MANAGEMENT CONSTRAINTS

The biggest challenge to management is effective surveillance and administration over so vast an area. Overfishing on official permits by industrial-scale fleets, Japanese, Russian and EU-subsidised, which cluster in the waters on the Banc just outside the Park, is severely depleting fish stocks of international importance, and are trying to secure permits to fish in the Park's waters. This may cause the decline of breeding colonies of fish-eating birds (Hughes & Hughes, 1992), and hinder the long-term regeneration of fish stocks by depleting the fish nursery areas. Mechanical shellfish harvesting, again by licensed foreign companies, is degrading the sea bed. There is some hunting of marine turtles and the critical status of monk seals may be aggravated by the use of fishing nets, line fishing and lost nets which could trap and kill them as they do dolphins. There is potential for oil pollution from passing traffic at sea. Shoreline pollution by aquaculture and waste is noticeable since the bank is down-current from the iron ore and oil terminals at Cansado and Port Minéralier in the Baie du Lévrier. There is also some agricultural pollution from the Senegal River down the coast (IUCN, 2008).

On land, the degradation has been worse owing to drought, poaching and wood cutting as access for tourists and hunters has increased with the improvements to the Nouakchott-Nouadhibou road across the park. Hunting of gazelles is heavy and jackals and foxes prey on seabird colonies. In 2002 there was potential for pollution from the improved road, which was planned after an inadequate environmental impact assessment and made without consulting the Park's management. There is some illegal birding and timber cutting, overgrazing in wet years and the loss of wells to encroaching sand. There is also a threat from several companies licensed to explore and exploit oil and gas near and within the site which has already begun, but E.I.A.s for the work have not been submitted to the Park management. GTZ is finalising a report on the legality of this development. The WHC urged the State Party to establish an Environment and Development Technical Committee to assess and implement E.I.A. procedures (UNESCO, 2003, 2004).

The law passed in 2000 permits *Imraguen* fishermen - with up to a 100 boats only - to fish within the Park if engines, trawls, seine, drift, gill and fine-meshed nets are not used and turtles and sharks are not taken (People & the Planet, 2001). However, motorised foreign pirate fishermen raid the National Park itself and their over-fishing is driving the *Imraguen* to complain of reduced catches and reduced sizes of fish caught. Marginalised and stressed by these changes and suspicious of interference, they are torn between traditional and modern methods, and some are tempted some to compete with the small foreign pirate boats by the use of motorised fishing for shark fins even within the Park (UNESCO, 2002). They have in their turn, over-fished sharks and rays whose fins fetch very high prices in the Orient. However, in 2003 local fishermen agreed with Park officials to stop fishing the latter in favour of shadefish and mullet (WWF, 2004). Since then increased night patrols have reduced illegal fishing.

STAFF

This comprises one Director, four assistant directors, three wardens, two secretaries, one financial secretary, five drivers, eight camel corpsmen, all Mauritanian; along with expatriate scientists and volunteers (IUCN/ WWF, 1989). But management capacity and resources are still lacking (IUCN, 2008).

BUDGET

After initial financing of 18 million UM (ougyas) (US\$225,000) by the home government, extensive funding came from IFAD in 1992 and from the French government in 1995 (Ffr 1,000,000) and 1996 (Ffr 860,000), totaling US\$372,000). In 2001 the *Fondation Internationale du Banc d'Arguin* raised nearly Ffr16,000,000 (US\$2,285,700) for use in the Park. Funding for the reserve headquarters and for camel

patrols has been supplied by the French Ministry of Cooperation (PNBA, 1987) and in 1998, the WWF donated three fast patrol boats to control fishing piracy. Revenue from tourist entry fees goes toward Park management costs. To 2005 the UNF had granted US\$ 35,000 for technical cooperation. In 2008 an annual subsidy of 1 million euros from the EU-RIM 2006-2012 fishing agreement was granted towards the park's role in the sustainable regeneration of marine resources, 30-50% being reserved for a financing fund (UNESCO, 2009).

LOCAL ADDRESSES

M. le Directeur, Parc National du Banc d'Arguin, B.P.5355, Nouakchott, Mauritania.

M. le Directeur, Parc National du Banc d'Arguin, B.P.124, Nouadhibou, Mauritania.

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