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Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: 28 August 2000

2. Country: Niger

3. Name of wetland: Lake Chad

4. Geographical coordinates:

14° 15' North latitude
13° 20' East longitude

5. Altitude: 286 metres above sea level

6. Area: 340,423 hectares

7. Overview:

Lake Chad is fed by the Chari, the Logone and El Beid for 89 per cent of its water. Another 10 per cent comes from rainwater and 1 per cent from the Komadougou. Lake Chad has a depth of approximately 4 metres. It is, however, dependent on fluctuations in the surrounding climate and the abundance of rainfall in its watershed.

8. Wetland type: Continental: O, P

Types of wetlands by decreasing order of importance: P, O

9. Ramsar criteria: 1, 3, 4, 5, 6, 8

Criterion that best characterizes this site: 4

10. Map of site included? Please tick yes -or- no

11. Name and address of the compiler of this form:

Abdou Malam Issa
Direction de la faune, de la pêche et de la pisciculture
B.P. 721
Niamey, Niger

12. Justification of the criteria selected under point 9, on previous page:

Criterion 1: Lake Chad, because of its area and influence, is the fourth largest lake in Africa after lakes Victoria, Tanganyika and Nyassa. Among the endorheic lakes, Lake Chad is the third largest in the world after the Caspian and Aral seas. In the part in Niger, the site has a very rich and broad biodiversity. The migratory and sedentary bird life is probably the outstanding characteristic of the lake's biodiversity. A gradual drop of water level has prevented the carrying of surveys.

Criterion 3: Lake Chad is very rich in bird life. There are pelicans, marabou storks, teals, ducks, flamingos and *chevaliers combatants*.

Criterion 4: The lake is a resting and feeding stopover for migratory birds on their migration. It is also very important for conservation of biological diversity of the Sahel biogeographic region.

Criterion 5: Lake Chad is the regular habitat of 20,000 birds or more. During the two most recent surveys (2000–2001), a total of 1,040,500 (aerial survey) and 59,562 birds (land survey) were counted.

Criterion 6: The lake is the regular habitat of at least 1 per cent of the following species: African cormorant, Hansel stern, teal, *chevalier combatant* and ducks as reported in estimates published by Wetlands International in 1997.

Criterion 8: The lake provides habitat for a large population of fish, approximately 120 species. The distribution of species in the lake depends on the distance from the river system and the type of landscape (Bénech et al., 1983). Several species migrate for breeding to the river system and the flooded areas. Other species migrate in small numbers.

13. General location:

N'Guigmi is located in the department of Diffa, in the extreme eastern part of Niger in the Sahel-Saharan region. It is located between 12° 00' and 15° 35' East longitude and 13° 45' and 18° 00' North latitude. Located in an arid and semi-arid region, N'Guigmi receives very little precipitation, the average annual being about 190 millimetres. In addition to being light, annual rainfall is poorly distributed over time. There is an average of 22 days of rain per year for the winter season, which lasts for three months from July to September.

The geographical position of the arrondissement of N'Guigmi is in an area of high temperatures. The highest temperatures of more than 40° C are recorded between April and July. The lowest temperatures are in January and are well below 15° C and sometimes near 0° C. The southern part of the arrondissement is marked by the presence of a peri-Chadian dune chain, a sand ridge formed by fine sand and bits of shell. It is the interface between the Plateau du Manga and the end of Lake Chad. In 1997, the population of the arrondissement of N'Guigmi was estimated to be 330,382

persons with a majority of Kanouri, Toubou and Peulh. The population is divided into two large groups: the herder-farmers and the herders. Herding is the main activity in the economy of the arrondissement with a value estimated at about 50 billion francs.

Ratio of the number of head of cattle to the number of families in the area of the PNRN and N'Guigmi

Arrondissement of N'Guigmi	
Cattle	11.4
Camels	5.5
Small ruminants	24.9
Donkeys	2.7
Horses	1.3

Herding predominates in the north and herding and in the south a combination of farming and herding prevails. Farming is the second most important economic activity in the arrondissement. There are 119,500 hectares of arable land and 5,403 hectares of cultivated land.

