REPUBIC OF SENEGAL
Un Peuple – Un But – Une Foi

Request for the withdrawal of the Réserve Spéciale de Faune du Ndiaël, Ramsar Site

from the Montreux Record

In accordance with Resolution XII.6, 2015

With financial support from:

- **The African Development Bank (AfDB)**
- **The Global Environment Facility (GEF)**

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1. General Context

1.1. Wetlands and people

In the Sahelian region, each wetland plays an essential function for the conservation of wildlife and provides services for the life and development of human populations. In the Senegal delta, before the construction of the Diama dam, wetlands that remained inundated after a long period of drought (hot season and following cold season) had a specific function for the protection of wildlife or for meeting human needs (hunting, fishing, gathering). This resulted in potential risks of conflict between conservationists, concerned with the proper functioning of protected areas such as the Parc National des Oiseaux du Djoudj, and development entities (local governments...), who considered protected areas as refuges for birds that were causing serious damage to their crops. They also considered protected areas as large areas they could use, including for livestock feeding. The lack of water resources left the situation unresolved. Indeed, each period of drought was accompanied by its attendant disasters, with high mortality of livestock or people, and high pressure on the few areas that still had water resources or grasses.

The impoundment of the Diama dam created an unprecedented situation in which water resources were no longer the limiting factor. It was therefore possible to consider the return of water to dry areas and thus ease the pressure on territories that could not bear that anymore or that may eventually malfunction as a result. The Réserve de Faune du Ndiaël is one of those sites. Since its drying up in the 1960s, various reflooding projects could not be completed due to the lack of water and financial means. The reflooding project initiated and monitored by the Office des Lacs et Cours d'Eau (OLAC) with funding from the African Development Bank (AfDB) and the Global Environment Facility (GEF)is the first to have the means for both its engineering and technical implementation.

The Réserve Spéciale de Faune du Ndiaël, and especially its Ramsar site, is within the delta protected areas system (Figure 1), in which it plays a complementary role to other sites, and could also play the role of a replacement site, for example in the Parc National des Oiseaux du Djoudj, if, in a given year, its flood level was not enough to accommodate waterbird populations.

This report aims to show that conditions are now met to remove the Réserve Spéciale de Faune du Ndiaël from the Montreux record in which it has been registered since 1990.

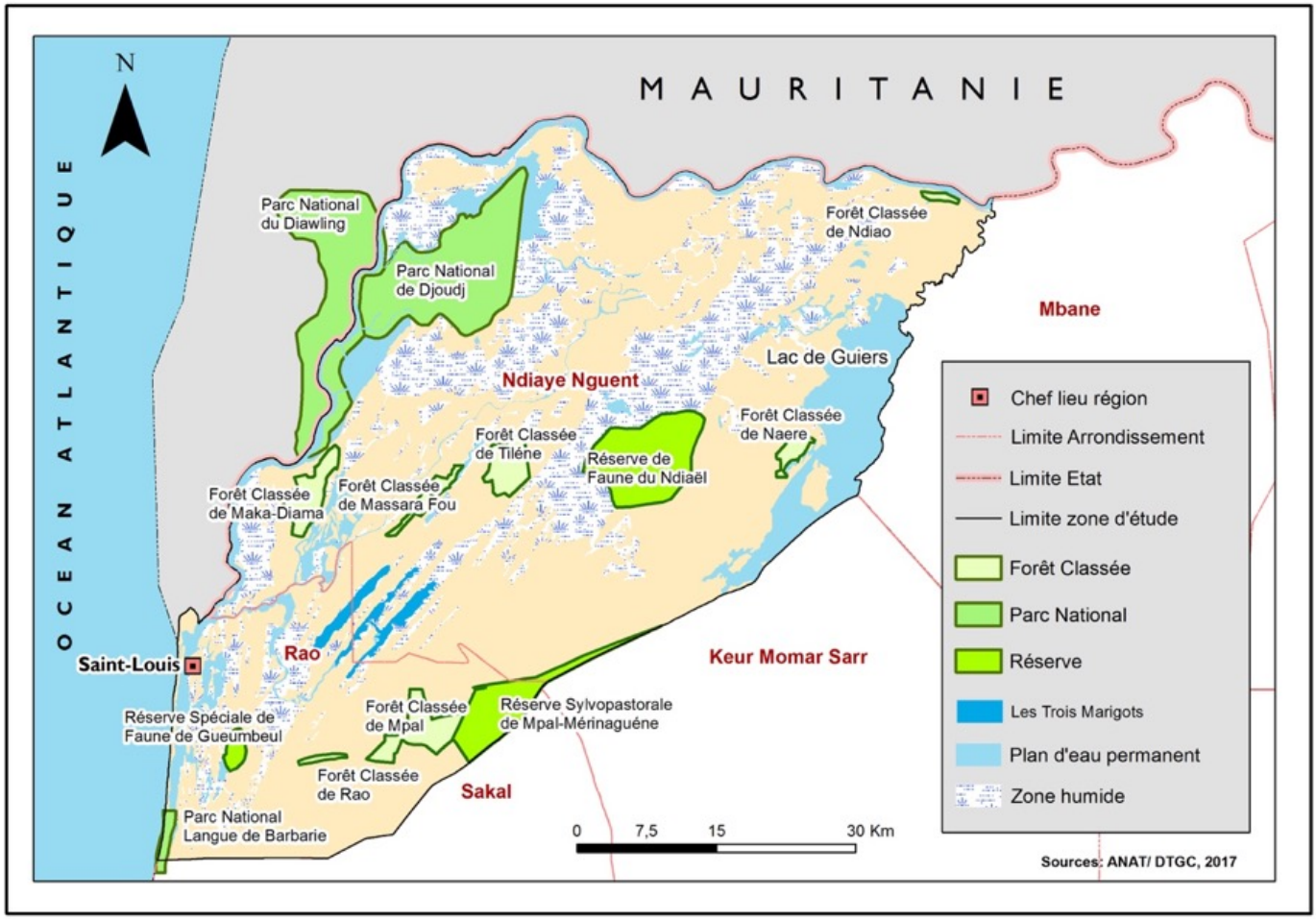


Figure 1: Location of the Réserve Spéciale de Faune du Ndiaël in the protected areas system of the Senegal River Delta

1.2. Designation of the Réserve de Faune du Ndiaël site on the List of Wetlands of International Importance

The Réserve de Faune du Ndiaël was included on the List of Wetlands of International Importance on 11 July 1977. Four of the nine Ramsar criteria were considered met (criteria 1a, 1c, 2c, 3b). These criteria defined by Recommendation 4.2 (1990) were rewritten in October 2014. The four criteria are presented in the Ramsar information sheet SN139, dated 18 August 1992. In the updated version of the criteria, the Ndiaël site is considered as meeting Ramsar criteria 1, 4, 5, 6 and 8.

The Réserve de Faune du Ndiaël is also cited, together with the Trois Marigots, as an Important Bird & Biodiversity Area (IBA).

2. Existing Management Measures

2.1. Date when the latest Ramsar Information Sheet (RIS) was submitted

The Réserve de Faune du Ndiaël Ramsar factsheet (still available to download) was submitted to the Secretariat on 18 August 1992. This fact sheet describes the problems posed by the lack of water but does not refer to the fact that Réserve de Faune du Ndiaël has been on the Montreux record since 4

July 1990. This sheet defines an area of 46,550 ha that actually corresponds to the wildlife reserve (area defined by decree). The surface area of the Ramsar site as defined on the Montreux Record is 10,000 ha, corresponding to the main basin. Thus, the decommissioning by a 2012 decree of part of the area (26,for agribusiness purposes does not concern the Ramsar site but the special bird reserve.

The RIS has been updated and send to the Ramsar Secretariat in June 2018. It clarifies the criteria and defines the elements that are presented further in this document. It indicates an extension of the surface area of the Ramsar site to 26,.

2.2. Monitoring Program in Place

Table I shows the monitoring already in place at the site, describing its status and operations.

Table I: Monitoring provided at the site

Monitoring of the hydrological regime	- Bos *et al*. (2015) analysed the trends of flooded areas between 1984 and 2014. This will be supplemented (at least every three years) using satellite (Landsat and Sentinel-2) and aerial (drone) imagery to characterize the flooded locations and their surface areas across the Ramsar site. - Projected implementation, in the management plan, of limnimetric observations (stage ladders) in the Grande Mare, intended to measure the variations of water levels from the filling period in July to the complete drying of the site in April, the following year. Monitoring in the Niéti channel (continuous flow-meter at Keur Idy and regular measures at Pont Alain and Belel Mbaye sluice gatesis also planned during the flood. Currently no quantitative monitoring is carried out on the site.
Water quality	Analyses were carried out to measure concentrations of inputs (fertilizers and pesticides) in water coming from the drainage of irrigated rice plots near the Ramsar site. This led to isolating the polluted discharge to prevent its flow into the “Grande Mare” area of the Ramsar site.
Plant communities	The vegetation map produced in 2013 (Bos *et al.,* 2015) provides a good view of the site before reflooding. It shows the diversity of habitats and the possible threats related to the risk of development of Typha. It will be updated when the site is reflooded, as provided for in the management plan.
Fish inventory	The extensive inventory on Lac de Guiers, Niéti Yone and Réserve de Faune du Ndiaël helped to better understand the resource in terms of abundance, species composition and distribution.
Bird Inventory	- monthly counts of waterbirds at different wetlands are carried out. The frequency was increased to counts every 15 days during the period from October 2017 to March 2018. This process has allowed a better assessment of the return by birds to the partially reflooded site. - A monthly transect inventory to determine the distribution, abundance and diversity of terrestrial birdlife was conducted in 2017, and was reviewed to

	allow for subsequent measurement of the impact of reflooding on terrestrial species.

2.3. Assessment protocol in place

The management plan (2018-2022) foresees that the level of progress towards the results will be measured through regular monitoring of predefined indicators in the logical framework and the annual work plan (AWP). This monitoring is organized by the Steering Committee in agreement with the Water and Forestry, Hunting and Soil Conservation Directorate through the Monitoring – Evaluation, and Wildlife Management Divisions.
In addition to the quarterly reviews by the Management Committee, periodic (semi-annual, annual) monitoring missions will be carried out in conjunction with the Regional Inspectorate for Water and Forestry.
An external evaluation will be conducted halfway through the management plan (2020) in order to take stock of progress and propose corrective measures if necessary. Upon completion of the plan, a second external evaluation (2022) shall endorse the progress made and formulate new orientations.
The initial objective of the management plan sets out the monitoring operations to be implemented to ensure that the reflooding results in the expected results (Table II).

