Case study on shorebird / waders conservation measures and recommendations for the Banc d'Arguin

Mauritania

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CONTENCTS

I. Presentation of the study area

The Banc d'Arguin National Park (PNBA), runs along the Mauritanian coastline for more than 180 km and covers an area of 12,000 km² composed almost equally of maritime and land areas. To the south, the area of the park is delimited by a line following the parallel 19°21'22"N; to the east, by the stretch of track from El Maharate to Nouadhibou; to the north, by a line following the parallel 20°50'00"N; and to the west, by a line following the meridian 16°45'00"W. The Parc National du Banc d'Arguin in Mauritania hosts the largest concentrations of coastal waterbirds in the East Atlantic Flyway according to annual counts nearly 2 million birds stay there annually for feeding, breeding and/or resting needs.

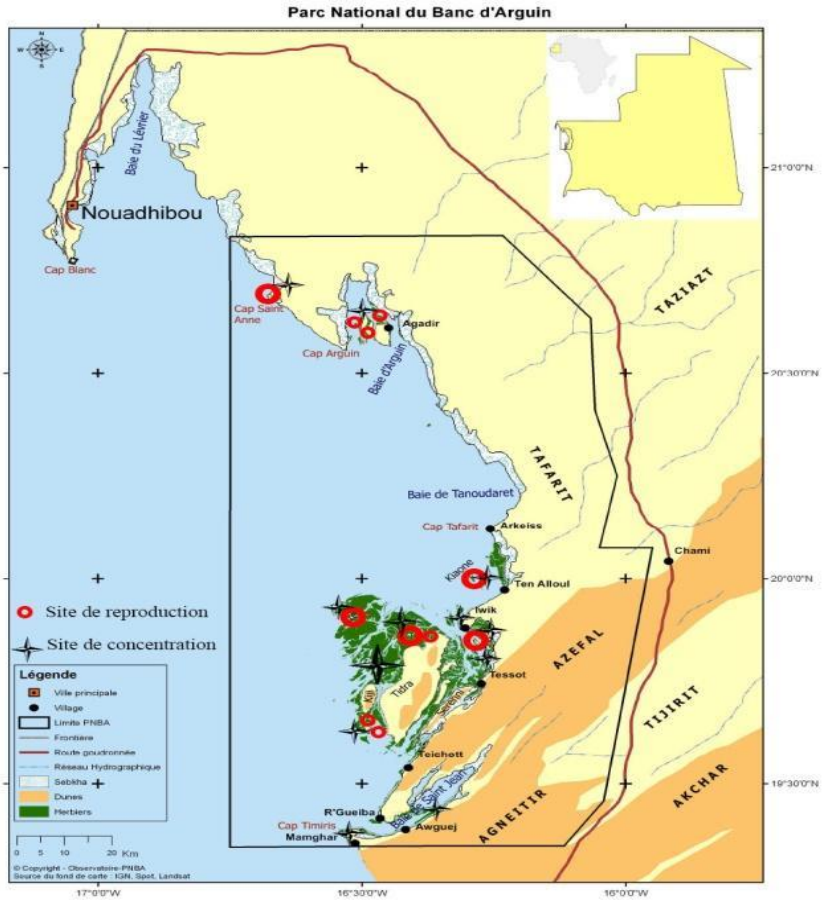


Figure 1 : Carte des sites de reproduction et de concentration des oiseaux au PNBA

However, in recent years, scientific research carried out by, among others, the Dutch NIOZ team has shown a progressive decrease in the numbers of birds, especially shorebirds.

II. Methodology of the study

During this case study, the Nature Mauritania team relied on several sources including

- Bibliographical review;
- Discussions, exchanges with researchers
- Discussions with the managers of the Banc d'Arguin Park, and other conservation NGO's;

III. Conservation measures

Banc d'Arguin, 1, 200,000 ha; 20°50'N 016°45'W. World Heritage Site; National Park. On the western fringe of the Sahara, the Banc d'Arguin accounts for more than one third of the country's entire coastline and as one of the richest fishing grounds in the world, owing to the upwelling of cold, nutrient-rich waters. The wetlands are composed of extensive, shallow marine areas, scattered islands, intertidal sand banks, mudflats, channels, creeks and relict mangrove forest. Mudflats support vast beds of seagrass housing a rich invertebrate fauna (especially molluscs and crustaceans), thousands of waterbirds and are important high-tide feeding or nursery areas

for commercially-important deep sea fish. Large flocks of shorebirds forage at low tide and over two million winter here. Other notable fauna include a variety of marine mammals, marine turtles, and an endangered seal species etc.