Main crops

Crops	Production (kilos/hectare)
Millet	410
Wheat	2,540
<i>Niébé</i>	225
Maize	-
Melon	70,000
Cabbage	80,000
Onion	42,000
Tomato	58,000
Sweat pepper	3,000
Garlic	12,000

14. Physical features:

From the point of view of geology and geomorphology, the Lake Chad basin is an intra-cratonic basin, formed on a Precambrian base during the pan-African orogeny. Sedimentation began in the lower Cretaceous and continued into the Quaternary. Deposits in the surrounding basin are about 100 metres thick. The lake is supplied by the Chari, Logone and El Beid rivers with 89 per cent of its water, 10 per cent of the inflow is rainwater and 1 per cent is provided by the Komadougou Yobé. The lake is about four metres deep in the absence of a drought or flooding and can reach a maximum of 7 metres. Rainfall depends on fluctuations in climate and the amount of rainfall in the water basins. An increase or decrease in water level is due to annual

variations in rainfall. This explains the formation of a large and a small lake and the drying up of a large portion of the northern part. Average salinity is 0.5 per cent.

15. Hydrological values:

The Chari, the Logone and El Beid river tributaries provide 89 per cent of the water, rainfall adds another 10 per cent and the Komadugu only 1 per cent. Water level depends on climatic variations and the amount of rainwater in the neighbouring basins. Because of its shallow depth and small volume, the lake is exposed to large variations in the flow of its tributaries. The low water of 1972–1973, 1973–1975 and 1982–1983 led to a drop in the area of the lake and the cutting-off and then drying up of the northern part. This situation had not been observed during the two dry spells around 1913 and 1942. The proximity of the lake to the sand desert with shifting dunes has led to its filling-in and reduction of its capacity to store water.

16. Ecological features:

The Niger part of Lake Chad is in the Sahel-Saharan sector of the Lake Chad basin. In the northern part of this part of the lake, there is a very sparse brush stratum of steppe and the most common ligneous plants are *Acacia raddiana*, *Commiphora africana* and *Leptadenia pyrotechnica*. The herbaceous steppe is formed of perennials and annuals. Among the perennials, the most prevalent is *Panicum turgidum*. The covering of annual grasses is composed essentially of Gramineae, among which the most abundant species are *Aristida mutabilis*, *Cenchrus biflorus*, *Enneapogon* spp. and *Tragus berteronianus*.

At the centre of the Sahel-Saharan section, there is a more regular and relatively thick brush stratum of steppe in the hollows among the dunes. The most common ligneous vegetation is *Acacia raddiana* and *Leptadenia pyrotechnica*. Among the other species, are found *Acacia senegal*, *Balanites aegyptiaca*, *Commiphora africana* and *Ziziphus mauritiana*. The herbaceous perennial species in this area are dominated by *Panicum turgidum*, which often competes with *Aristida pallida*, *Cymbopogon schoenathus* and *Cyperus jemicus*. The blanket of annual grasses is formed by *Aristida funiculata*, *A. mutabilis*, *Cenchrus biflorus*, *Eragrostis tremula* and *Schoenefeldia gracilis*.

In the southern part, there is a shrub stratum formed by *Prosopis* spp. This association is the result of work of the N'Guigmi environmental service, which in 1977 planted 10 hectares of prosopis on the edge of Lake Chad. Now, the area covered by the prosopis is approximately 100,000 hectares. The other species found are *Acacia laeta*, *A. raddiana*, *A. senegal*, *A. seyal*, *Commiphora africana*, *Leptadenia pyrotechnica*, *Piliostigma reticulatum* and *Salvadora persica*.

The perennial herbaceous stratum is almost non-existent. The annual herbaceous stratum can be quite dense because of soil conditions and is formed by *Aristida mutabilis*, *Cenchrus biflorus*, *Dactyloctenium aegyptium* and *Schoenefeldia gracilis*. Other species have been introduced in addition to prosopis: *Azadirachta indica*, *Eucalyptus camaldulensis*, *Moringa oleifera* and *Phoenix dactilifera*.

17. Noteworthy flora:

The population of prosopis, despite having been introduced, plays an economic role in the local economy. The creation of local markets for firewood could be an important source of income for the local inhabitants. The endangered species are *Acacia raddiana*, *A. senegal*, *Balanites aegyptiaca* and *Salvadora persica*, which are used for feeding cattle, general-purpose wood, pharmaceuticals and firewood.

18. Noteworthy fauna:

Wildlife species provide the local inhabitants with income based on handicrafts, medicinal plants and the pride of having a natural heritage. The local fauna is composed of mammals, birds and reptiles.

Birds

An aerial census carried out in parts of Niger and Nigeria in 1987 gave the following results.

Species	Quantity
Ducks	512,500
Teal	400,000
<i>Chevallier combatant</i>	128,000

The following species were recorded during a recent visit and recent survey: African cormorant, *anhiga roux*, *bihoreau gris*, *blongios nain*, *canard pilet*, *chevalier combatant*, *cygne blanche*, *cygne noire*, *échasse blanche*, *grande aigrette*, *grue couronnée*, Guinea fowl, *héron cendré*, *héron strié*, *ibis falcinelle*, marabou stork, pelican, *pluvian d’Egypte*, *râle noir*, *sarcelle d’été*, *spatule d’Afrique* and *tantale ibis*.

Mammals

The following animals are often encountered: jackal, *gazelle rufifrons*, hare, *singe patasse* and wart hog. Others, however, are endangered: fennec, Dama gazelle and the *lycaon*.

Reptiles

The Nile crocodile, the *varan du Nile* and turtles appear to have disappeared. The interest for birds is focused on egg-laying areas, the feeding of the crested crane and the wintering areas for migratory birds.

19. Social and cultural values:

The fisheries have not been studied, but they are an important source of food for the local inhabitants and as a source of revenue. The total catch was 46,000 to 50,000 tons in 1969, 52,000 to 57,000 tons in 1970, 91,000 to 99,000 tons in 1971 and 130,000 to 141,000 tons in 1972, according to a study made by J.R. Durand on changes in Lake Chad fisheries from 1963 until 1971. Local markets have been created for wood, which will provide the local inhabitants with substantial income from the forest of propopis. Some species of fauna and flora are used by the local inhabitants in their religious practices and as a source of medicines.

20. Land tenure/ownership of:

Tribal chiefs are responsible for the land, distribute rights and settle land problems. Also to be taken into consideration are national land legislation, the rural code and the forestry code.

21. Current land use:

The main human activities at the site, in the surrounding area and in the watersheds are the growing of crops depending on rainfall or irrigation, grazing, forestry, fishing and hunting. At the time the lake was still in Niger, once the water had retreated the lake surface could be used for growing maize to be harvested in June, then again sown with sorghum just before the rains. Average crop yields were about one ton per hectare, but varied considerably depending on the technique used with yields from 0 to 4 tons per hectare. This part of the lake was heavily planted with up to 6000 hectares of sorghum. The growing of sorghum on the lakebed dropped primarily because of the non-flooding of the part of the lake in Niger. Nonetheless, this type of irrigation is found where the Komadougou enters the lake, near Mamouri. Its large storage capacity makes it possible to exploit the soil intensively. Sorghum is still planted during the period when the water recedes and wheat, barley, maize and *niébé* (a variety of bean).

Similar to the activities in the region of Mamouri, near N'Guigmi, irrigation is used with seed holes on raised mounds (*exhaure à la puisette*) or irrigation is carried out with the aide of gravity using an ancient pumping mechanism (*chadouf*) in the low spots and on the bed of the former lake. Vegetables such as the potato and wheat are the most widely grown crops in small plots, and fruit trees and date palms have been planted in certain places.

Fishing depends on a rise in the water level in the Niger part of the lake. This year, the lake returned after more than a decade of low water permitted fishing. It is one of the most lucrative activities in the area, because the basin serves as habitat for approximately 120 species of fish.

The normal basin encloses one of the most productive regions of freshwater fish in Africa. Fish production dropped considerably from 140,000 tons in 1966 to 70,000 tons in 1983. Now, with the return of the lake in the Niger part production is not counted. The species of fish caught are *Alates baremoze*, *Clarias* spp. and *Tilapia* spp., although the most abundant is the catfish. Around the lake, grazing is also important. The total

biomass was estimated (weight of freshly cut grass) in February 1995 to be 244,000 tons (11,000 square kilometres). Estimates do not include flooded vegetation. Traditional grazing is primarily nomadic. Its impact on the environment represents an important threat of desertification during the dry period. Biodiversity is threatened, especially the Kouri breed of cow. The total area of the basin usually available to man, cattle and the fauna is 300,000 square kilometres, plus that which is farmed. A third of this surface is used for grazing. Domestic animals include cows, goats, sheep, camels, donkeys and horses. Lake Chad contains a large biological diversity, especially fauna, which is exploited by the local inhabitants. Hunting is practiced by all the surrounding villages, especially by the young men.

Big-game hunting is practiced in the forest by poachers and the inhabitants of the neighbouring countries who regularly come to carry away the benefits of this fauna. For most poachers, the target animal is the *gazelle rufifrons*. Dams built in the neighbouring countries of Cameroon and Nigeria have a direct influence on the site. This phenomenon must be taken into account for the future of Lake Chad. Expansion of irrigation planned for the basin will cause big changes in the water flow. The irrigation expansion programme will require taking water directly from the lake and its tributaries. This will reduce the volume of the lake and two possibilities can result: either the lake stabilizes at the low level with a reduced volume and surface or the lake will completely dry up as a result of excessive extraction for irrigation.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

Lake Chad is the symbolic heart of the conventional basin. It not only represents a natural resource but also plays an important psychological role, giving an identity to the region. Any threat to its equilibrium and future existence must be carefully considered and avoided. The gravest threat to the wise management of natural resources is the absence of a land system that guarantees access and use. Ecological management would have much to gain if transhumance, epizootic disease and epidemics were controlled throughout the basin. Among the possible causes of lack of rainfall are a waning of the general troposphere, an absence of depressions that bring rain and complex ocean-atmosphere interactions. A series of dry years means a drop in water resources.

Large-scale irrigated crops have a tendency to fail or produce undesirable results. The practice of constructing small dams in the water basins near the lake itself lead to ecological damage to users downstream and on the floodplains. The poor water retention qualities of the soil act as a major constraint on production. The main soil concerns in the basin are river and aeolian erosion, the abrasion of plants by sand storms, a drop in fertility and soil creation, salinization, the formation of crusts on the soil and sand dunes. Soil degradation was caused by meteorological droughts and exceptionally strong river and aeolian erosion. Man increased these natural events through poor practices, including brushfires, mechanical ploughing, overexploitation of the soil, insufficient rotation of crops, overgrazing, poor irrigation practices, exposure of fields after harvest and trampling. Man-made phenomena, such as overexploitation of

trees for firewood and building materials, the clearing of land for farming and water engineering works combined with drought have increased degradation of the environment.

23. Conservation measures taken:

No specific measure concerning Lake Chad, but through Law 98-07 of 29 April 1998, establishing hunting regulations and protection for fauna, general regulations for the protection of certain species, especially those on list 1 of that law, mostly species in CITES Annex1. In addition, there is the forestry code.

24. Conservation measures proposed but not yet implemented:

Rational exploitation of the population of prosopis through the creation of rural markets for the sale of firewood.

A master plan for the ecologically rational development and management of natural resources in the Lake Chad basin.

25. Current scientific research and facilities: non-existent

26. Current conservation education: non-existent

27. Current recreation and tourism: non-existent

28. Jurisdiction:

The government of Niger exercises territorial jurisdiction, and functional jurisdiction for conservation is the domain of the Ministry for the Environment and Combat against Desertification.

29. Management authority:

Service d'Arrondissement de l'Environnement de N'Guigmi
Ministry for the Environment and Combat against Desertification

30. References: