

Information Sheet on Ramsar Wetlands

1. **Date this sheet was completed/updated:** 28 May 1998

2. **Country:** Madagascar

3. **Name of wetland:** The Manambolomaty lakes (Ankerika, Antsamaka, Befotaka and Soamalipo)

4. **Geographical coordinates:**

18° 59' – 19° 03' South latitude
44° 19' – 44° 29' East longitude

5. **Altitude:** 7 metres above sea level

6. **Area:**

Total area of 7491 hectares, including a buffer area, Ankerika, Befotaka and Soamalipo lakes (2660 hectares) and Lake Antsamaka (173.6 hectares).

7. **Overview:**

Ankerika, Befotaka and Soamalipo lakes are permanent freshwater lakes surrounded by the dry Tsimembo forest and supplied by the Manambolomaty River during the rainy season. Each lake has seasonal marshes in the southern part, and there are 98 hectares of rice fields.

Lake Antsamaka is a brackish lake in the Tsimembo forest with a maximum depth of 3 metres during the rainy season, but which can dry up completely towards the end of the dry season. It depends heavily on precipitation because the Manambolomaty River, which supplied it earlier, has changed its bed.

8. **Wetland type:**

Ankerika, Befotaka and Soamalipo lakes: Continental: O, Ts

Lake Antsamaka: Continental: R

9. **Ramsar criteria:**

Ankerika, Befotaka and Soamalipo lakes: 1a, 2a, 2c, 2d

Criterion that best describes the site: 2d

Lake Antsamaka: 1d, 2c, 3b, 3c

Criterion that best describes the site: 3c

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

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

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

The Ankerika, Befotaka and Soamalipo lakes are the habitat for ten pairs of the Madagascar fish-eagle (*Haliaeetus vociferoides*), ten per cent of the world population of this species in Madagascar, which is an endemic and critically endangered species.

There is also one of the best populations know of an endemic freshwater turtle, *Erymnochelys madagascariensis*, which is endangered and disappearing from western Madagascar. The island in Lake Befotaka is a nesting and sleeping area for Ardeidae, including the Humblot heron (*Ardea humbloti*), which is vulnerable, and the *Ardea cinerea*.

Lake Antsamaka has a very large variety of waterfowl, including the Madagascar teal (*Anas bernieri*), which is endangered. This is the only known moulting site for this species, the *erismature à dos blanc* (*Thalassornis leuconotus insularis*) and migratory waterfowl. It also is a breeding and nesting site for several species. Forty-six species of waterfowl have been recorded in the Manambolomaty system of lakes, of which about twenty are species or subspecies endemic to Madagascar.

The area around Antsalova has a large area of wetlands and was recognized in 1988 by the government as one of the 14 top priority areas to protect in Madagascar because of the importance of its biodiversity and the large variety of wetlands that are represented there. The Manambolomaty lakes are formed by lakes Ankerika, Antsamaka, Befotaka and Soamalipo surrounded by the dense deciduous Tsimembo forest, which covers 32,800 hectares of which 13,900 are protected. The delimitation of these sites is based on biological, ecological and limnological criteria of the environment. The boundaries were set primarily because of biological and ecological needs of the endangered species present in the lakes plus those of other species that frequent this wetland. The boundary is one kilometre for Anderika, Befotaka amd Soamalipo lakes and 100 metres for Lake Antsamaka.

An area of concentration of the Madagascar fish-eagle (*Haliaeetus voiciferoides*): Ten coupes of Madagascar fish-eagles (10 per cent of the world population present exclusively in Madagascar) are concentrated near the three lakes (Rabarisoa et al.

1997). The fish-eagles use the forest as a nesting site because fish-eagles need tall trees that grow around the lakes to construct their nest and raise their offspring. The maximum distance observed for the nesting trees is 900 metres from the shores of the lakes. The presence of an undisturbed forest within a radius of 100 metres around the nest is necessary as a perch for watching the nest and the fledglings (Berkelman 1997; Watson et al. 2000). The presence of tall trees around the lakes is also important for the eagles, because they use them as observation posts for finding prey at a distance. The perch is usually located less than 100 metres from the lake shores.