Being aware of the economic, cultural and ecological importance the National du Banc d'Arguin (PNBA) was created by presidential decree in 1976. Following this creation, an arsenal of conservation measures was set up to enable and regularly updated to allow the Banc d'Arguin to fully play his role of maintaining marine biodiversity and protecting the ecosystem of the Gulf of Arguin.

Given that this site is a key element in the renewal of fishing resources on the scale of the Mauritanian Exclusive Economic Zone and, no doubt, more broadly on a sub-regional scale.

- Classification of Banc d'Arguin (one third of the Mauritanian coastline 12000km2) on protected area by Presidential decree;
- Successive elaboration of Development and Management Plans;
- Establishment of a Trust Fund: A sustainable financing mechanism created in 2009 to preserve the exceptional natural and human capital of the Mauritanian coastline and sea;
- Elaboration of a (tableau de board) to measure the efficiency of the Banc d'Arguin's management;
- Collaborations, partnerships at local (site), national, regional, international levels etc.
- Implementation of a ringing program for endemic birds of the PNBA such as Balsaci.

IV. Pressures/Threats on shorebirds

Long-distance migratory shorebirds are highly dependent on strings of adequate habitats for their survival, not least the wintering sites where they spend most of the year. From the late 1970s to our day, the global importance of the Banc d'Arguin for migrating shorebirds has been recognized. However, it should be noted that recent international counts have raised concerns about declines in shorebird populations along flyways worldwide (Conklin et al. 2014, van Roomen et al. 2015, Piersma et al. 2016). This decline includes the East Atlantic Flyway, where apparent problems occur at listed World Heritage Sites such as the Wadden Sea in Western Europe and the Park National du Banc d'Arguin in Mauritania.

Spite of all the conservation measures mentioned above the declines of shorebirds in Banc d'Arguin is confirmed throughout several census carried out by different teams from conservationist to researchers. Studies shows that the total waterbird numbers showed a decrease between 1980 and 2017, with only Great White Pelican *Pelecanus onocrotalus* showing a significant increase in numbers. Five species showed significant declines: Long-tailed Cormorant *Phalacrocorax africanus*, Red Knot *Calidris canutus*, Bar-tailed Godwit *Limosa lapponica*, Eurasian Curlew *Numenius arquata*, and Western Marsh Harrier *Circus aeruginosus*.

