

Lake Natron, Flamingos and the Proposed Soda Ash Factory

An overview...

By Marc Baker

In early April, the *Daily News* reported that the government wishes to fast track the plans for a soda ash factory at Lake Natron (<http://dailynews.co.tz/home/?n=18633&cat=home>). Given this recent attention, TNRF member, Marc Baker of Ecological Initiatives, provides an overview of Lake Natron, its diversity, Lesser Flamingos and what a soda ash factory could mean for this fragile environment.

Lake Natron in context:

Lake Natron covers an area of 85,000ha. The lake basin is approximately 65 km long, although on average only 20% of this is ever covered by water. The water is highly saline (ph 10), and most of the lake is an extremely inhospitable environment. Whilst Lake Natron is not aquatically diverse, it does have some very ecologically dependant species. For example, the fish species *Oreochromis alcalicus* appear to be endemic (only occurs within) to Lake Natron and Kenya's Lake Magadi. *O.alcalicus*, like the majority of the lake's resident and migratory biological diversity, is concentrated on the margins of the lake where spring water or seasonal river inflow creates a unique but fragile environment. It is upon this fragile ecotone along the edges of the lake that the local human population, as well as the biological diversity, largely depends. Any development projects would require well-designed management and mitigation techniques, especially with the use and management of the limited fresh water resources in the area.

What do we know about Lake Natron? Evidence suggests that approximately 10,000 years ago, the lake was 60 meters higher than it is now and was contiguous with Lake Magadi in Kenya. At that time the water was less saline. There are 16 wetland sites that are important for migratory and resident birdlife that are grouped into three general areas, most easily defined by the water sources that sustain them. The southern two areas, 'east south' and 'west south', show variation in their water compositions, and have many different aquatic plant and animal species. There is then a gap of approximately 60 km between the southern lagoon and Shompole, which is at the northern end of the lake. The Shompole area is a complex of wetland systems, which vary considerably during the year. The Ewaso Ngiro river, which feeds these northern wetlands, is the largest freshwater inflow into the lake. The northern and southern areas are known to join in extreme rainfall events, but otherwise they are isolated from one another.

These complex wetlands on the edge of the lake form extensive areas of regularly burnt edaphic grassland, such as that characterised by *Sporobolus spicatus*, which are found in the basin (these are crossed when driving from Ngare Sero to Pinyinyi) and on areas at the base of Gelai. The woodland area is mainly dry (rainfall is c.600mm/year) and dominated by *Acacia-Commiphora* woodland with *Sansevieria* spp. and other drought resistant species such as *Opuntia longifolia* and *Euphorbia kibwenziensis*.

Why is Lake Natron so controversial? Is it just because of the Lesser Flamingo?

Lake Natron is always associated with Lesser Flamingos, but that is only part of the story. What we do know is that 65% of all Lesser Flamingos on earth are born at Lake Natron, so clearly this is an important breeding area for this enigmatic species. The current global population is approximately 2-3 million birds.

Lesser Flamingos are itinerant, meaning that they respond to changes in local environmental conditions by moving and thus are dependent on a network of suitable wetland sites. What this means is that the Lesser Flamingo populations that you see in many of the East African rift valley lakes, such as Natron, Manyara, Empakai, Bogoria and Nakuru are continuously moving throughout the year. Whilst we know that hydrological change and water quality drive this response, the specifics are difficult to define. Food

availability plays a role and both natural and man-made events are also a major consideration for movement.

Lesser Flamingo's main breeding area is on the Gelai mudflats - on January 1st 2011, 2 flocks of approximately 35,000 fledglings were counted here. The site is often clumped, and the nests are made of soft mud (see picture), which means if there is no rainfall and it becomes too dry, then there will be no breeding because there is no mud; if it is too wet, then the sites can be flooded. Shompole, which is considered the secondary breeding area (although on an annual basis possibly as important as the Gelai mudflats), has nest sites that usually run in lines along cracks in the trona. Young fledglings in this area almost certainly walk north towards the fresh water and the wetland areas.



Lesser Flamingo nest site on the Gelai mud flats. Picture. M.Baker.

Once the flamingos fledge, they must walk to fresh water to drink and wash the soda from their feathers. This is extremely important, because without access to fresh water they will die. We think they move either east towards the base of Gelai (4-8km - separated by a channel of water 1km wide, but only 1m deep) or west, south-east or north-east towards the floodplains of, Ngaresero, Mosonik and possibly Pinyinyi Rivers. What could be termed 'good' breeding events are rare, happening possibly every 5 years. This is a long-lived species with population levels that are constantly changing and therefore, measuring the changes and understanding what is driving the change, can be very challenging. Listed as 'Near Threatened' (indicating that it is considered likely to qualify for a threatened category in the near future) Lesser Flamingo is also listed in Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA) action plan, Appendix II of the Bonn Convention (CMS) and Appendix II of the CITES convention.

In addition to Lake Natron being a globally important site for Lesser Flamingo, the lake basin (mainly the wetland sites along the edges) also supports over 100,000 individuals of other waterbird species, including large numbers of migrant species. In January 1995, a total of 105,730 waterbirds were estimated on the lake (this was done by counting all the individuals over a 4 day period). In addition to Lesser Flamingo, another nine waterbird species have been recorded within 1% of their total global population limits making the lake and Important Bird Area (IBA).

What is the legal mechanism to ‘understand’ potential environmental damage?

The main body of soda to be extracted is proposed to come from the area north of Gelai mudflats and south of Shompole. There are benefits to this area: there are no wetland sites; the trona (trisodium hydrogencarbonate dehydrate and the main source of sodium carbonate) seen on the ground as a white crusty surface reaches the edge of the lake; there is very little use by mammals or birds; for most of the year it is, generally speaking (barring extreme weather events), devoid of life. If this is the case, what could the potential impacts be and how can they be measured?

The National Environmental Management Council (NEMC) is mandated by the Department of Environment in the Vice President’s Office, to review and comment on the potential environmental and social impacts of development projects in Tanzania. An Environmental Impact Assessment (EIA) was carried out and the resulting Environmental Impact Statement (EIS) produced on the previous application to utilize the Sodium Carbonate deposits in Natron. This was the guiding document that suggested the current site (Wosi Wosi) for consideration. This site was supported as being the least environmentally damaging option and in order to mitigate against the majority of potential threats to flora and fauna in Lake Natron.

The Environmental Management Act (2004) also states the legal requirement for the Ministry of Energy and Minerals to undertake a Strategic Environmental Assessment (SEA) of the proposed development even before it reaches the project implementation stage. This was not done and the result is that many concerns have been raised by the public, concerned stakeholders and interested parties subsequent to the scheme being announced. One of the central tenets of SEA is the involvement of all stakeholders at the earliest possible stage of planning. Another is the investigation of alternatives to the scheme, and a third is the consideration of cumulative effects of the development with regard to more widespread impacts, such as infrastructural challenges and off-site ramifications, the latter being of extreme importance in this case.

An EIA is not designed as a process that says ‘yes’ or ‘no’ to development; instead, it is a tool to evaluate the possible environmental impacts associated with a planned project, intended to help the technical advisory committee within NEMC to best advise the Minister of State for the Environment on the pros and cons of that project. It is a very important decision-making tool in the environmental management process in Tanzania and *should* be seen as the mechanism for assisting policy and decision makers to make informed choices based on facts, and not hearsay. The EIA includes an evaluation of all technical aspects of the project, including the development of road access, projected impacts on wildlife and ecosystems, etc. for this purpose.

This is a critical process designed to manage development in a sustainable manner. For Tanzania to continue along the development path, it means developing more internal wealth, jobs and industrial processes. EIA as a tool and the role of NEMC is to advise and balance these processes.

What it could mean...

At present, the most probable threat to Lake Natron’s fragile ecosystem and dependant species is water extraction from any of the wetlands, changes to the hydrology by massive soda extraction and, especially relevant for Lesser Flamingos, pipe work over the surface of the lake. Any form of physical barrier, even one that is only 20cm in height, could present a major hindrance to fledglings as they move across the surface of the lake.

There are some very important details to consider when looking at the development of a soda ash factory at Lake Natron. However, as a whole, the soda ash plant could provide jobs, generate income and be a valuable long-term resource.

- Tanzania needs its own source of soda bicarbonate for export and internal manufacturing processes.
- If the developer engages with known environmental variables, plans and builds with these in mind, incorporates the protection of Lesser Flamingo into the management plan, then it is likely that sodium bicarbonate can be extracted from Natron.
- Very little is known about the lake, a well funded and detailed study as part of a larger EIA is essential, required by law and in the interests of Tanzania. Any company wishing to engage in this area must follow the laws in Tanzania.
- Water! Once soda is extracted in its raw form, it requires massive amounts of water up to 3,000,000 litres a day to process the raw soda (unless it is shipped out and processed in a different location, which could be logistically very challenging). Therefore, this operation will require massive amounts of water. Where is this going to come from? This is probably the most significant concern because if any water is pumped out of the wetlands, which are created by springs or seasonal water flow, it could seriously affect the hydrology and ecology of the lake basin.
- There is very little tourism on the eastern side of the lake. In fact, tourists would not even notice the development as you cannot see Wosi Wosi from Ngare Sero, the main tourism area. However, tourism drives local revenue generation making it an important process in the lake.
- Natron is an AEWA site and, especially the western side, and an extremely important site for migratory birds.
- The impact on communities between Wosi Wosi and Longido will be significant
- The impact on mammal populations in the area north of Gelai to Longido could be significant. There is likely to be a rise in bush meat trade when the area is opened to hundreds of workers, and charcoal trade in the area would possibly increase.
- Hunting companies, which significantly contribute to healthy mammal populations in the area, would likely be adversely affected and should be considered in the process.
- Tanzania needs to create jobs, create industry and continue its march on the well-worn path towards economic growth. Fortunately, Tanzania does have some excellent environmental laws and systems that are meant to help protect such a process from causing unnecessary harm.

If the soda ash developer and the government of Tanzania are serious about sustainable development, then environmental and ecological thinking have to be incorporated into the soda ash extraction process from the start. We have the skills in Tanzania, and the developer should have the financial ability to put these assets into action. This will require environmental and conservation bodies, as well as other stakeholders, engaging in this process, but doing so with open minds and without set agendas. With Lake Natron, a multitude of misconceptions and a general lack of critical thinking make the process difficult to engage with and obscure the path to a truly sustainable outcome.

<http://www.africanconservation.org/20071106186/network-news-section/tnrf-lake-natron-a-summary-of-the-major-discussion-points>

<http://tanzaniabirdatlas.com/environmental-impact-assessment-lake-natron>

<http://www.tnrf.org/resources/news/latest?page=3>