Table II: Summary of activities within the action plan in accordance with the Management Plan (2018-2022)

Operational Goal	Activity Code	Activities
A. Restore and monitor the bio-ecological potential of the site, in order to restore its international importance, especially for waterbirds	**A1**	Implementing management and maintenance operations for waterways and water bodies.
	A2	Monitoring water quality parameters.
	A3	Monitoring the hydrodynamic and hydro-sedimentary components after the reflooding of the RSAN.
	A4	Establishing a hydrological model for the management of water bodies.
	A5	Monitoring the dynamics of biodiversity (reinstallation of fauna and flora) in connection with the reflooding.
	A6	Assessing the ecosystem goods and services.
	A7	Building and rehabilitating monitoring, surveillance and information infrastructures and reinforcing monitoring equipment.

Furthermore, effective management of the refilled Réserve de Faune du Ndiaël entails the establishment of collaborative mechanisms at two levels at least:

a) At the regional level, the creation of a multi-stakeholder consultation framework is planned (local government, competent technical services, management bodies, socio-professional

organizations, private sector and cooperation agencies) to build a shared vision of the management modalities of the reserve;

b) In the area of the Réserve de Faune du Ndiaël, it is necessary to set up a partnership framework between local trade-based organizations, the Forestry service and local authorities, with a view to setting the conditions for making shared choices and consensual decisions regarding the development and implementation of the reserve management plan. In other words, the development of the partnership aims to:

(i) Raise the awareness of the various groups of stakeholders on their responsibilities;
(ii) Ensure a smooth flow of information to support informed decision-making;
(iii) Ensure that decisions made collectively are considered appropriate by all stakeholders involved.

3. Improvement and restoration measures in place or planned

3.1. Previous attempts

As early as 1961, initial studies carried out by the Senegal Planning Mission attempted to estimate the cost for reflooding the site (de Naurois, 1965). Several attempts followed since 1985 under the initiative of the non-governmental organisation Migratory Birds of the Western Palearctic (OMPO) and its local partner – the Directorate of Water, Forestry, Hunting and Fisheries – and based on an assessment of the situation carried out by the CNRS Strasbourg laboratory, under the supervision of Michel Mietton.

Mietton and Humbert (1994) explained that the reflooding of Ndiaël basin is technically feasible. At least it is possible in a scenario of flooding strictly limited to the sebkha, extending about a hundred km^2 (96 km^2 for a water level of +1m). This requires importing a variable volume of water, depending on the management scenarios and the maximum level chosen, of between 100 and 200 million m^3 approximately. For example, in the case of permanent water, the overall inflow is 202 million m^3 (extreme of July: 40.8 x 100 m^3 for a maximum height of +0.92 m). The staggered inflow is calculated by taking into account a free water inflow limited to the period from mid-August to mid-October. The creation of this water body assumes on the other hand that the Ndiaël basin is closed, mainly in the south to avoid discharges towards the “Trois Marigots”, but also to the north to cut it off, as was done in 2018, from the drain of Ndiaël that serves as an outlet for the wastewaters from the Kassak and Grande Digue perimeters. According to the authors, a floodgate in the southwest would be necessary to ensure occasional emptying, in case of salinization; this was also built in 2018. They also suggested considering real embankments with compacted materials, which would serve at the same time as tracks, bypassing closely the water body.

The Réserve Spéciale de faune du Ndiaël Rehabilitation and Management Plan established by OMPO was part of a long-term ecosystem restoration program with three objectives:

• Restore the avifaunal potential, with the project to restore its vocation as a Ramsar Site;

• Organise the use of the site by traditional fishing and farming activities, while respecting natural equilibriums;

• Promote reforestation in order to combat desertification and if possible provide firewood for local populations.

The implementation of this plan started with:

a) Reflooding, by digging a canal in the bed of the old marsh with the assistance of OMPO, in January 1995;

b) The delineation of the reserve;

c) The establishment of a local management committee comprised of representatives of the Rural Council, the Sub-Prefect of Ross Bethio, the head of the Water and Forestry brigade and the chiefs of the village involved.

The actions implemented include the creation of a canal between the Third Marigot and the southern end of the Ndiaël basin and gates at the level of the water reserve of Saint-Louis, since this canal flows into the “Trois Marigots” and the Ndiaël only when it is entirely full. Due to a lack of consultation, and despite the management plan being approved by the various administrations, but never implemented (Mbaye Ndiaye *et al*., 1999), the projects were never completed.

Thus, the canal dug by OMPO was not maintained and lost its functionality quickly when it was blocked by tamarisks.

As a follow-up to the OMPO initiative, the Ndiaël Integrated Planning and Development Project (PADIN) was implemented from 1997 onwards. It was part of a wider intervention, trying to reconcile two major requirements:

(i) The revitalization of the reserve enabling it to fulfil its ecological functions;

(ii) The development of socio-economic activities to improve the living conditions of local populations.

PADIN adopted a participatory approach based on the involvement of local populations in the management of the Reserve's resources.

3.2. Recent attempts

The Senegal - Mauritania Biodiversity Conservation Project (took over from PADIN in 2001. As regards the Ndiaël area, the PCBSM did not have an objective to reflood of the reserve. The project interventions were focused on:

(i) Capacity building of local actors;

(ii) Support for reforestation activities;

(iii) The promotion of protection activities, in order to support natural regeneration of the environment.

In 2004, the project supported the restructuring of community services for local populations living near the Reserve, through the setting up of village committees and the Inter-Village Association (AIV). This unifying structure has defined a five-year management plan for 2008-2012, for which implementation was based on a diversified partnership involving decentralized technical services, local authorities and private operators enjoying a lease of hunting areas.

The program entitled "*Community Management of Protected Areas for Conservation*" (COMPACT) was implemented between 2008 and 2010. It focused mainly on the partial reflooding of the “Grande Mare” and supporting the activities of the AIV.

The end of the COMPACT project marked a pause in interventions at Réserve de Faune du Ndiaël. From 2011, Wetlands International, in partnership with IUCN Netherlands, Both ENDS and Living on the Edge - Netherlands initiated the project *"Contribution to the Restoration of the Réserve Spéciale de faune du Ndiaël*".

Wetlands International's interventions at Réserve de Faune du Ndiaël were on three levels:

(i) Generation of knowledge about Réserve de Faune du Ndiaël;

(ii) Capacity building of local actors including the AIV;

(iii) Actions to restore the ecological functions of Réserve de Faune du Ndiaël.

Regarding the generation of knowledge, several studies focused on:

(i) Socio-economic situation;

(ii) Mapping the evolution of the water body to determine the flooding area in the Grande Mare;

(iii) Measuring the impacts of previous interventions at Réserve de Faune du Ndiaël, etc.

This research work led to the implementation of a simplified management plan for the Reserve in 2015 (Faye, 2015), from which a large part of the objectives are included in the 2018-2022 management plan.

For a participatory management of the Reserve, the project *"Contribution to the Restoration of the Réserve Spéciale de faune du Ndiaël"* has engaged in several activities of capacity building and income generation, such as:

(i) systematic ecological monitoring of bird life;

(ii) the processing of wood products;

(iii) conservation and processing of livestock products (mainly milk);

(iv) cattle fattening;

(v) study trips to reserves in Senegal and Mauritania;

(vi) local conventions on the use of natural resources of the Réserve Spéciale de Faune du Ndiaël.

The physical achievements include the following:

(i) the delineation of the Reserve, including subspaces corresponding to the Grande Mare and the buffer zone;

(ii) promoting reforestation and protection initiatives;

(iii) cleaning and clearing obstructions along the *Niéti Yone* channel and the way leading to the Grande Mare;

(iv) microcredits etc.;

(v) geo-referencing and signposting of the lake and the current limits of the reserve and the Grande Mare, the construction of a watchtower at Yowre for a scientific observatory and the Belel Mbaye track.

In 2009 and 2010, thanks to a grant from the micro-GEF and with the assistance of Water and Forestry Services, the AIV refilled the basin between September and December (Figure 2).

To do this, the hydraulic channel largely responsible for bringing water to the Grande Mare (the Niéti , was mechanically cleaned (dredging, unblocking of the lateral channels) and then manually cleaned (cuttings of *Typha* and other aquatic plants) by the village committees organized in teams.

Four other secondary pools (Bellel Mbaye, Yowré, Barkedji Hanna and Mborodi) were dredged with a mechanical digger. Additional works (culverts) built in collaboration with a private partner also contributed to filling the secondary pool of Yowre.

These actions were accompanied by the control of anthropogenic factors degrading the environment, including illegal logging and overgrazing. Reforestation of the site is initiated with the production of

seedlings of various plant species from a field nursery. Reforestation is supplemented by defensive management and assisted natural regeneration in village lands, especially around forest galleries.

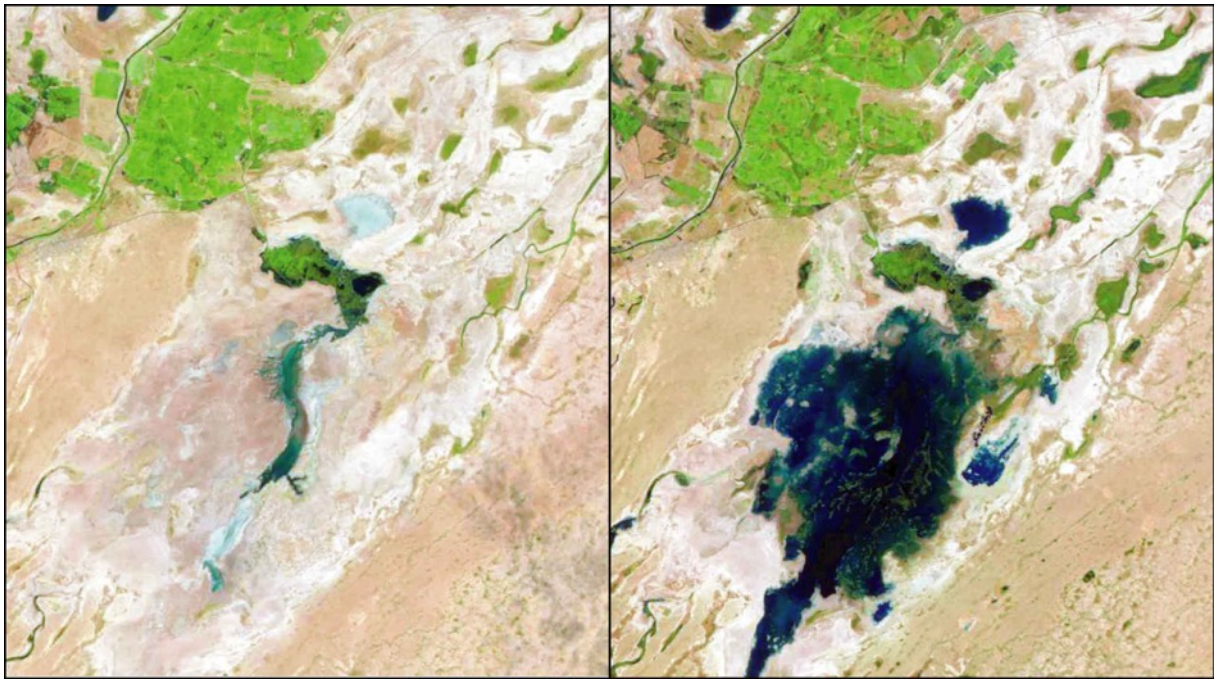


Figure 2: Satellite images of Ndiaël in a dry year (left) and in 2010 following heavy rains and small interventions to improve the accumulation of water in the basin (extract from Bos *et al*., 2015)

In addition, reforestation and site protection activities have encouraged the regeneration of pastoral resources and the maintenance of livestock farming system in riparian areas of the Reserve.

4. Assessment for the removal of the Ramsar Site from the Montreux Record

4. 1. Successful improvement, restoration or maintenance measures

Lac de Guiers Ecological and Economic Functions Restoration Project (PREFELAG)

Due to multiple factors (limitations inherent to the approaches developed, low funding levels mobilized, lack of involvement of local populations, etc.), previous projects have not been able to achieve complete rehabilitation of the wetland. However, the decree creating the Réserve Spéciale de Faune du Ndiaël, signed in 1965, already provided for the possibility of reflooding the site –evidence that from that time the site was threatened and that half a century later, the issue is still topical. The cumulative results of these projects remain modest in relation to the challenges with the ecosystem. Yet, those interventions helped restore some water bodies and maintain the use of the reserve by migratory birds. They also helped to maintain the hope of reflooding the site on a regular basis, keeping the attention of potential financial partners. The discharge of surplus water from rice fields north of Ross-Bethio since the early 1990s has created a water body highly used by waterbirds. The quality of this water discharged in the vicinity of a Ramsar site may be subject to debate, but results show that birds can quickly use the Réserve de Faune du Ndiaël, if it regularly receives water. In addition, reforestation and site protection activities have encouraged the regeneration of pastoral

resources and the maintenance of the pastoral livestock farming system in riparian areas of the reserve.

The reflooding of the Réserve de Faune du Ndiaël is now part of the Lac de Guiers Ecological and Economic Functions Restoration Project (PREFELAG), designed and implemented by the Office du Lac de Guiers (OLAG), with funding from the African Development Bank (AfDB) and the Global Environment Facility (GEF) to the amount of 13.94 billion CFA francs, or about 22 million Euros. It aims primarily to raise the storage volume of Lac de Guiers from 1.2 to 2.1 billion m^3 of water, allowing the necessary quantity to refill the Réserve de Faune du Ndiaël sustainably and to enable the site to be removed from the Montreux register where it has been since 1990.

The PREFELAG is designed around three main components, which prepare for and facilitate the reflooding, which could not be done without an application of the whole planned mechanism.

Component 1: "*Improving the hydrological dynamics of the Lac de Guiers system".* This component focuses on:

a) *Rehabilitation of infrastructure (work to improve the water level of the lake, through the cleaning of the Taouey channel, the rehabilitation of the Merinaghen floodgate and of dikes around about ten kilometres of the lake, as well as the removal of aquatic invasive plants), which increases the volume of water in the lake and thus provides the resources needed to fill the Ndiaël basin.*

b) *The development of the Réserve Spéciale de faune du Ndiaël and Niéti Yone (cleaning of the Niéti Yone*, *construction of new floodgates, creation of a navigation way, creation of two nesting islands, re-profiling of 40 ha of basins, construction of landing stages, rehabilitation and construction of the Reserve surveillance infrastructures;*

c) *Implementation of management tools (system for collecting and processing hydrological and climatic information, definition of a land use and land allocation plan);*

d) *The preservation of water quality (development of the baseline situation, monitoring of water quality, implementation of a rural equipment program aimed at improving water quality).*

Component 2: "*Capacity Building and Support for Economic Initiatives." This component aims to promote:*

a) *Awareness-raising, training and communications (organizing training sessions targeting managers and members of social and professional organizations, etc.);*

b) *Support for economic initiatives (support for village development activities, promotion of ecotourism, development of fish farming ponds and development of activities specifically targeting women).*

Component 3: *"Administrative, financial and technical management of the project."*

Unlike previous projects, PREFELAG was designed based on the fact that the lacustrine depression of the Ndiaël belongs to a large hydrological basin, including other hydrogeological formations such as Lac de Guiers and the "Trois Marigots", among others. Based on this finding, PREFELAG has adopted a systemic approach taking into account all components of the greater Lac de Guiers Basin, which extends over the St. Louis and Louga regions.

It should be noted that the investments planned under the PREFELAG are the most significant dedicated to the Réserve de Faune du Ndiaël Ramsar site since its classification. They include infrastructure and facilities that have a direct effect on the entire ecosystem, as well as support for economic, social and environmental areas.

The infrastructures built upstream of Lac de Guiers and the cleaning and rehabilitation works of the Taouey channel, over a distance of about 20 km, make it possible to control the flow of water from the Senegal River to Lac de Guiers. At the same time, the cleaning of the "*Niéti Yone* channel connecting Lac de Guiers to the Réserve Spéciale de faune du Ndiaël along its entire length, the topography work on 26,000 hectares of the Reserve, resizing and dredging of the navigation channel in the Grande Mare, and the construction of protective embankments to maintain water levels at a height of 1 to 1.5 meters are contributing to the maintenance of the water bodies required for the different species of birds with different habitat and water quality requirements.

Targeted work under PREFELAG contributed to:

i) Opening a 10m wide inlet channel by excavation and de-cluttering the bed of the Niéti Yone alg a length of 28 km.

ii) Building a floodgate of 15 m^3/s on a 10m long and 8m wide section at the Pont Alain site. This structure is equipped with two 1.40m long valves. It also serves as a bridge allowing the circulation of vehicles and goods. It makes it possible to regulate the flow of water towards the Grande Mare as needed.

iii) Building a floodgate provided with a valve (1.4m x 1.4m) with a double seal, and with a capacity of 5 m^3/s between the Grande Mare and Trois Marigots. This gate is also used for reverse filling if the conditions of Trois Marigots allow it. It will only be opened exceptionally if local conditions require it.

iv) Building ten control gates to supply the string of ponds along Niéti Yone. These are small gates provided with valves anchored to the right of the channel and stabilized by masonry rubble;

v) Building a crossing and regulating floodgate (flow of 15 m^3/s) on the Niéty Yone channel at Bélel Mbaye. The dimensions of this structure are the same as that in place at Pont Alain and also serves the circulation of people and goods.

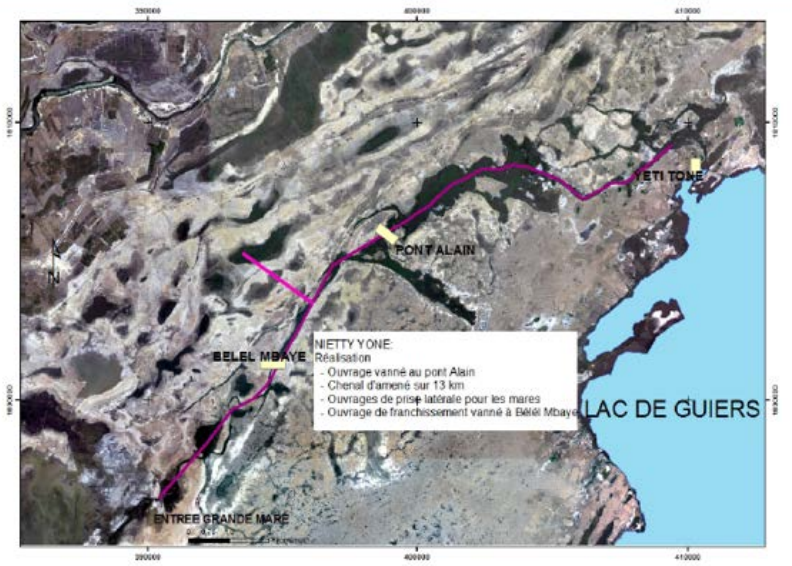


Figure 3: Layout of the Niéti Yone channel

Figure 4: Cleaning and reprofiling of the Taouey channel

Figure 5: Rehabilitation of floodgates and embankments

For a total cost of 885,000 euros, capacity building and support for economic initiatives of beneficiaries grouped around the AIV were implemented. These were mainly for:

1. updating the management plan for the reserve, which was completed in December 2017;
2. completing the command and guard posts;
3. reinforcing computer and logistics equipment (car and motorcycles);

4. strengthening monitoring (count) and surveillance equipment (telescope, binoculars, watchtowers, GPS, etc.);
5. supporting the improvement of vegetation cover by exclosures and tree nursery;
6. creating an ecotourism centre and provision of boats for the transportation of tourists;
7. supporting the reduction of pressure on the plant cover through the provision of 600 improved stoves;
8. construction of 3 fish farms, 9 ponds and 1 dairy unit to contribute to the improvement of populations income;
9. building an equipped head office for the AIV;
10. providing a community radio to facilitate the flow of information;
11. conducting training sessions and exchange trips;
12. proposed amendment of the regulatory texts for better security on the site;
13. conducting awareness and communication activities on good practices for better management of biodiversity.

Figure 6: Training of RSAN actors on site management

At a cost of 14.83 million Euros, the works carried out have made it possible to increase the capacity of the Taouey channel (between the Senegal River and Lac de Guiers) at a theoretical maximum flow of 100 m^3/s in order to increase the annual contributions of Taouey to the lake from 1.20 to 2.34 billion m^3. They also made it possible to re-establish the operating conditions of the embankments over a linear of 13.1 km, from the Niéti Yone over 28 km in order to ensure the availability of quality water from the Senegal River to the Grande Mare of Ndiaël.

Figure 7: Before and after the construction of the Belel Mbaye gate for the reflooding of Ndiaël

4.2. Situation as at 1st July 2018

The cleaning and the re-profiling of 16 km of the Niéti Yone has been achieved by the project through cofunding resources. The Niéti Yone channel and the control gates of Pont Alain and Belel Mbaye have been sized to allow a maximum flow of 15 m^3/s. In practice, OLAC aims to provides a maximum flow rate of 10 m^3/s at the entrance of Grande Mare, due to withdrawals up to Pont Alain by motor-powered pumps for agribusiness and small farmers, as well as overflows to supply small ponds on the sides allowed by the low dykes and through lateral outlets.

These important works have created a continuous water channel along the hydraulic course of Niéti Yone and filled adjacent ponds. We already noted a gradual return of birds and an exceptional development of habitats in the string of ponds, along Niéti Yone. An area of 30 m at the outlet of the Niéti Yone / entrance to the Grande Mare has not yet been dug and the upstream valves remain closed to allow the company responsible for the construction of protective embankments to complete its work. The completion of this work, the excavation of the last meters of Niéti Yone, and the valves are opened the 15 July 2018.

Work on the command post, guard posts and ecotourism centre is nearly completed.

5. How the ecological elements, processes and services of the site were restored or maintained

The 2018-2022 Réserve de Faune du Ndiaël management plan presents the ecosystem services rendered by Ndiaël. The restoration effort (see appendix II) now enables improved values of this function or service, which is particularly visible at the pond located at the outlet of Niéti Yone, which already serves as a resting area for birds.

Table III: Demonstration of Restoration of Ecosystem Functions and Services

Known ecosystem function or service	Restoration effort
A site of great value for the conservation of biodiversity, especially for birds, but which could also serve as a refuge for many species of mammals and reptiles.	Increased numbers of waterbirds, with 4 species meeting criterion 6 (1%) and cumulative numbers exceeding 20,000 birds (criterion 5).
Site that will contribute to dust suppression by stabilizing the flooded soils. It will also create a microclimate, with a cooler temperature due to evaporation over a large area.	Flooding for 5 to 8 months per year with an area of up to 10,000 ha serving this purpose. The northern part, at the outlet of the Niéti Yone is already stabilized from this point of view.
Fish production site	The Lac de Guiers - Niéti Yone - Ndiaël connection increases the areas favourable to the reproduction and growth of fish. The important point is that fishing is not allowed on the special bird reserve. The production will therefore consolidate the stocks outside this

	site. The amount of fry observed throughout Niéti Yone shows that this area will support the production of fish for all this part of the delta, for the benefit of birds and human populations.
Development site for ecotourism products that will increase financial resources for local populations and develop products associated with the Parc National des Oiseaux du Djoudj and other protected areas of the delta, thus increasing the overall value of ecotourism in the delta area.	The opening of the ecotourism camp, the training of specialized staff in the reception of the public, the demarcation of tour circuits which will all be functional from October 2018 will help meet the objective of local development, and the project fits into the revitalization of ecotourism in the delta.
Ecological Services: The Reserve provides forage resources for 63 villages or hamlets. In addition, the Réserve de Faune du Ndiaël is located in a transitional zone for pastoralists between the rich agricultural lands of the Senegal Valley and shores of Lac de Guiers, and the pastoral lands of the Ferlo.	Soil humidification will favour the development of herbaceous vegetation. Surface defences enable greater development of grass and improved forage production for livestock. There are plans to increase the pasture-free areas for at least part of the year to supply the entire area with quality fodder during the dry season.
Supply Services: Craftwork is an activity that develops all around the reserve. Indeed, this activity benefit from the availability of materials such as *Typha* and *Sporobolus* for weaving, and manufacturing gabions, mats and grass fencing. The valorisation of those resources is the responsibility of women who manufacture handicrafts to sell in the various urban centers of the region of Saint-Louis, including hotels for decoration purposes.	With much more humid areas, *Sporobolus* should increase, which will provide more raw material for craft trades. This should be visible in the near future, probably by 2020 or 2021.
Educational and scientific value: the reserve has a high scientific value still poorly known. In particular, the many flooding areas that support vegetation, wildlife behaviour, movements of domestic livestock and pastoralists (and their crops) deserve more attention.	In this respect, the Réserve de Faune du Ndiaël is a real field of experimentation on the relations between people and their environment. It should be a real open-air laboratory where the hydrodynamic processes and recolonization by wildlife and flora could be studied. The ecotourism camp must also become an accommodation and workstation for

	students and academics, as proposed by the advisory mission of December 2017. The diachronic monitoring already undertaken must continue and be the foundation of studies and monitoring, as set out in the management plan, with the assistance of universities, and in priority that of Saint-Louis.
Existence of cult and cultural sites: The Reserve is home to cultural and spiritual elements that are poorly emphasized.	No changes are made to this service.

6. Reasons to remove the Ramsar site from the Montreux Register

6.1. Meeting the reasons behind its classification

The Réserve de Faune du Ndiaël was entered on the Montreux register following the December 1988 advisory mission led by Michael Smart that made the following recommendations:

a) *The current situation in the Ndiaël basin does not correspond to that of a wetland of international importance. It should therefore be remedied either by removing it from the list and replacing it with another wetland of equal value or by restoring it. So far, no Contracting Party has removed a wetland from the list, and it would be unfortunate for Senegal to be the first to do so, given its multiple activities in favour of the conservation and wise use of wetlands. I therefore recommend that the Réserve de Faune du Ndiaël be kept on the Ramsar list.*

b) *Water sources needed for impoundment are currently available. In addition, many international organizations have informed Senegalese authorities that they are ready to cooperate in developing, financing and implementing a restoration plan. I therefore recommend that a restoration plan be initiated, especially as it could serve as an example for other countries and other Contracting Parties to the Ramsar Convention.*

c) *The main partners in this restoration plan are CIC and IUCN, each of which has developed a restoration project. Both projects deal with different aspects and are, in my opinion, quite compatible. I therefore recommend that Senegalese authorities meet with the two organizations involved (and with any other organization that could make a contribution) with a view to developing an integrated plan of action. In developing this plan, the various water supply options (Niéti Yone, Bondol, western canal of Lac de Guiers) should be reviewed to select the most appropriate solution; the management to be adopted later should also be defined on the basis of IUCN's proposals.*

d) *The implementation of such a restoration project will require close and very delicate cooperation with local residents and local authorities in the Saint-Louis region. Experience in other important wetlands suggests that the implementation of such a project requires the creation of an entity responsible for the tasks. I therefore recommend the creation of a project implementation unit with the necessary administrative and financial powers.*

Status of each of the above points*: *argumentation reiterating the elements of Michael Smart's report

(a') Despite the difficulties and its partial drying up, the Réserve de Faune du Ndiaël remained on the Ramsar list. As early as 1990, the discharge of the rice farms drainage water into the north of the basin helped maintain a large number of birds, particularly when the site served as a resting place for Black-tailed Godwits and Ruffs. At no point has the site been completely drained and it has continued to play a minor role in the waterfowl distribution opportunities in the delta. This has led to the calculation of the 1% criterion in recent years to establish that four species exceeded this threshold (see below).

(b') A management plan was initiated by OMPO following this recommendation. Four others followed and the current management plan is directly based on what the site must become once the reflooding is completed. The five successive plans are all based on Michael Smart's assumption that water resources are available, and that support structures are in place. The only missing link was funding, which became available as part of the PREFELAG project which covers all necessary expenses for the reflooding.

(c') IUCN, like the CIC (in fact the CIC Migratory Birds Working Group - OMPO), has followed-up on this recommendation and has never stopped trying to find a solution. OMPO initiated reflooding through a channel from the third marigot, though this was unsuccessful. Currently, OMPO has been subcontracted by IUCN to provide technical assistance for the reflooding and removal of the Réserve de Faune du Ndiaël from the Montreux Record.

(d') The engagement of many entities rather than just one has enabled the success of the project. The Office du Lac de Guiers (which became in late 2017, the Office des Lacs et Cours d'Eau) was the management unit of the financing provided by the AfDB and GEF. The management of the reserve is entrusted to the Regional Water and Forests Inspectorate. With support from the Mauritania-Senegal Biodiversity Project, efforts to organize the populations living around the RSAN have been realized. Thus, the Ndiaël AIV was created in 2004 and includes 32 villages. Its headquarters are in Ross-Bethio and it has 800 members. A committee consists of three representatives per village. The Executive Bureau has 4 men and 3 women. The work is done on a voluntary basis, based on the Ndiaël reflooding project to develop livestock activities, fishing and ecotourism. The association has been working on floodplain restoration and has been involved in a number of projects to reflood the basin and restore regular flooding. It has also lobbied the government, mobilizing and collaborating with international organizations such as development agencies, IUCN, Wetlands International and BirdLife International. Activities have included the construction of hydrological infrastructures, the elimination of invasive plants, the establishment of artificial breeding sites for birds, the construction of an observation platform for ecotourism, and training and advice to local activists and landowners. The AIV received the 2015 AEWA Waterbird Conservation Award in the Institutional category for the exemplary quality of its work.

The site is administered by a team of wardens, in the same way as the other protected areas of the delta.
The resources of the reserve can be used (recognized use rights) for market gardening and grazing, and the AIV carries out voluntary counts of birds.
Several decentralized State services are directly or indirectly involved in the management of the Réserve Spéciale de faune du Ndiaël (technical services responsible for forestry, agriculture, livestock, water, fisheries and tourism). The Office des Lacs et Cours d'Eau plays a leading role in the reflooding process and the implementation of appropriate means for the management of the site.

6.2. Implementation of the recommendations by the Advisory Mission 87 (December 2017)

The Ramsar Advisory Mission (RAM) in December 2017 made a number of recommendations, some of which are already enforced. This paragraph summarizes what has been done since December 2017.

Recommendation 1.a) The Mission considers that the RIS should be revised to better support the developed criteria. A second revision will have to be carried out two to three years after the actual reflooding.

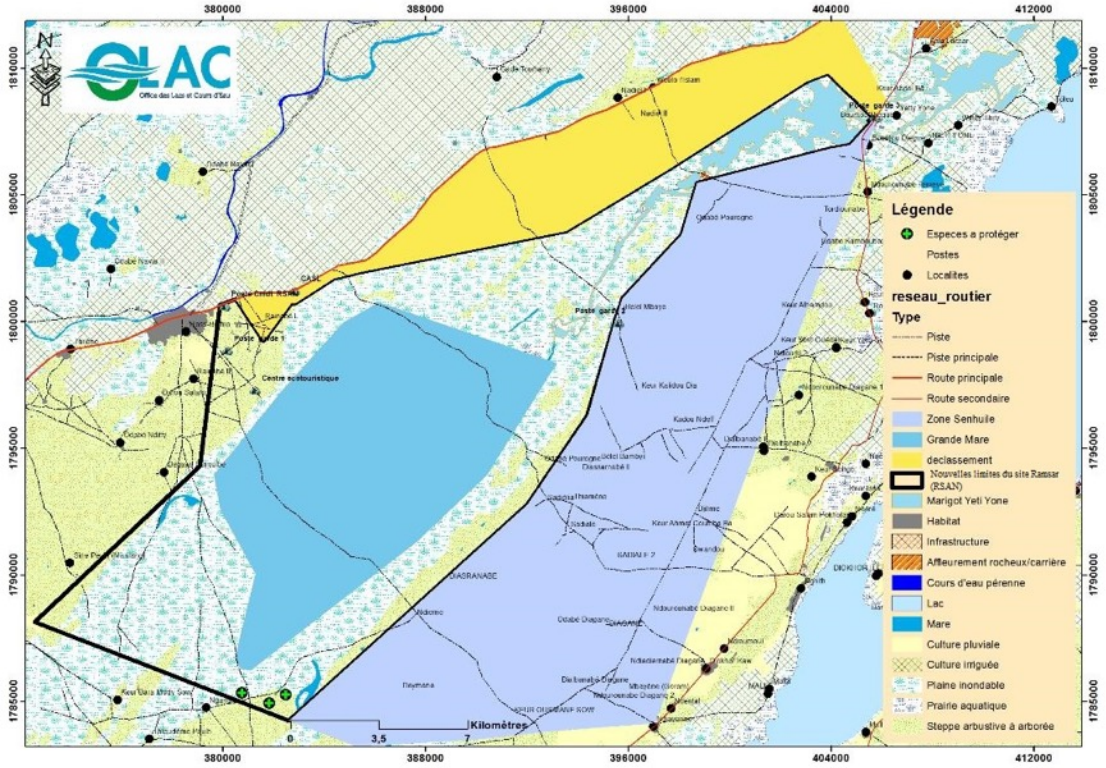
The revision was completed after the evaluation mission.

Recommendation 1.b) The Mission believes that the future maintenance of the site on the Ramsar List will require the implementation of conservation actions provided for in the management plan.

There is a sense of urgency for the authorities and the AIV to start implementing the management plan.

Recommendation 1.c) The Mission notes that there is a need to clearly show the consistency of the boundaries of the reserve and the Ramsar Site on all maps.

The latest maps produced by OLAC (see above) clearly indicate that the reserve and the Ramsar Site have exactly the same boundaries.



Recommendation 2.a) The Mission emphasized in terms of hydrology:

- *The importance of regular upkeep and maintenance of canals and inlet control structures.*
- *The importance of monitoring water resources.*

- *The importance of adaptability in the hydrological management of the area.*
- *The importance of maintaining flooding in the overflow areas of Niéti Yone and on the outskirts of the Grande Mare.*
- *The importance of integrated water resources management across Lac de Guiers.*

These recommendations are in line with the missions of OLAC. Indeed, OLAC has an operational plan for the management, upkeep and maintenance of the areas, reserves and hydraulic structures. The purchase of a reed & weed cutting boat is also expected in the second half of 2018 (from additional funding) to carry out regular cleaning of the Niéti Yone channel.
A hydraulic model (MIKE) has been developed with support from DHI for the monitoring and operational management of Lac de Guiers and Ndiaël. This model will be fed by the measurements and observations from hydrological monitoring of the stage levels in the Grande Mare, Lac de Guiers, and flows in the Taouey and Niéti Yone Canal.

In addition, it should be noted that the works have not been completed but the overflow areas of Niéti Yone have remained under water. The very light excavation of a channel allows the water to flow and spread over a large area without a “drain” effect.

Recommendation 2.b) The Mission hopes that the four decrees drafted to normalize the administrative status of the site will be adopted as quickly as possible in order to formalise the status of the Reserve.

These four decrees are submitted for endorsement. They will increase the area of the RSAN, and therefore the Ramsar site from 10,to 26,000 ha.

Recommendation 3.a) The Mission recommends that the reserve management team be strengthened and provided with the human and financial resources to implement the management plan.

This recommendation could not be implemented in such a short period of time.

Recommendation 3.b) The mission also considers it necessary to establish a water inflow schedule so that the site can be completely drained by the end of March or early April of the following year.

This principle has been endorsed, and will be implemented after the first filling in 2018 and adjusted based on knowledge acquired on the functioning of the site.

Recommendation 3.c) The mission also recommends, with regard to operations related to the ecotourism development of the site:

- *That boat tours to bird colony islands do not approach the sites within 300 meters in the first two to three years after installation in order to ensure their security for birds.*
- *To diversify the possibilities of use of the tourist camp by accommodating students and researchers, and to implement a public promotion strategy.*

These recommendations cannot be implemented in such a short period of time.

Recommendation 3.d) The Mission recommends zoning to differentiate grazing areas from areas of forest reclamation.

This recommendation cannot be implemented in such a short period of time.

Recommendation 3.e) The Mission suggests to sensitize neighbouring populations and local elected representatives in order to obtain their buy-in to the implementation of activities.

A brochure has been prepared for all audiences and will be distributed in English and French at the Ramsar COP in Dubai in October 2018.

Recommendation 3.f) The Mission emphasizes the need not to discharge water into the Trois Marigots.

This recommendation is validated by OLAC. A valve regulates the discharges, and water will be released into Trois Marigots only if it is required there.

Recommendation 3.g) The Mission considers that the reserve and associated ecosystem services should not be charged for access to water.

This recommendation cannot be implemented in such a short period of time, but it has been approved by OLAC.

Recommendation 4.a) The Mission recommends that care should always be taken to make the most judicious choice possible for developments that could impact Grande Mare or Niéti Yone.

Adjustments are being made to minimize the impact on the site and its landscapes. The navigation channels do not distort the site or its landscape. They are materialised with only slight re-excavation and with the use of wooden poles.

Recommendation 4.b) The Mission considers it necessary that the committees recommended by the Management Plan should exclude no stakeholder and that they should include agribusiness representatives.

The second advisory mission in June 2018 met with stakeholders to discuss this issue further. Representatives of the agribusiness sector that were met (Ferme de la Teranga, former Senhuile) are also willing to be part of the committees recommended by the Management Plan and to support the proper functioning of the reserve, as well as launching additional studies.

Recommendation 4.c) The Mission believes that the highest vigilance is required in the border area between the Senhuile farm and the Niéti Yone.

This point was addressed by the second consultative mission with the representatives of *Fermes de la Teranga* (formerly *Senhuile*). They voiced a desire to work with the various stakeholders to find together solutions to the issues that may arise.

Recommendation 5.a) As the Mission was unable to meet with the Senhuille agribusiness, they recommended sharing this report with this company and arranging a meeting during the next mission.

A meeting was scheduled during the second consultative mission with representatives of Senhuile, now called Fermes de la Teranga.

Recommendation 6.a) In accordance with observations in 2) and 3), the Mission recommends:

- *Providing OLAC with the necessary means (financial, human, technical) to perform its sovereign mission of monitoring the development of Ndiaël.*
- *Initiating consultation on the management of water resources at the scale of the Lac de Guiers - Ndiaël - Ferlo system.*
- *Articulating more effectively the institutional functioning of the restored reserve with the other protected areas of the Senegal Delta.*
- *Listing the economic and tourism activities conducted in the Réserve de Faune du Ndiaël (current and future) and make an analysis of their compatibility with the conservation of the environment and biodiversity (present and future).*
- *Monitoring the risks of conflict between agro-economic and tourism development and the conservation of nature and biodiversity in the Réserve de Faune du Ndiaël.*

These recommendations cannot be implemented in such a short time. A study on the hydrology of Lac de Guiers and Ndiaël was commissioned by the Société du Canal de Provence and received. A hydraulic model developed in partnership with DHI supports the initiatives of OLAC on the management of water resources across the Lac de Guiers - Ndiaël - Ferlo system.

Recommendation 7.a) The mission approves the organization of a second Ramsar Advisory Mission in July 2018 which shall consider:

- *Consulting agribusiness companies and neighbouring hunting lease holders.*
- *Assessing the completion of the development works of Niéti Yone.*
- *Observing the hydraulic continuity and the effective reflooding of the Grande Mare.*
- *Writing the request for the withdrawal of the Réserve de Faune du Ndiaël from the Montreux Record.*
- *Assisting the Ramsar focal point to prepare a side event at the Conference of Parties to the Ramsar Convention in October 2018.*

This second mission has taken place in June 2018. It was tasked to validate all the work and meet the actors who were not met during the December mission. It formulated final recommendations in line with the flooded area recorded in the report of Ramsar Advisory Mission 87 bis.

6.3. Review of criteria

The review of the criteria used to classify the site emphasize the renewal of the site. Table IV specifies these elements. Criteria based on birds were then developed as they are currently the most significant markers.

Table IV: Reminder of the criteria for nominating Réserve de Faune du Ndiaël as a Ramsar site and updating of criteria (handbook 17)

	Recommendation 4.2 (1990)		October 2014 Version	Criteria of 1st April 2018
1	Criteria for representative or unique wetlands			
1 a	A good example that is representative of a wetland characteristic of the biogeographical region involved.	1	A wetland should be considered a site of international importance if it contains a representative, rare or unique example of a natural or near-natural wetland typical of the	As an endorheic basin, the site meets criterion 1, because it is a type of rare wetland for this area (10,000 ha for the Grande Mare), the reflooding of which is an excellent way to fight against wind erosion of soils and promote the development of vegetation, as a source of animal feed. It is therefore a site that provides hydrological and
1c	A representative example of a wetland that plays an			

	important hydrological, biological or ecological role in the functioning of a river basin or coastal system, particularly if it is located on both sides of a border.		biogeographic region concerned.	ecosystem services that benefit the entire Senegal River Delta.
2	General criteria based on flora or fauna			
2c	The site is of particular value as a habitat for plants or animals at a critical stage of their life cycle.	4	A wetland should be considered as a site of international importance if it is home to plant and/or animal species at a critical stage in their life cycle or if it serves as a refuge in difficult conditions.	The fact sheet considers that Criterion 2 is met by the presence of the Temminck's Coursers (*Cursorius temminckii)* found in Trois Marigots and Réserve de Faune du Ndiaël – the unique habitats for its reproduction throughout the Senegal River Delta. In December 2017, an African White-backed Vulture – *Gyps africanus* – was found dead at the Grand Mare. This species is Critically Endangered (CR), so its presence on the site also meets Criterion 2 of the Convention. In addition, at least 1 Pallid Harrier *Circus macrourus* was seen in December 2017. It is a Near Threatened species (NT). The Black Crowned-crane *Balearica pavonina* has been observed during international waterbird counts (5 on 15 January 15 2016, 1 on 15 January 2017, and 2 on 15 January 2018); it should become regular on the site after the reopening of the Grande Mare. It is a Vulnerable species (VU), just like the Aquatic Warbler *Acrocephalus paludicola*, thus meeting criterion 2.
3	Specific criteria based on waterbirds			
3b	The site is usually home to a significant number of individuals belonging to particular groups of waterbirds, and indicators of values, productivity or diversity of the wetland.	5	A wetland should be considered a site of international importance if it regularly supports 20,000 or more waterbirds.	For the first time in several decades, the total number of waterbirds in the Réserve de Faune du Ndiaël exceeds 20,000 individuals, meeting Criterion 5 of the Ramsar Convention. This is all the more interesting that the Ross-Bethio pond, which usually hosts waterbirds, was completely drained in January 2018.

3c	Where population data are available, the site usually hosts 1% of the population of a waterbirds species or subspecies.	6	A wetland should be considered as a site of international importance if it is regularly supports 1% of individuals in a population of a species or subspecies of waterbird.	The revitalization of the site means that the numbers of four species exceed the 1% threshold allowing the site to be of international importance for each of them, according to criterion 6 of the Ramsar Convention (White-faced Whistling-duck, Egyptian Goose, Black Stork and Eurasian Spoonbill) according to the Ramsar Convention site designation criteria.
		8	A wetland should be considered as a site of international importance if it serves as a major feeding source for fish, spawning grounds, nursery grounds and/or migratory route for fish stocks in the wetland or from elsewhere (criterion 8).	The 2017 RIS indicates that the site meets this criterion. The abundance of fish in the Niéti Yone, in the form of fry, indicates that the site will strongly contribute to the re-stocking of this part of the Delta.

In conclusion, since 2018, Réserve de Faune du Ndiaël has met criteria 1, 4, 6 and 8, which justifies its removal from the Montreux Record.

6.4. Focus on waterbirds

Among the key lessons from the January 2018 waterbird count, which will act as a benchmark to monitor the recolonization of the site by birds, the following should be highlighted:

White-faced Whistling-duck numbers are the highest since 2010 (first year of exhaustive counting at the site). This number is lower than that of 11,700 birds recorded in December 2017.

Such a high number of Knob-billed Duck (595) has never been recorded in the delta outside the PNOD (Parc National des Oiseaux du Djoudj), indicating the very large capacity of the site to accommodate this species, as well as many others.

The African Pygmy-goose number (193) is higher than the PNOD count, but does not reach that of the Trois Marigots. However, it confirms the vitality of this species that used to be rare 20 years ago, and which can now easily be seen throughout the delta.

The high number of Garganeys (9,651) is in addition to the 12,514 individuals from the PNOD and confirms that counts from the PNOD alone do not represent their actual number in the whole delta. Although many wetlands may be dry, those with water play host to birds and, given the likely underestimation at the PNOD (see above), the numbers in the delta, in January 2018, must be between 35,and 40,000 birds.

The number of Northern Shoveler is consistent with the usual numbers in good years at the site but remains below the values of 1993 (420) and 2000 (400). This indicates that the site is now able to accommodate high numbers again, which should be confirmed over the next few years.

The number of Reed Cormorants is the highest ever recorded at the site. The previous maximum number was recorded in 2016 (1,048 individuals).

In 2018 the maximum number ever was also recorded at the site for African Darter, Black-crowned Night-heron, Squacco Heron, Black Heron, Grey Heron, Purple Heron, Great Egret, Intermediate Egret, Western Reef-egret, Eurasian Spoonbill (275 birds in December 2017), Little Grebe, Green Sandpiper, Caspian Tern, Little Tern, and among the raptors, African Fish-eagle and Western Marsh-harrier.

Table V: Numbers of different species of waterbirds and birds of prey at the Réserve Spéciale de Faune du Ndiaël, 15 January 2018. Counts by sector and total numbers are provided.

Species	Niéti Yone	Barkedji Anna	Ndoub ourene	Hore Tare	Mayo Gandji	Yowre	TOTAL
Fulvous Whistling-duck	12	240					252
White-faced Whistling-duck	1063	770		154		4054	6041
Egyptian Goose	9	1		20		10	40
Spur-winged Goose	23	1		1		19	44
Knob-billed Duck	230	157		23		185	595
African Pygmy-goose	61	44		17		71	193
Northern Pintail		2		35			37
Garganey	5752	293		649		2957	9651
Northern Shoveler	174	5		23			202
Little Grebe		10				9	19
Great Cormorant	45	13				1	59
Reed Cormorant	1030	52		19		22	1123
African Darter	175	8					183
Great White Pelican	1			30			31
Pink-backed Pelican	1						1
Back-crowned Night-heron	747	63		3		2	815
Squacco Heron	146	9	1	59		33	248
Cattle Egret	29	8		15			52
Black Heron	214	18		21		2	255
Western Reef-Egret	8	1		24		2	35
Little Egret	97	5		61			163
Intermediate Egret	33	7				3	43
Great Egret	115	17		4		2	138
Grey Heron	66	7	7	19		16	115
Black-headed Heron	1	2	1				4
Purple Heron	38	5	3	4		8	58
Hamerkop	2						2
White Stork	3		1				4
Black Stork				25			25
Glossy Ibis	49						49
African Sacred ibis				1			1
Eurasian Spoonbill	156	9		154		5	324
Osprey						4	4
Montagu's Harrier				1			1
Western Marsh-harrier	17		9				26

Species	Niéti Yone	Barkedji Anna	Ndoub ourene	Hore Tare	Mayo Gandji	Yowre	TOTAL
African Fish-eagle	3			41			44
Black rail	22		71				93
Common moorhen	4	16	5	68			123
Purple Swamphen	56	9	5	38		26	134
Black Crowned-crane	2						2
African Jacana	96	49	2	42		153	380
Black-winged Stilt	134	8	8	48		1	199
Pied Avocet	7			13			20
Collared Pratincole	1						1
Little Ringed Plover	1			10			11
Common Ringed Plover	33			1			34
Kentish Plover	3	5		12			20
Spur-winged Lapwing	100	9	4	23	3	7	146
African Wattled Lapwing	1						1
Little Stint	166	9		37			212
Curlew Sandpiper	13			15			28
Ruff	857			2		28	887
Common Snipe	9	3					12
Black-tailed Godwit	9						9
Common Redshank		1					1
Marsh Sandpiper	3						3
Common Greenshank	12	1	1				14
Green Sandpiper	117			2			119
Wood Sandpiper		3					3
Common Sandpiper	7		1			1	9
Grey-headed Gull				1		1	2
Black-headed Gull		9		1		1	11
Gull-billed Tern				3			3
Caspian Tern	73	44				63	180
Sandwich Tern				66			66
Little Tern	99						99
African Pygmy-kingfisher	2						2
Pied Kingfisher	38						38

January data from 2010 to 2018 provide a comparison between the numbers of previous years and 2018, the first effective year of reflooding.

Table VI: Numbers of different waterbird species in January from 2010 to 2018 (taken from the management plan) and DPNS/OMPO/ONCFS database

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018
Garganey	517	3268	128		5839	490	1420	715	9651
Northern Pintail	12	29			69		3		37
Northern Shoveler	100	38			5	25	6		202
White-faced Whistling-duck	581	635	14	40	71	1335	35	182	6041

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fulvous Whistling-duck	220	1449			576	272	138	37	251
Spur-winged Goose	524	179	94	19	69	47	195	26	44
Egyptian Goose	58	125	24	1	63	27	154	149	40
Knob-billed Duck	24	140		2	41	12	10		595
African Pygmy-goose	13	3			55	76	14		193
Great White Pelican	4	358	38	2	96	18	81	6	31
Reed Cormorant	17	486	2	36	190	813	1048	96	1123
Great Cormorant	16	257	2	26	9	86	129	6	59
African Darter	8	27	11	1	26		28		183
Black-Crowned Night-heron			171	3	2	48	133	11	815
Squacco Heron	26	96	136	35	78	94	90	49	248
Cattle Egret	10	38	22	27	16	12	200		52
Black Heron	2	9			146	50	128	8	255
Grey Heron	21	47	61	10	96	29	105	96	115
Purple Heron	6	16	47	4	38	33	53	34	58
Great Egret	35	128	50	20	87	40	67		138
Intermediate Egret		15	8	24	6	19	48		43
Little Egret	63	75	337	104	230	239			163
Black Stork	4	1	11		109	10	70	5	45
Yellow-billed Stork		1					1		
Glossy Ibis		203			13		74	200	59
Eurasian Spoonbill	59	139	92		563	19	109		324
Osprey	7	2	4		6	5		4	4
African Fish-eagle	3		5	1		7		2	44
Western Marsh-harrier	18	11	5	10	8			24	26
Black-winged Stilt	85		95	129	169	100	139	334	199
Spur-winged Lapwing	18		12		154	52	99	458	146
Black-headed Lapwing	12		43			37	45	3	
African Wattled Lapwing	14		14	70	10	34	3	23	
Common Ringed Plover	4		37	48	34	14	12	16	34
Black-tailed Godwit	79		10	5	84	86	20	3	9
Common Greenshank	212	34	104	25	19	18	14	15	14
Curlew Sandpiper	15	14	2	2	18	43	17		28
Dunlin	1	146	24	40			39		
Little Stint	310	124	144	83	204	41	278	416	212
Ruff	320	216	257	463	362	80	283	685	887

Table VII: Species exceeding the 1%threshold as calculated from 2013 to 2017

Common name	*Scientific name*	1%	Ndiaël (including Niéti Yone)
White-faced Whistling-duck	*Dendrocygna viduata*	6,500	11,700
Egyptian Goose	*Alopochen aegyptiaca*	70	115
Black Stork	*Ciconia nigra*	15	26
Eurasian Spoonbill	*Platalea leucorodia*	110	275

Note: In addition to these four species, the site is also home to a number of Squacco Herons *Ardeola ralloides* (estimated at 230 during the mission). The 1% threshold for the Palaearctic migratory population of this species is 40, but these birds are mixing with a second resident population in Africa,

which has a 1% threshold of 4,200. Unless we are able to separate these two populations, the threshold of 1% for individual populations cannot be applied.

7. Status of any other similar or related site intervention process, i.e. in the context of other Multilateral Environmental Agreements, and explanations on how to harmonize the removal from the Montreux Record with those processes

The Réserve de Faune du Ndiaël project and its management plan take into consideration the core dimension of the reserve within the framework of the Senegal River Delta Transboundary Biosphere Reserve through the implementation of concerted management strategies for the biological diversity of the Senegal River Delta.

This management plan also contributes to strengthening the efforts made by the State of Senegal in the implementation of the Convention on Biological Diversity, through the implementation of the Protected Areas Work Program.

Finally, it is in line with the Strategic Orientations (SOs) of the Environment and Natural Resources Sectoral Policy Paper (LPSERN), particularly its SOs 2 and 3 which are respectively: "*stepping up the fight against the current trend towards the degradation of the environment and natural resources in accordance with the relevant international conventions"* and "*strengthening the institutional and technical capacities of stakeholders in the implementation of environment and natural resources conservation actions."*

Specifically, it aims at implementing Program 5: "*biodiversity conservation and wetland management"* from the multi-year expenditure planning document (DPPD) which is the materialization of the LPSERN.

Returning the site on the list of Ramsar sites will make it possible to consider the site as a new hub in the River Delta Biosphere Reserve.

8. Measures to be implemented by the Contracting Party to maintain the ecological characteristics of the site through clear indicators for monitoring

By the time the reflooding project was launched, the Contracting Party had prepared a management plan for the 2018-2022 period, with the **vision that the Réserve de Faune du Ndiaël, together with Trois Marigots and *Niéti Yone*, should form an ecological and socio-economic cluster, combining conservation objectives, improved ecosystem services and economic development for the benefit of local people.**

This vision places this management plan in direct extension of the development plan prepared within the framework of PREFELAG, the primary purpose of which is the reflooding of the Réserve de Faune du Ndiaël basin and the installation of basic equipment and infrastructure for the reserve. It therefore assumes that the operations necessary for the reflooding of the site have been completed and that it is now necessary to develop an adaptive management of the site, for the well-being of the plant, animal and human populations. This management plan has one long-term objective and three medium-term objectives.

The long-term objective (LTO) of this management plan is to sustainably preserve the Réserve de Faune du Ndiaël and its ecological, social and economic benefits in a context of changes in the Senegal River Delta.

Thus, the development of this management plan is part of the implementation of the Ramsar Convention, mainly Article 3, which states that *Contracting Parties shall develop and implement their*

management plans to promote wetland conservation. **From this long-term objective, the following operational objectives (OPs) are derived:**

OP A: Restore and monitor the bio-ecological potential of the site, with the aim of re-establishing its international significance, particularly for waterbirds.

OP B: Promote the sustainable use of natural resources of the reserve for local socio-economic activities (rearing livestock, harvesting dead wood, ecotourism).

OP C: Promote dynamic partnerships to ensure sustainable financing and management of the RSAN.

The medium-term objective OP A is typically designed to improve knowledge of the site but also to evaluate the work and the different stages of reflooding of the site.

Conclusion

This questionnaire indicates that the work currently being completed already has strong positive impacts and enables the Réserve de Faune du Ndiaël site to meet four criteria necessary for the designation of a site compliant to the Convention.

The Government of Senegal has therefore decided, pursuant to paragraph 3.3.5. of resolution VI.1, to remove the Réserve de Faune du Ndiaël from the Montreux Record as soon as the Scientific and Technical Review Panel has provided its opinion and recommendations on this project.

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Annex 1. Reasons behind the drying up of the site

General background

The water supply problems of the Ndiaël basin have been known for a long time and have been the subject of various studies and reviews. Several causes have combined since the mid-1950s leading to this situation. The state of conservation of the site has been a concern since the creation of the reserve, as the presidential decree 65 053, signed on 2 February 1965 by His Excellency Leopold Sedar Senghor, President of the Republic of Senegal, already indicated the necessity of refill it.

The main cause of water level fluctuations in the Réserve de Faune du Ndiaël, but generally in the delta as a whole, is the level of the Senegal River. Once we understand its dynamic, we can understand how the various supply sources used to work and stopped working.

The water supply of the Ndiaël basin was historically dependent on four sources:

- The Niéti Yone, which comes from Lac de Guiers, and which, more than a simple channel or a marsh, could be considered as a floodplain allowing ancestral use for livestock rearing, farming and fishing;
- The connection with the Lampsar, through the Bonbol marsh, replenishing the northwest of the basin;
- The overflow of the Third Marigot, especially when the rise in the river level was enough to replenish the backwaters;
- Rainfall that supplies the basin with water.

The recession of the Senegal River flow rate

The flow of the Senegal River has been monitored since 1903 at the Bakel station. Various correlations between historical data and hydrological observations made it possible to evaluate the inter-annual module of the second half of the 19th century at around 900m^3/s. For the 84 years of observations reported here, this inter-annual module is only 702 m^3/s. Since 1965, a steady decline has been recorded, Figure 1 (Olivry, 1987). This decline was responsible for the poor filling of Lac de Guiers and the delta marshes.

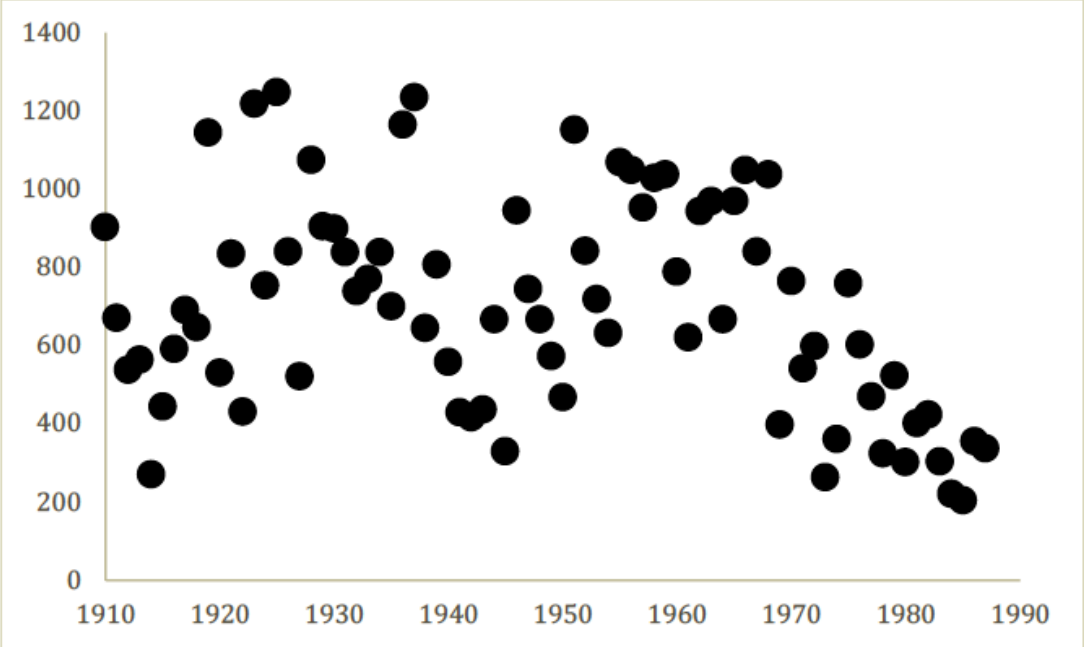

Figure 1: Maximum flow rate (m3/s) of the Senegal River at Bakel from 1903-1904 to 1986-1987

From 1961 to 1964, the creation of the dyke on the left bank of the Senegal River distorted the ecological equilibrium related to water. Indeed, it enabled the control and limitation of the floods of the delta and the farming areas. The creation of the SAED in 1965 was aimed at irrigating 30,000 ha of land. The 1970s were marked by the scaling up of irrigation techniques and the development of agri-business to cultivate larger areas.

The embankment on the left bank was built between Saint Louis and Richard-Toll in 1964 along the river. Upstream, the dyke prevents the inflow of river discharge during floods while downstream, it prevents the emptying of the marshes and ponds when water subsides, and salt water intrusions from the sea.

Hydraulic management structures are generally located on the embankment at the mouth of the outlets.

Since 1965, there has been no more uncontrolled flooding on much of the left bank of the river, disrupting landscapes and ecological balances. In particular, the Ndiaël basin is protected against floods. The creation of the Parc National des Oiseaux du Djoudj (PNOD, 16,000 ha) in 1971 was a compensatory measure to the loss of biodiversity.

Since 1986, the situation changed with the commissioning of the Diama dam, which regulates the upstream level and thus interferes with the flow of the river, which explains why Figure 1 does not extend beyond that year.

The next step – the construction of the dyke on the Mauritanian side – was completed in late 1992, raising the water level to that of the dam. This led to the flooding of areas between the riverbed and the embankment, as well as the drying up of vast areas to the north of the dyke, particularly in the Diawling National Park created in 1991 with an area of 16,000 ha. The development of the embankments was completed in 1994, with their raising on the left bank allowing the availability of water needed not only for farming, but to supply Lac de Guiers.

Discontinuity between Lac de Guiers and Ndiaël

Lac de Guiers lies in an elongated North-South depression, between 15°55 and 16°16 West longitude. It belongs to the downstream zone of the fossil hydrographic network of Ferlo, a vast 37,000 km^2 watershed, connected to that of the Senegal River by the Taouey, a marsh converted into a straight 17 km canal. The lake has an average length of 50 km and an average width of 7 km. Its surface area varies between 240 and 340 km^2 according to the recommended management level of 1.5 to 2.5 m IGN (a.s.l). Thus, its filling capacity fluctuates between 450 and 750 million m^3. The annual water inflows are currently estimated at 1.2 billion m^3.

The process of artificializing Lac de Guiers began in 1940. In 1947, the Richard Toll dam was built on the Taouey, the main outlet supplying the lake from the Senegal River. The outflows to the Ndiaël were interrupted in 1951 and 1956. The Keur Momar Sarr dyke was built in 1958 and the route of the Taouey straightened in 1973 by the Senegalese Sugar Company.

At the end of the Second World War, the French government undertook the development of an irrigated scheme for mechanized rice cultivation in the upper Delta (Richard Toll) and created a special agency, the Mission d'Aménagement du Senegal (MAS), reporting to the Services des Travaux Publics (Public Engineering Department), in order to design "projects for the Development of the Senegal River". Between 1946 and 1960, 6,000 ha were developed and entrusted (from 1953 to 1960) to a private engineering company to be managed for the purpose of rice farming. The Société de Développement de la Riziculture au Sénégal (SDRS) took over the facilities in order to pursue the activities until it was dissolved in 1970 and replaced by the Compagnie Sucrière Sénégalaise (CSS), which replaced rice by sugar cane on the Richard-Toll plots.

The construction of an embankment along the banks of Lac de Guiers from 1951, then the one in Keur Momar Sarr in 1956, made it possible to have a fresh water reservoir almost 9 months out of 12. However, the dyke isolated the Niéti Yone, leading to its gradual drying out, as well as to a water deficit in the Ndiaël.

Thus, from 1916 to 1976, the Lac de Guiers experienced a process of artificialization with developments on the Taouey (Richard Toll bridge dam, isolating the lake from the river), the construction of dykes (1947 to 1956) resulting in the isolation of the lake's outlets, i.e. the Ferlo valley (southernmost) and the Bounoum valley (interruption of fresh water flows to the Ndiaël).

The lake therefore became a real freshwater reservoir. From 1985, the commissioning of the Diama, then Manantali (1988) dams increased its volume and provided a resource that could previously not be stored in such high quantities. The straightening of the Taouey as early as 1974 – a meandering 26 km long channel replaced by a straight 17 km canal - allows more water to be conveyed in a shorter period of time, allowing for additional uses beyond supplying Dakar with drinking water.

The system of protection and use of water from Lac de Guiers, which dates from 1973 (Decree of 19 March 1973), indeed prioritizes drinking water supply to Dakar and entrusts the management of the Taouey dam to the Ministry of Hydraulics.

On top of this, all the hydraulic structures that existed until the beginning of the 1970s had the aim of optimizing the management of water for agricultural purposes. Thus, in 1968, the installation of a water treatment plant by SONEES in Ngnith, central-west to Lac de Guiers, marked an important step in the development of the region. Sugar cane plantations developed in Richard-Toll from 1972 onward.

Breach of contact with Lampsar

The water access through the Tellel was closed by the construction of the National Highway 2 (RN2), connecting Saint Louis to Richard-Toll, cutting any connections between the two sides. This road has made it possible to separate two large parts in the region from the Senegal River Delta. North of the Saint-Louis-Richard-Toll road, the delta is wet. South of the road, it is rather dry. This characteristic is due to the fact that the RN2 (which crosses the delta) no longer allows the effluents that were supplying some depressions located in its southern part to drain along their natural flow channels.

Rice farming developments were implemented in the early 1990s to change the situation. Although the Bonbol marsh, located on the western side of the road was not extended as some projects recommended, the Ndiaël was partially refilled in the early 1990s, by the runoffs from rice farms located north of Ross-Bethio. With a total length of 17.5 km, the Ndiaël drain provided for the reorganization of the Kassack Nord scheme and the Grand Digue Tellel area, representing a 2,750 ha developed area. The drain has two culverts, one at the Kassack marsh and the other at the National Highway 2, 7 km from Ross-Béthio. The drain flows into the north of the basin. Wastewater has a basic profile, with a maximum pH of 8.21 in May and a minimum of 6.98 in September. Wastewaters are also loaded with phosphates from unused fertilizers, promoting the development of vegetation. This drain has not been functioning regularly since the beginning of 2010 and the commissioning of the delta outlet. The result has been a drying up of the Grand Mare in the northern Ndiaël for longer periods than usual. During dry season irrigation, the discharged water makes it possible to have one of the rare large-scale water bodies (more than 200 ha) in the delta, with particularly high numbers of birds. Thus, on 4 July 2017, this lake hosted 540 Spur-winged Geese, 60 Knob-billed Ducks, 650 Greater Flamingos and 40 Eurasian Spoonbills, among others.

End of supplies from the South

The end of supplies from the south began in 1866 when a channel was closed by a dam to allow the installation of a water reservoir for Saint-Louis.

The commissioning of the Diama dam in 1986, with the aim of obtaining water to develop rice farming, led to a control of water with negative impacts on the environment and in particular leading to a decrease in volumes available for the Trois Marigots and the need to put in place a new management strategy for supplying Ndiaoudoune.

This was achieved from the years 1992 - 1993 and allowed, for example, the partial filling of the Ndiaël basin from the third marigot, through a channel called OMPO canal, during the rare years of very high water availability. In years of reduced availability, the filling of the Trois Marigots does not leave enough water for the OMPO canal. This solution is therefore unsatisfactory because it only allows the filling of a few pools between the Third marigot and the Ndiaël basin, which, for the ecological functioning, has no effect because when the water can reach the OMPO canal, the Trois Marigots ponds are full enough to perform the functions and services expected from this type of wetland.

The breach opened in 2004 in the Langue de Barbarie to avoid the flooding of Saint-Louis has resulted in an increased water discharge rate downstream of the Diama dam. The quantities available are just enough to fill the Lampsar and Djeuss, where the city of St. Louis draws its drinking water from, and leaves just enough water to fill the Trois Marigots. Since that date, water can no longer flow up the OMPO canal. The water discharges are now doubly controlled by the Ndiaoudoune and a system of locks with cofferdams at the entrance of the first marigot.

Rainfall deficit

The fourth element that explains the drying up of the site is the rainfall deficit. Figure 2 shows the annual amounts of rainfall since 1900. Overall, the level of rainfall over the 117 years reviewed has significantly declined ($r = -0.34$, $P < 0.001$), although the years 2010 onwards seem to indicate a return of high rainfall and suggest some accumulations in the Grand Mare. The accumulation of rain maintains water in the basin between August and January, or until February/March when the quantities accumulated are important. The decrease in rainfall recorded since 1970 has had a profound impact on rainfed farming in the delta and the mid-valleys, which has implications for environmental management (SAED, 1985).

The steady decrease in rainfall does not correctly reflect the existence of cycles with years of heavy rainfall and extended droughts during which problems are exacerbated.

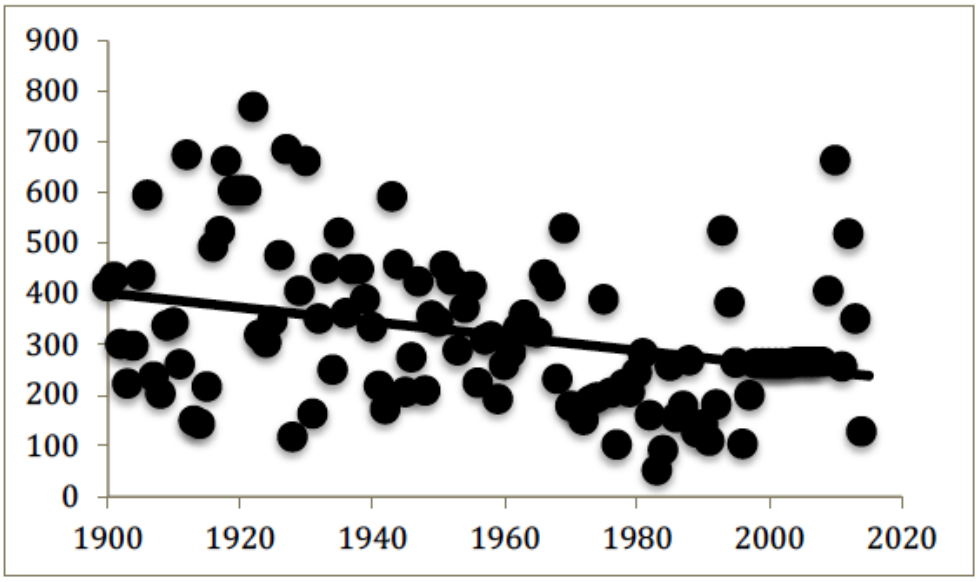

Figure 2: Annual rainfall (mm) in Saint-Louis from 1900 to 2014