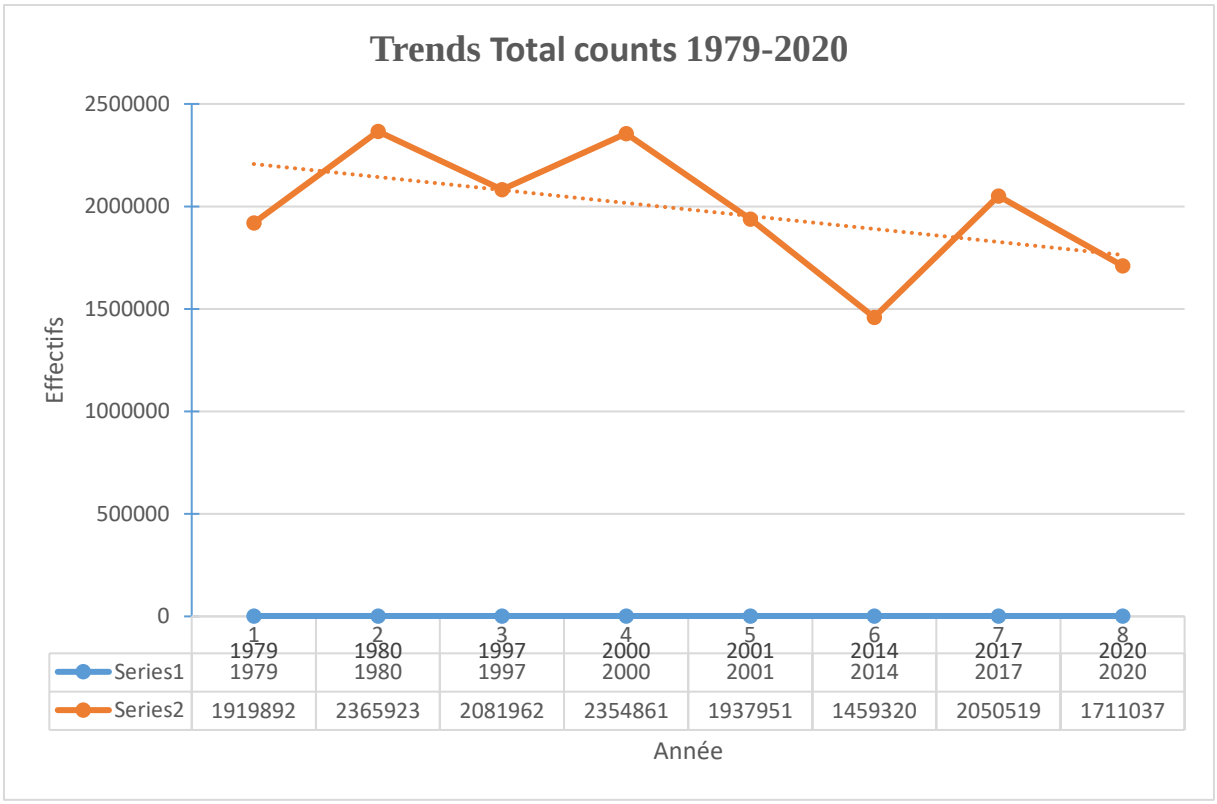
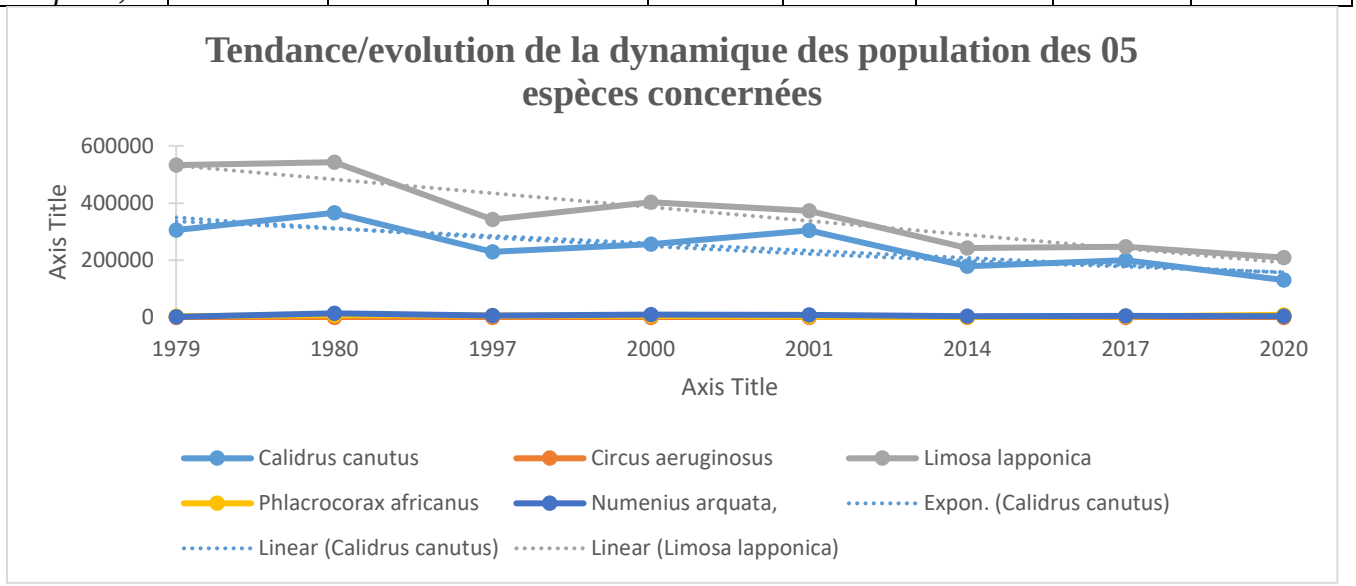


Table of the evolution of the 05 most decreasing species from 1979-2020

Species	**1979**	**1980**	**1997**	**2000**	**2001**	**2014**	**2017**	**2020**
Calidrus canutus	304 975	365 880	229 471	255 630	303 979	179 361	200 543	130369
Circus aeruginosus	0	62	48	39	44	26	34	39
Limosa lapponica	532 900	542 965	342 316	402 571	372 582	242 582	247 464	209 090
Phlacrocorax africanus	3 630	7 787	6 616	4 641	2 984	1 053	2 915	9003
Numenius arquata,	1 710	14 176	6 468	10 186	8 481	4 333	5 665	4 246



Even if the drivers of decline remains difficult to interpret, it should be noted that, like all the biodiversity components shorebird in Banc d'Arguin are under a certain amount of pressure and threat. There some of the more relevant ones!

1. Internal dynamics of the PNBA

a- **Fishing inside the park on board the lanches:** This form of fishing is defined by law as subsistence fishing. However, it has been noted that this subsistence fishing has gradually been transformed into commercial fishing. This phenomenon is encouraged by a significant demand for sharks on the external market, characterized by an increase in fishing effort and quantities fished. In this context, the catches of the selectivorous species have accounted for more than 40% of the total catches of the landline fleet since 2006, as outlined on the Strategic and management Plan of PNBA 2015-2019.

Despite the monitoring mechanisms put in place by the PNBA administration, the latest report on the evaluation of management effectiveness published in November 2020 shows that the results for the 5 selected species hammerhead shark (Sphyrna lewini), guitar skate (*Glaucostegus cemiculus*), cattle skate (*Pteromylaeus bovinus*), skate (*Rhinoptera marginata*) and the bluntnose sixgill shark (Rhizoprionodon acutus), the tonnage of catches is still much higher than the year of lowest catch in the last 20 years, taken as the reference year (2001) for each of them. The research carried out by the Mauritanian Institute of Fisheries Oceanographic Research (IMROP) within the framework of its partnership with the PNBA for the monitoring shows **823 tons in 2018**(Hammerhead shark **12 tons**, Guitar ray, **73 tons**; Cattle skate, **13 tons**, Skate mourine **250 tons** and Shark with pointed snout **475 tons**., **901 tons in 2019** (**18** tons for the hammerhead shark**, 81** tons for the guitar ray**, 12** tons for the skate, **377** tons for the skate**, and 413** tons for the muzzle-eye shark**),** compared to around **480 tons in 2001** (PAG, 2015) which is the year of good reference for the conservation of these species.

By the way the decline in shorebirds could be a cascading effect of human fisheries on the benthic community. The illegal fishing of Lusitian Cownose Ray *Rhinoptera marginata* and Bull Ray *Pteromylaeus bovinus* is expected to have changed the dynamics of seagrass beds. These rays eat the large West African bloody Cockles Senilia senilis, which may outcompete the similarly suspension-feeding Dosinia isocardia, now that their stocks are so much greater (Sidi Yahya et al. in prep.). Previous research has shown that annual Dosinia densities explain year to year differences in the survival of Red Knots (van Gils et al. 2013).

b- **Dynamics of seagrass beds:** Seagrass beds are the main primary producer, thus driving the functioning and stability of the intertidal flat communities (Folmer et al. 2012, van der Heide et al. 2012, de Fouw et al. 2016). Seagrass cover has increased in Banc d'Arguin since the early 1970s as a result of the Sahel drought, resulting in a shift in benthic community from a polychaete-dominated to a bivalve-dominated system (El-Hacen et al. 2020), with a sharp decline in worms and the bivalve Dosinia isocardia, and an increase in one prey species, the bivalve Loripes orbiculatus (El-Hacen et al. 2020). However, due to the sulphide-based metabolism of Loripes, foragers need other prey species to complement a diet of Loripes (van Gils et al. 2013, Oudman et al. 2014). Indeed, Bar-tailed Godwits and Red Knots, two shorebird species that are known to

depend heavily on polychaetes and Dosinia respectively, have declined in Banc d'Arguin according to both the total counts as the yearly Iwik ones

c- **Climate change (sea level rise):** One of the consequences of climate change is the rise in sea level, which leads to the submersion of certain islands which constitute breeding sites for most of Afrotropical species, including species endemic to the Banc d'Arguin, such as the Balsaci spoonbill and White Heron.

Unfortunately, today, very little data are available to draw a conclusion on the impact of the see level rising on birds as highlighted in the last report of the evaluation of the Park's management effectiveness.

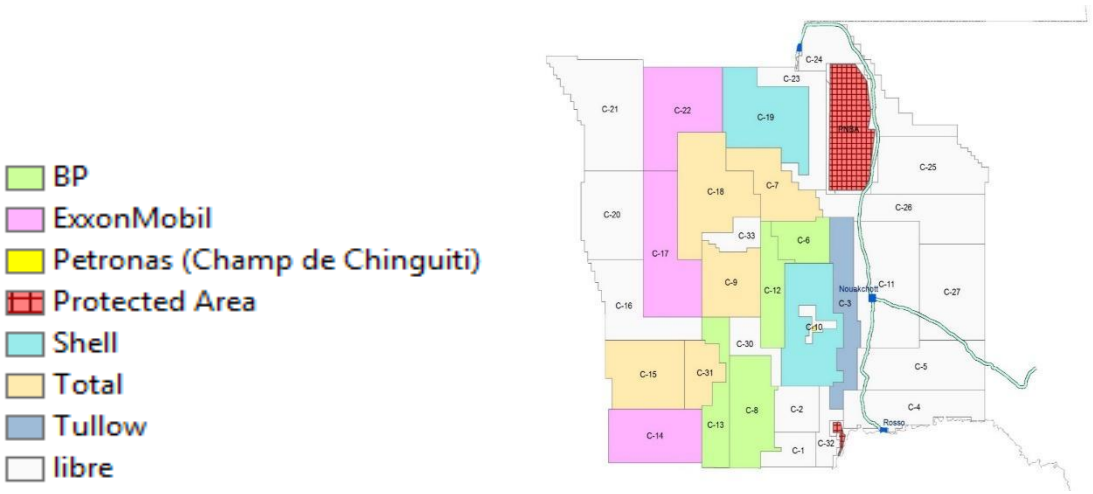
Even if the various observations (see photo) show that the submersion of the islands has real impacts on the reproductive success of the breeding species of the Banc d'Arguin.

Reproduction of Balsaci on Ile de Nair, in high tide period

2. External threats:

a- **Oil and gaz**: Discovered in 2000 on the Mauritanian coast, the oil industries has developed rapidly. Today according to the **M**auritanian **H**ydrocarbons and **M**ining **H**eritage **C**ompany, 06 oil companies operate in the Mauritanian coastal basin, with a total of 16 concerned blocks distributed as follows:

-BP: 04 blocks
- ExxonMoble: 03 blocks
- Shell: 02 blocks
- Total: 05 blocks
- Tullow Oil: 01 block
-Petronas: Chinguetti field (protected area)



Note that the Chinguiti well in production from 2006 has been abandoned since December 2017. This abandonment is in accordance with best practice and international standards (First phase successfully completed and second phase underway).

Even in the absence of available relevant data on a possible impacts of oil exploration/exploitation on the Banc d'Arguin ecosystems, the lack of a significant buffer zone between these blocks, especially block c-7 (see on the map) and the Banc d'Arguin National Park boundaries, shows that there is a high risk of a potential impacts like Oil spill during transportation, noise etc. that could cause a huge biodiversity loss in one way or another.

b- Mining activities: The development of mining activities in the vicinity of the Banc d'Arguin constitutes a threat to biodiversity in the long term, even if studies show that the risks of a possible contamination of biodiversity are low at the moment (IMROP-2020).

c- The port of Tanit: Located 70 km north of Nouakchott, the port of Tanit houses an integrated port complex for small-scale and coastal fishing called "Pole of development of artisanal and inshore fishing in Tanit", which include infrastructures and port equipment required for the landing and marketing of the fish. The asphalt ramp linking this port to the Nouakchott-Nouadhibou road and the master plan for the construction of an adjacent town around this axis are risks increased pressure on the park's resources, including coastal birds.

d- Creation of Chami Moughataa: The Moughataa of Chami was created in 2013 by Decree n°2013-071 of May 06, 2013. A plan of the development was built for the city and sales were made for its most of it. This plan includes an industrial zone located in the south of the city and about six miles (6,000) parcels of land. The city being in the immediate vicinity of the park will and therefore have an impact on the number of visitors and, consequently, on the impact on the resources, such as birds disturbance, plastic pollution and so one.

V. Conclusion

Although the Banc d'Arguin National Park remains an important site for biodiversity in general and shorebirds in particular, the results of various monitoring programs and waterbird counts carried out between 1979 and 2020 by national and international teams, show a progressive decrease in bird populations especially among palearctic migrants such as *Calidrus canutus*, *Limosa lapponica*, and *Numenius arquata* but also some Afrotropical piscivores such as *Phlacrocorax africanus*.

This, despite of the considerable efforts deployed by the Mauritanian Government through, among others, the establishment of a Trust Fund to ensure the sustainability of funding, cooperation at the national and international levels, elaboration and implementation of several management plans, implementation of a strategy for the management effectiveness, the implementation of a special monitoring program for endemic species and fisheries..

Climate change through sea level rise, sedimentation etc., galloping anthropogenic pressures like the increase of human population mainly on the peripheral zone(new city of Chami), extractive industries (oil gaz, iron, gold…), infrastructures (port of Tanit, fishing camps), targeted and overfishing of some species of ray etc. the Banc d'Arguin National Park is facing serious threats that is impacting the biodiversity in general but especially the survival of the waterbird population, as shown by the declin of species highlighted above.

However, given the complexity of the Banc d'Arguin National Park and the interdependency of key sites along the flyway, it would be important to take the lessons of this study with some caution.

More collaboration between the various stakeholders including site managers, Civil Society Organizations, local populations, researchers is needed in order to draw a reliable conclusion. It's also vital to build local teams capacities in terms of monitoring.

All these factor could ensure a good data qualities and a better understanding of waterbirds trends, identify the real causes of species declines and set up conservation measures that will improve efforts already in place. This for the benefit of biodiversity as a whole and shorebirds in Banc d'Arguin as well as the entire flyway.

VI. Recommendations

Given the complexity of the Banc d'Arguin ecosystem and the interdependence and complementarity of the different sites along the flyway, it is difficult, if not impossible, to give a clear response to the decline of waterbirds in the PNBA.

However, some recommendations that could contribute to a better management of the site are given below

- Capacity building in terms of monitoring and counting birds at local level for better data quality;
- Loyalty of the counting teams in relation to the counting sites to minimize errors on bird counting: Repetition by the same team will help building experience on the terrain, tides, and bird movements, enabling to optimize the planning of the counts and standardize the methodology

- Consideration of shorebirds in the various monitoring programs in the same way as endemic birds;
- Conducting and making public impact studies, in particular on the impact of the oil and mining sector on the Banc d'Arguin ecosystem in general and on shorebirds in particular;
- A preliminary exploration of the potential to use annual counts of a sample of counting units as an index of changes in numbers of birds on the entire Banc d'Arguin suggested that this approach for now seems to have limited potential due to variation in bird distribution within the studied area and the substantial sampling error in the counting unit counts themselves;
- Organize a yearly count that would also mean that all regions of the Banc d'Arguin ecosystem will be visited and inspected on a regular basis, which will improve the capacity to detect important ecological changes as early as possible;
- Conduct multidiscinary research teams (including PhDs and postdocs) engaging deeply with these difficult topics for better conservation measures;
- Regular monitoring program in order to collect data on the impact of sea level rising on the breeding community;
- Implication of the university student's for more national capacities on topics relatives to conservation in general and bird in particular.

VII. References

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