Habitat of the Madagascar big-headed turtle (*Erymnochelys madagascariensis*): The three lakes (Ankerika, Befotaka and Soamalipo) are the habitat of one of the most important populations of this endangered species (considered as endangered by Kuchling 1993). The species probably uses the forest for nesting (Kuchling personal communication). Detailed studies should provide information on the ecological conditions preferred by this species.

Habitat of other species: The forest surrounding the lakes is used for sleeping, resting and nesting by many species, especially waterfowl such as the herons. The area that serves as a resting place for the herons (*Ardea cinerea*, *A. humbloti* (vulnerable) and *Casmerodius alba*) is located within 50 to 650 metres from the edge of Lake Befotaka (Rabarisoa 1996). This area corresponds to the distribution of the *Anhinga melanogaster*, the *Ardeola ralloides* and the cattle egret (*Bubulcus ibis*). The sleeping area of the Madagascar flying-fox (*Pteropus rufus*) is about 400 metres distant from the shore of Lake Ankerika. More than 1000 specimens of this species were recorded in 1996 (Rabarisoa 1994).

Need for forest cover: Erosion is still a limited phenomenon at the Manambolomaty Lakes. However, there are areas of erosion on the deforested part of the lake shores. Excessive deforestation can lead to the creation of sand, which can contribute to the aggravation of turbidity and a decrease in the water depth. These two factors affect the availability of prey for the fish-eagles. Clear water and low turbidity allow the fish-eagles to clearly identify their prey. The filling with sand and turbidity decrease the productivity of fish in the lakes and have adverse effects on other aquatic species.

Importance of plants on the lake shores: The nearness of the water creates special ecological conditions that make possible the existence of evergreen species such as *Securinega perrieri* and commercial species such as *Commiphora* sp., *Cordylia madagascariensis*, *Dalbergia* sp. and *Hazomalania voyroni* (Zarasoa 1994). The proposed limit is sufficient for this specific type of vegetation.

Taking into account these facts, the National Committee recommends a distance of 1000 metres around the lakes as a sufficient limit for the protection of the lakes and the species found there.

Lake Antsamaka

Apart from the protection provided by the forest, the trees serve as a sleeping place for certain waterfowl, such as *Anastomus lamelligerus*, *Ardeola ralloides* and *Bubulcus ibis*. This forest also serves as a refuge for species of forest-dwelling birds: *Coua coquereli*,

C. cristata and *C. gigas* and the lemurs *Eropithecus verreauxi deckeni* (vulnerable) and *Phaner furcifer pallescens* (vulnerable). Several species of endemic reptiles, such as *Leioheterodon madagascariensis* and *L. modestus*, are also known to frequent this ecosystem. The space separating the forest from the lake, a grassland, is used for resting and nesting by several species of waterfowl, including *Dendrocygna bicolor*, *D. viduata* (Anatidae), *Dryolimnas cuvieri* (Rallidae) and *Rostratula bengalensis* (Rostratulidae). The National Committee recommends a forest limit of a radius of 100 metres around the lake in order to protect the habitat of these species and to preserve the sleeping areas of the waterfowl.

13. General location:

Antsamaka, Befotaka and Soamalipo lakes are in the commune of Masoarivo, while Lake Ankerika is in the commune of Trangahy, approximately 45 kilometres southeast of Antsalova. The site is in the province of Mahajanga, in the prefecture of Maintirano and subprefecture of Antsalova.

14. Physical features:

The Manambolomaty system of lakes is of natural origin and is on a large clay and sandstone depression, sometimes sandy with muted and broken relief. The climate is dry tropical with annual rainfall of 1000 to 1500 millimetres.

Ankerika, Befotaka and Soamalipo lakes are permanent freshwater lakes with algae whose pH varies between 6.8 and 7.5 and with a turbidity of ~30 centimetres. The depth is 3 to 5 metres, variable according to the season (a maximum towards the end of the rainy season in March and a minimum towards the end of the dry season in October). These lakes are fed by the Manambolomaty River during the rainy season.

