

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

1. Date this sheet was completed/updated:

9 July 2001

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Designation date

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Site Reference Number

2. Country: United Republic of Tanzania

3. Name of wetland: Lake Natron Basin

4. Geographical co-ordinates: 2°21' S 36°00 E'

5. Elevation: (average and/or max. & min.) 600 (lake bottom) - 3000 m

6. Area: (in hectares) 224,781

7. Overview: (general summary, in two or three sentences, of the wetland's principal characteristics)

Lake Natron is a soda lake of variable extent situated in the bottom of the Rift Valley basin (Gregory Rift) and surrounded by Rift Valley escarpments and volcanic mountains whereof the mountain of Oldonyo Lengai in the south is still active. It is the only regularly breeding area for Lesser Flamingos in East Africa and furthermore, it offers feeding and roosting opportunities for an estimated 100,000 individuals of other species of waterbirds many of them Palearctic migrants. In the lake margins springs and a few perennial streams are a source of freshwater for Maasai, cattle, wildlife and flamingos that co-exists in this huge lake basin.

8. Wetland Type (please circle the applicable codes for wetland types; in the present document, the "Ramsar Classification System for Wetland Type" is found on page 9) **Inland water**

R • Q • Sp • Ss • M • N • Zg Y • L • Tp • Ts

Ranked from the most to the least dominant: i.e. Seasonal alkaline lakes and flats (**R**) permanent alkaline lake (**Q**), permanent alkaline marshes (**Sp**), seasonal alkaline marshes (**Ss**), permanent rivers/streams (**M**), seasonal rivers/streams (**N**), freshwater springs (**Y**), geothermal wetlands (**Zg**), permanent inland delta (**L**), permanent freshwater marshes/pools, (**Tp**), seasonal/intermittent freshwater marshes/pools (**Ts**).

9. Ramsar Criteria: (please circle the applicable Criteria; the *Criteria for Identifying Wetlands of International Importance* are reprinted beginning on page 11 of this document.)

1 • 2 • 3 • 4 • 5 • 6 • 7

Please specify the most significant criterion applicable to the site: 4

10. Map of site included? *Yes*

A map is submitted showing the demarcated Ramsar area, land use patterns and topographical features at a 500 meters interval. The map is in colour due to the fact that the electronic version of the GIS based land use cover map is in colour.

In west the proposed boundary of the Ramsar site follow the boundary between Loliondo and Lake Natron Game Controlled Areas following the top of the Rift Valley escarpment north south from the Kenyan border. From here the boundary goes east to encompass the crater of Oldonyo Lengai in south to go to the peak of Mount Gelai at the south-eastern corner of the lake. North of Gelai it follows a more or less straight line back to the Kenyan border encompassing the eastern water catchment area. The proposed site includes the entire lake bottom as well as a part of the water catchment area.

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

Director of Wildlife, Wildlife Division, Ministry of Natural resources and Tourism, P.O. Box 1994, Dar es Salaam, Tanzania. Tel: 255 22 2866418; Fax: 255 22 865836 ; E-mail: wildlife-division@twiga.com

Please provide additional information on each of the following categories by attaching extra pages (please limit extra pages to no more than 10):

12. Justification of the criteria selected under point 9, on previous page. (Please refer to the *Criteria for Identifying Wetlands of International Importance* appended to this document)

- *Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographical region*

Lake Natron is a representative of a Rift Valley soda Lake of East Africa and at the same time unique as being the only lake in this region which constitutes a regularly breeding site for the about 2,5 million Lesser Flamingos in East Africa. Aerial surveys reveal that breeding although variable between years takes place throughout the lake.

- *Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered or critically endangered species or threatened ecological communities.*

The highly specialised flamingo community must be considered a threatened ecological community especially for soda ash exploitation plans in the lake and plans for massive agriculture and change of the hydrology regime in Ewaso Ngiro of Kenya.

- *Criterion 3: A wetland should be considered internationally important if it supports population of plant and/or animal species important for maintaining the biological diversity of a particular biogeographical region*

The fish species *Oreochromis alcalicus* inhabits alkaline springs and lagoons and it is reported to live only in Lake Natron and Lake Magadi in Kenya. The lake support blue-green algae *Spirulina platensis* that in turn is essential for the Lesser Flamingo population. Such specialised and highly interdependent species form part of an ecological community, which is fragile to changes from outside.

- *Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.*

Again this criterion applies to the Flamingos where Lake Natron is essential in their breeding period but probably important throughout the year.

- *Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more water birds.*

Lake Natron is an important wetland for a number of waterbird species. The site qualifies for Lesser Flamingos alone, with regularly 2.5 million breeding birds. Various estimates of the flamingo populations in East Africa have

been proposed ranging from about 2 to 4 million. The movement of the species is not fully known. A majority of this population may be breeding at irregularly intervals, in Lake Natron. Detailed aerial counts in 1957 and 1991 indicate about 500,000 breeding pairs/nests. In addition it also supports over 100,000 individuals of other species, including large numbers of migrant species. For example, in January 1995 a total of 105,730 water birds were estimated in the lake. Palearctic migrants such as Little Stint, Ruff, White-winged Black Tern and White Stork numbered 93,860 alone. Regular and comprehensive counts are, however, not available.

- *Criterion 6. A wetland should be internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbirds.*

This applies for Lesser Flamingo where Lake Natron at times supports at least half of the East African population. Another nine waterbirds are expected to meet the 1% criterion: White Stork, Glossy Ibis, African Spoonbill, Black-winged Stilt, Chestnut-banded Plover, Blacksmith Plover, Little Stint, Marsh Sandpiper, White-winged Black Tern (Baker 1996), but regularly counts are lacking.

- *Criterion 7. A wetland should be considered internationally important if it supports a significant proportion of indigenous fish sub species , species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.*

The fish species *Oreochromis alcalicus* is endemic to Lake Natron and Lake Magadi in Kenya. Other fish, amphibians and reptiles have not been studied.

13. General location: (include the nearest large town and its administrative region)

Lake Natron is located in northern Tanzania contiguous to the Tanzania - Kenyan border. It is situated in Ngorongoro and Monduli Districts within the Arusha Region.

14. Physical features: (e.g., geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; catchment area; downstream area; climate)

Lake Natron is a closed lake basin situated in the Gregory Rift part of the Rift Valley system. A significant part of the lake surface is covered by an evaporite salt crust, which dissolves only during the rainy season. The environment of Lake Natron is extremely harsh and dry and the first more scientific ground surveys ever took place as late as 1949-50.

The Lake Basin is about 930 km². The single largest water catchment is that of Ewaso Ng'iro in Kenya of about 7,600 km². The total water catchment area of Lake Natron was estimated to be about 17,000 km² (Knight Piesold & Partners 1992). The eight large saline lagoons in Natron cover an area of about 80 km². The lake is shallow with a maximum depth of about 2 m.

The bottom of the Lake Natron basin, which is situated at about 600m, comprises lagoons, soda flats and lakeshore environments such as springs, seasonal or permanent rivers and streams. Permanent rivers include Ngare Sero and Peninj. In the dry season the basin and especially the surrounding land is dry except for a number of springs and rivers. Some 28 alkaline spring flows were sampled in 1949-50 (Guest and Steven 1951). Water temperatures in the springs varied between 32° and 50°C. The first escarpment to the west of the lake rises to a height of about 800m followed by a gently rising plateau between 5-15 km wide. Thereafter another escarpment raises to about 1100 m the edge of which constitutes the proposed Ramsar boundary. In the western part of the Lake Natron area the landscape is formed by series of plateau's and escarpments.

To the south rises the active volcano of Oldonyo Lengai to an altitude of about 3000 m. From the top of Oldonyo Lengai the Lake Natron lies to the North as in a bottom of a pot outlined to the West by the Rift valley escarpments and to the east by the volcanic peak of Gelai at 2900 m followed by undulating hills at lower

elevation to the north to the Kenyan border. Other old volcanoes include Shompole (1567 m) to the northeast and Sambu (2043 m) in northwest.

15. Hydrological values: (groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.)

Lake Natron is situated in a closed basin and act as a sink for numerous seasonal and a few perennial streams and about 28 mainly saline springs; most water to the lake basin comes from rainfall, however, the arid conditions prevail due to a negative precipitation/evaporation balance. The permanent freshwater source in the basin is essential for people and wildlife in the dry season.

16. Ecological features: (main habitats and vegetation types)

Lake Natron is highly saline and has no macrophytic flora. However, the microscopic blue-green algae *Spirulina platensis* thrive in the alkaline water of the lagoons and constitute the food resource of the Lesser Flamingo. Except the rare events of total flooding in the lake basin extensive dry soda flats occupy a major part with *Tamarix* scrubland in places at the edge. Permanent and seasonal swamps and floodplains near the freshwater inflows are dominated by tall plant species such as *Cyperus papyrus*, *Phragmites mauritianinus* and *Typha domingensis*. This type of community is fragile and vulnerable to human disturbance. Extensive areas of regularly burnt edaphic grassland such as *Sporobolus spicatus* are found in the basin and on adjacent mountain slopes.

Along the rivers and springs the areas are dominated by evergreen riverine thickets including *Salvadora persa* and *Commiphora* spp., which are also found along the permanent streams as well as bush land away from the streams. *Acacia tortilis* and *Acacia-Commiphora* woodland dominate on the Rift valley escarpments with *Sansevieria* spp. and other drought resistant species such as *Opuntia longifolia* and *Euphorbia kibwenziensis*.

17. Noteworthy flora: (indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc.)

No information available on possibly unique and endangered species of plants. More research is needed.

18. Noteworthy fauna: (indicating, e.g., which species are unique, rare, endangered, abundant or biogeographically important; include count data, etc.)

Various estimates of the flamingo populations in East Africa have been proposed ranging from about 2 to 4 million. The movement of the species is not fully known. A majority of this population may be breeding at irregularly intervals, in Lake Natron. Detailed aerial counts in 1957 and 1991 indicate about 500,000 breeding pairs/nests.

The 1995 waterbird count in Tanzania shows that another nine waterbirds meet the 1% population criteria during a (estimates): White Stork (4,360), Glossy Ibis (1,610), African Spoonbill (790), Black-winged Stilt (2,150), Chestnut-banded Plover (3,110), Blacksmith Plover (2,380), Little Stint (75,610), Marsh Sandpiper (1,830), White-winged Black Tern (6,080) (Baker 1996). It should be underlined that these numbers should be regarded as a best guess and that waterbird surveys are still lacking.

The fish species *Oreochromis alcalicus* is endemic to Lake Natron and Magadi in Kenya. Other fish and amphibians, reptiles have not been studied. In recent times Black Rhinoceros has become extinct and Elephant and Kudu locally extinct while Oryx and Cheetah are greatly reduced in numbers.

19. Social and cultural values: (e.g., fisheries production, forestry, religious importance, archaeological site, etc.)

Pastoralists inhabit the Basin and surroundings except for a few business men and farmers. The Maasai tribe comprises an estimated 95% of the people living within the Ramsar site with high concentrations of livestock. Numerous Maasai bomas are scattered around in the proposed Ramsar site. The human population has been reported to have increased significantly and consequently the pressure on the natural resources. Immigration of other pastoralist tribes and other people into the basin has been reported.

Grazing

Extensive pastoralism is taking place and it is the dominant land use within the proposed Ramsar site and the majority are solely dependant on livestock keeping and practise a semi-nomadic system of subsistence pastoralism. The most important animals are cattle, goats and sheep, which are used for food and as a source of income. Furthermore, the number of livestock in the Maasai tribe is a symbol of wealth. Donkeys are essential as carrying animals for transporting goods, belongings and water in this remote and hardly accessible area. Large scale livestock grazing goes on throughout the area. The number of cattle and goats appears to be unsustainable high in the dry season.

Agriculture

Two permanent villages are located along freshwater inflows to the lake. Recently small-scale farming has been initiated in one of the villages and in valleys elsewhere. In general the soil in the lake basin and adjacent areas is poor and sustainable farming is not possible.

Wildlife

The actual hunting pressure in the Lake Natron Basin is not known. However, sightings of Wildebeest and Zebras showed that these animals are extremely shy indicating a high hunting pressure. MDPA Ingenierie/National Chemical Industries (1993) considered hunting in Natron a huge problem and while poachers use motor vehicles anti-poaching patrols are done on foot. No fishing takes place in the lake. Lake Natron is situated in a Game Controlled Area (under the Wildlife Conservation Act, 1974), which in turn is split into two hunting blocks: North and South. The Northern block was leased to Wengert Windrose and the Southern block to TAWICO hunting companies at the time of this study. Tour companies based in Arusha take clients to the lakeside for photographing tours, game viewing/bird watching and mountain climbing. Sengo Safaris operates a permanent camp just south of Engare Sero.

Religion

The name of the active volcano of Oldonyo Lengai means Mountain of God and it has a religious meaning for the Maasai's.

Soda ash exploitation

Local people use soda ash for different purposes mainly domestic; however, soda ash is sold or exchange locally and generate some income. Cattle also lick soda ash.

20. Land tenure/ownership of:

The proposed Ramsar site is under District Councils (Ngorongoro and Monduli). Wildlife is managed by District Councils but utilisation is regulated by the Wildlife Division under Ministry of Natural Resources and Tourism.

The surrounding area is under District authority except Ngorongoro Conservation Area to the south, which is managed by the Ngorongoro Conservation Area Authority.

21. Current land use: (a) site (b) surroundings/catchment

Data from land use cover maps show that 69% of the proposed Ramsar site is either water or seasonally inundated grassland. Most of the remaining land comprises various types of bush land or bushed grassland. About 3% is swamp/marsh and less than 1% is cultivated land.

Extensive pastoralism is taking place and it is certainly the dominant land use within the proposed Ramsar site and the majority of the people are solely depending on livestock keeping and practise a semi-nomadic system of subsistence pastoralism. The same applies for the surrounding catchment area.

Hunting and small-scale eco-tourism takes place in the area and there is an area of archaeological interest to the West of the Ramsar site.

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

Two large direct threats to the Lake Natron ecosystem are hydropower plans for Ewaso Ngiro River in Kenya and soda ash exploitation in the lake itself in Tanzania. A lengthy list of literature exists on both projects including feasibility studies and environmental impact assessments. A review of the literature has been undertaken by Kobb (2000). Both projects pose a long-term threat to Lake Natron, which should not be underestimated.

Mining activities would require large amounts of water, which would have to be taken from the area. The water would be heated up and risk some pollution as well before it is pumped back into the lake. The proposed activities would require the building of dikes in the lake to a pumping area and the settlement of 250 workers in the Natron Basin (shared with a proposed factory in Tanga) and improved infrastructure. The reason for choosing Natron, as the living area for workers is that it is unprotected (MDPA Ingenierie/National Chemical Industries 1993). One of the assumptions in the sketch plans is that the utilisation of soda ash should not take place within 4 km of any breeding place for the flamingos. Looking over a longer time span this would be difficult to meet this criteria because the flamingos are nomadic of nature and do not only move between different Rift Valley lakes but do also show a highly dynamic breeding distribution in Lake Natron. At the moment of the feasibility study in 1993 the economic calculations did not allow an immediate implementation of a soda ash project (MDPA Ingenierie/National Chemical Industries 1993), however, the private company Tanganyika Gold from Australia has proposed new large scale plans based on new investigations (Tanganyika Gold 1998, 1999).

The Ewaso Ngiro project in Kenya may have a high negative impact on the Lake Natron ecosystem (Mugasha *et al.* 1994; Shishira *et al.* 1999; Sarundat 1999, Mulokozi & Dinesen 2001). An overview of the project plans has been given by Kobb (2000). A project implies the change of hydrology and water inflow of the principal freshwater river to Natron and the creation of a variable freshwater lagoon of about 50 km² in north. Both food and nest building of flamingos are negative correlated with flooding (Knight Piesold & Partners 1992). Furthermore, plans for expanded irrigation and subsequently risk of pollution of water with agrochemicals and pesticides into Natron through the Ewaso Ngiro swamps is included in the project plans. The project plans continue to be developed in Kenya. Furthermore, implementation of the plans has started. Additionally, there are plans for excising the Mau catchment forests in Kenya for community development. Clearance of natural vegetation in the Lake Natron Catchment may severely affect the lake ecosystem e.g. in form of general siltation and freshwater dilution of the soda lake in the wet season.

A further potential hazard is the increase in air traffic over the lake and the likelihood of the breeding population being continually disturbed by low flying aircraft. It will be needed to take this potential risk into account in the work of drafting a management plan for Natron.

The effect of overgrazing in the lake area is not known. However, it might pose a threat to the ecosystem and it should be investigated. Due to limited information, wildlife surveys and monitoring would reveal a lot of new information to improve the understanding.

23. Conservation measures taken: (national category and legal status of protected areas - including any boundary changes which have been made; management practices; whether an officially approved management plan exists and whether it has been implemented)

The lake is unprotected. It has status as Game Controlled Area, which means that only hunting is regulated.

24. Conservation measures proposed but not yet implemented: (e.g., management plan in preparation; officially proposed as a protected area, etc.)

A proposed action plan has been developed (attached) which include plans for the development of a proposed management plan, monitoring programme and awareness campaigns. The issue of a cross-border Ramsar site will be discuss with the relevant authority from Kenya in the near future.

25. Current scientific research and facilities: (e.g., details of current projects; existence of field station, etc.)

No facilities. No current long-term research project has been undertaken.

26. Current conservation education: (e.g., visitors centre, hides, info booklet, facilities for school visits, etc.)

None.

27. Current recreation and tourism: (state if wetland is used for recreation/tourism; indicate type and frequency/intensity)

The major tourist attractions in the Ngorongoro district are game viewing, the landscape scenery and the Maasai culture. One of the world's most famous attractions is the Ngorongoro Crater in Ngorongoro Conservation Area. Other attractions include craters of Embagai, the active volcano of Oldonyo Lengai, Lake Natron, the traditional Maasai culture, the Olduvai Gorge, the first human foot prints at Loitika and the endless plains adjacent to Serengeti NP and Ngorongoro CA.

The high potential of tourism in Lake Natron was confirmed by tour operators in Arusha and underlined by the fact that several tour companies e.g. Sengo Safaris and Scan Tan Tours have invested in the area. A number of tourists visited Lake Natron in 1999: 1,512 (second half of year) and 1,067 in 2000 (first half of year) although the security situation has been far from stable. It was stressed by tour operators that the insecure situation has resulted in loss of income and investments and that tour operators were monitoring the situation before they were keen to start up tourism again.

Tourists visited the Lake Natron Basin for three specific reasons. Firstly, to see and climb the active volcano of Oldonyo Lengai; secondly to see the lake, flamingos and other waterfowl and thirdly, to walk to a couple of scenic waterfalls in Ngare Sero and Peninj. In addition the landscape scenery and the traditional Maasai culture attracts a number of tourists as well as researchers who visited the basin for cultural, archaeological, geological, biological or related studies.

28. Jurisdiction: (territorial, e.g. state/region, and functional, e.g. Dept of Agriculture/Dept. of Environment, etc.)

Ministry of Natural Resources and Tourism in collaboration with the Ngorongoro and Monduli Districts Councils.

29. Management authority: (name and address of local body directly responsible for managing the wetland)

Ngorongoro and Monduli District councils in collaboration with the Wildlife Division.

District Executive Director
Ngorongoro District
PO Box 1
Loliondo

District Executive Director
Monduli District
PO Box 5033
Monduli

30. Bibliographical references: (scientific/technical only)

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