Lake Antsamaka is a clear brackish lake with a pH between 7.9 and 9.1. Its maximum depth is 3 metres with fluctuations according to the season, reaching a maximum towards the end of the rainy season in March and a minimum towards the end of the dry season in October. Up to this period, the salinity of the water increases inversely proportional to the quantity of water in the lake. Studies are underway on the hydrological characteristics and soil properties.

15. Hydrological values:

A study is being carried out.

16. Ecological features:

Ankerika, Befotaka and Soamalipo lakes are lakes surrounded by the Tsimembo forest with dry deciduous vegetation. The plant formation includes *Commiphora*, *Dalbergia* and *Hildegardia*. The edge of the lakes is characterized by the presence of very definite ecological conditions with differentiation of types of vegetation in wet forest with the presence of evergreen species such as *Securinega perrieri*.

Lake Antsamaka is a shallow, non-permanent, brackish lake surrounded by the Ankotrofotsy forest (part of the forest range of Tsimembo). Part of the surface of the lake is covered by a characteristic formation of *Cyperus rotundus* (*reforefo*), *Juncus* sp. (*moita*), *Nymphaea lotus* (*etrevo*), *N. stellata* (*jijo*) and *Logorosipho madagascariensis* (*sara*). The surface vegetation disappears completely from the lake towards the end of the dry season because of either an increase in water salinity or because of intense human activity (fishing with small-mesh nets).

17. Noteworthy flora:

The Tsimembo forest is characterized by the presence of tall trees reaching 20 to 30 metres in height. It is very rich in commercial timber species, such as *Commiphora* sp., *Cordylia madagascariensis*, *Dalbergia* sp. and *Hazomalania voyroni*. Several species are important for the local population as construction material. *Alleanthus greveanus*, *Givotia madagascariensis* and *Gyrocarpus americanus* are used for building pirogues and *Cedrelopsis* sp. and *Dalbergia* sp. for fire wood. The shores of Lake Antsamaka are characterized by an abundance of baobab trees (*Adansonia* spp.).

18. Noteworthy fauna:

More than 1 per cent of the total population of Madagascar teal (endangered, with 34 specimens recorded in 1997) use Lake Antsamaka as a moulting and feeding area. At least 10 per cent of the total population of the Madagascar fish-eagle (critically endangered, 10 breeding pairs) nest on the shores of Ankerika, Befotaka and Soamalipo lakes. There is a very important population of *Erymnochelys madagascariensis* (endangered) in the Ankerika, Befotaka and Soamalipo lakes. The trees on the shores of the lakes serve as a nesting and sleeping site for Ardeidae, such as the Humblot heron (*Ardea humbloti*) (threatened) and the grey heron (*Ardea cinerea*). More than forty species of waterfowl have been identified in this system, such as pink flamingos (*Phoenicopterus ruber*), the lesser flamingo (*Phoeniconaias minor*), waders and terns. In addition, the Tsimembo forest is the habitat of seven different species of lemurs: *Eulemur fulvus rufus*, *Haplemur griseus occidentalis* (threatened), *Lepilemur edwarsi*, *Microcebus murinus*, *Mirza coquereli* (threatened), *Phaner furcifer pallescens* (threatened) and *Propithecus verreauxi deckeni* (threatened).

19. Social and cultural values:

The Tsimembo forest is an important resource for the local inhabitants: firewood, medicinal plants and wood for construction, especially for the construction of pirogues.

The economic importance of this system of lakes is the small-scale fishing that forms one of the main sources of income for the surrounding villages. Rice is grown along the shores (Befotaka and Soamalipo), which is also used for grazing cattle.

Ankerika, Befotaka and Soamalipo lakes play a cultural role for the local population. Traditional rites are held every year to worship ancestors. This activity is led by the Tompondrano (traditional responsible for the lakes) to mark the opening of the fishing season.

20. Land tenure/ownership of:

These lakes are the property of the government, but they are regulated by traditional laws led by the Tompondrano (traditional responsible for the lakes). At the present time, the management of lake resources of the Befotaka and Soamalipo lakes is under the supervision of a local association FIZAMI (Union des natifs d'Andranobe).

21. Current land use:

Five main villages and about thirty camp sites have been identified around Ankerika, Befotaka and Soamalipo lakes in 1996. The villages are Antsakoaramby (38 inhabitants), Ankirangato (131 inhabitants), Ankoririky (70 inhabitants), Ambondrombe (25 inhabitants) and Mahavony (147 inhabitants). The closest village, Masoarivo, is 3 kilometres south of the lake. The shores of the Manambolomaty River (floodable area), the water basin for the lakes, are used for growing subsistence crops after retreat of the water.

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

Sedimentation, the growing of rice, an increase in aquatic vegetation (especially in introduced species such as the water hyacinth (*Eichhornia crassipes*) and deforestation are adverse factors that affect the ecological characteristics of the lakes. The grazing area is also one of the factors that affect the regeneration of forests within the Tsimembo forest. Extensive raising of cattle in the forest destroys young trees. For Lake Antsamaka, the change in the course of the Manambolomaty River has created a non-permanent lake, which depends on rainwater.

23. Conservation measures taken:

In the Ankerika, Befotaka and Soamalipo lakes in 1996, an initiative to reinforce traditional laws was made under the direction of the Tompondrano (traditional responsible for the lakes) and the Ray-amandreny (notable) aided by the projects and local government representatives (mayors). Since 1997, the inhabitants along the shores of Befotaka and Soamalipo lakes have formed an association called the FIZAMI (Fikambananan'ny Zanatany Andranobe Miray—Union des natifs d'Andranobe) in order to provide community management of the lakes' natural resources. This association is attempting to apply an environmental policy related to Law 96 025 concerning the secure local management (GELOSE) for the management of renewable natural resources for the local inhabitants. Part of the Tsimembo forest is designated as a protected forest of 13,000 hectares.

24. Conservation measures proposed but not yet implemented:

The community management programme for natural resources is under way around Ankerika, Befotaka and Soamalipo lakes. For Lake Antsamaka, initial contacts were made in 1997 between the Jersey Wildlife Preservation Trust, local inhabitants and the local government representatives for wise management of the lake.

25. Current scientific research and facilities:

The Peregrine Fund Madagascar project has been carrying out biological, ecological and socio-economic studies in the region of the three lakes since 1991. Biological and ecological studies include studies on the Madagascar fish-eagle, surveys of forest birds in the Tsimembo forest, biannual follow-up counts (in January and July) of waterfowl, a botanical survey of the Tsimembo forest, a study of changes in fish populations that affect the Madagascar fish-eagle, a study of the impact of human activities on the population of *Propithecus verreauxi deckeni*, a survey of fish and useful animals in the three lakes and the surrounding forest and a socio-economic survey.

In 1997, the Jersey wildlife Preservation Trust established a team in Antsamaka to study conditions in the lake and the behaviour and ecology of the Madagascar teal. A census of waterfowl (in January and July) are carried out by the Peregrine Fund.

26. Current conservation education:

Since 1994, the Peregrine Fund has had a programme of interaction with local inhabitants to determine how the population can participate and benefit from the sustainable use of natural resources through discussions with local inhabitants. In June 1997, the team from Jersey Wildlife Preservation Trust, the Peregrine Fund and Project Bemaraha began a joint training and awareness-promotion programme in the region. This programme will be continued and will be expanded to other regions.

27. Current recreation and tourism:

The region of Antsalova, especially the system of the Manambolomaty lakes, has potential for tourism (the richness of the aquatic birdlife, the lemurs, the cultural values). The main problem is difficulty of access to the site, especially during the rainy season.

28. Jurisdiction:

The lakes are under the jurisdiction of the Direction des Eaux et Forêts of Maintirano through the Service Provincial des Eaux et Forêt of Mahajanga. Part of the Tsimembo forest is protected forest (13,900 hectares).

29. Management authority:

The Cantonnement forester of Antsalova and the mayor of the commune of Masoarivo and Trangahy.

The Association FIZAMI has assumed the management of resources in the Befotaka and Soamalipo lakes under the supervision of the management authority.

30. Bibliographical references: