

DOCUMENT NO. 377

ST LUCIA DOCUMENT COLLECTION



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Title THE MKUZE SWAMPS

Source 1982 ST LUCIA RESEARCH REVIEW. CH.17. NATAL PARKS BOARD

Keywords MKUZE=SWAMPS*

THE MKUZE SWAMPS

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1 Introduction

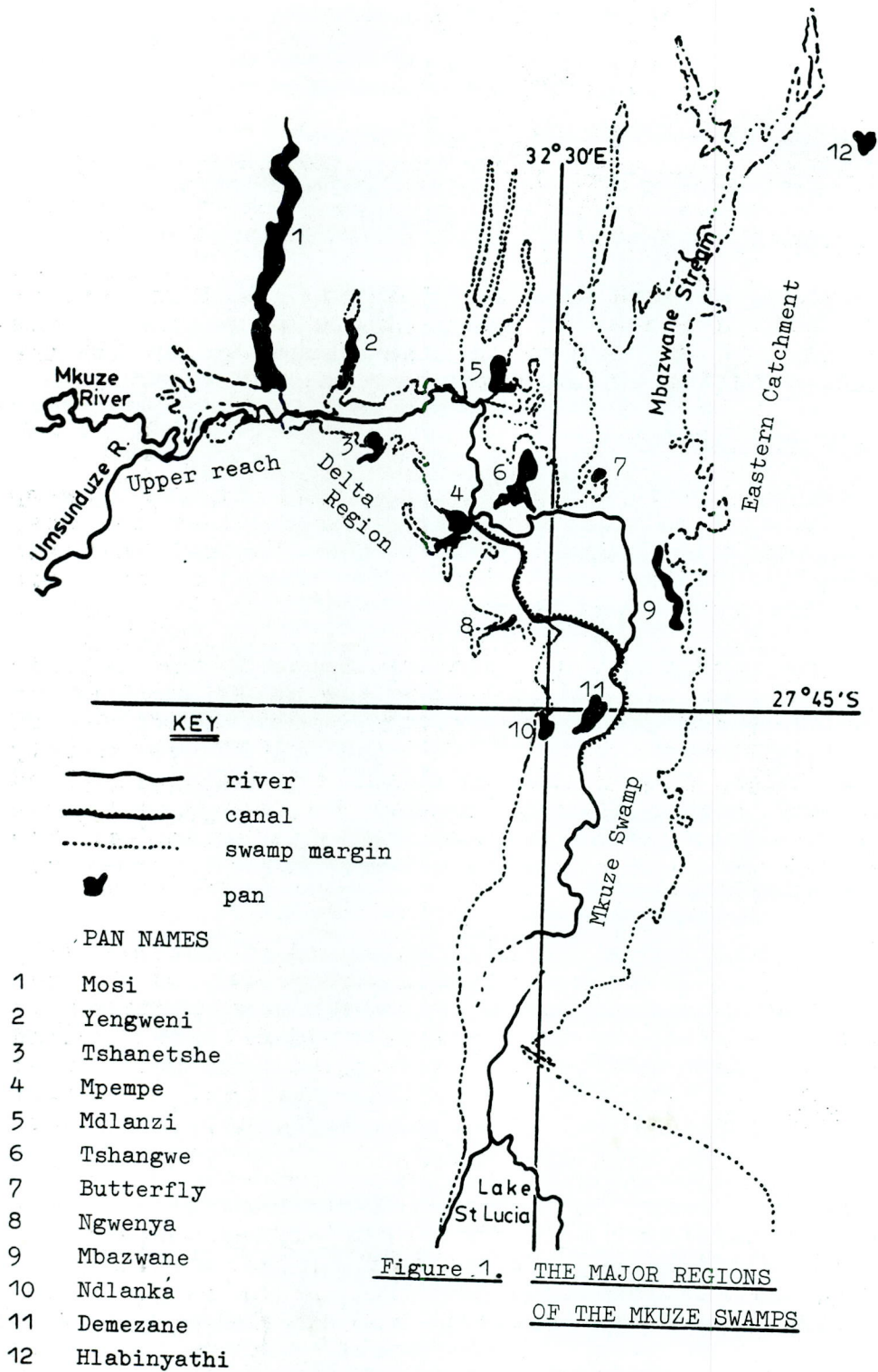
The Mkuze swamps, an area of over 10 500ha, lie to the north of Lake St Lucia and east of the Lembombo mountains. This area of swampland is formed by the Mkuze which is the largest river entering the St Lucia system.

2 Topography and hydrology

Alexander (1976) described the topography of the swamp system and recognised three fairly well defined regions, which he called the "upper reach", the "delta" and the "Mkuze swamp". These are shown in fig. 1 and his descriptions are summarised below:

- i) The upper reach is the section between the Lebombo mountains and the delta. Here the river becomes an aggrading stream passing through a fossil north-south orientated dune system. As the river is fairly narrow, high river flows inundate the adjacent flood plain and recharge pans located in the fossil dune valleys. These pans follow the orientation of the dune system and therefore are also north-south orientated.
- ii) The delta has formed in the region where the easterly flowing Mkuze River enters the north-south orientated Mkuze swamp. It is a region where the gradient is relatively steep. The river changes its course relatively frequently here, and pans form in blocked off portions of the old watercourses. Mpempe, Ntshangwe, Mdlanzi and Tshanetshe are examples of such pans.
- iii) The Mkuze swamp is the northern section of the ancestral Lake St Lucia which has silted up and has become shallow enough to support rooted and floating vegetation. Saline water penetration is inhibited by a natural bar at the southern end of the swamp and a feature of the swamp is the small, but well defined river channel down the middle. The open water in the swamp occurs in the Demezane, Mbazwana, Butterfly and Ndlaka pans.

To the east of the Mkuze swamps is a large area of vleis and hygrophilous grasslands which are inundated



in wet years. This area although not dealt with by Alexander can be regarded as an extension of the swamp system as it stores a large quantity of water which, during wet conditions, would gradually seep into the swamp. It is largely this water which maintains the flow of the Mbazwane stream. Pans form in depressions where the watertable has been exposed. Hlabinyathi is one of the more important of such pans of this area.

Alexander (1973) described the process of the swamps being charged up with water during the wet season. Once charged, water continues to be released from the swamps into St Lucia until the swamp water level drops. Therefore he says that under natural conditions, fresh-water from the summer rains can only be expected to reach the lake in late summer and will then keep flowing for several months after the last flows have entered the top end of the swamp.

3 Vegetation

Little information is available about the vegetation of the Mkuze swamps. There is no vegetation description and no quantitative work has been carried out in the area.

In the upper reach the most important trees along the river bank are Acacia xanthophloea and Ficus sycomorus. In certain areas, these trees have been felled, through agricultural encroachment, or their roots have been undermined by erosion. The result is that the tree-trunks have formed log jams which may divert the course of the river in places.

In the swamp the dominant plants are Cyperus papyrus, Phragmites mauritianus and Echinochloa pyramidalis. The papyrus in some localities may form a floating mat. On the levee along the river channel Ficus sycamorus and Ficus trichopoda occur.

The Mbazwane stream supports a swamp forest which has Barringtonia racemosa and Ficus trichopoda as dominant trees. In places this swamp forest has been felled by the local inhabitants, but now that the lower reaches are being totally protected this forest is regenerating.

In the pans the important species are Nymphaea capensis, Nymphaea lotus, Trapa natans and Ceratophyllum demersum.

Although there are no records of Eichhornia crassipes, the water hyacinth, from the Mkuze swamps, it occurs in drainage systems to the south and to the north and it is possibly only a matter of time before it is carried into this area. The likelihood of infestation increases as the nutrient status of the water rises due to the leaching of fertilisers

from agricultural areas. The results of hyacinth infestation are difficult to predict, but it is likely to result in drastic alteration of the vegetation and general ecology of the system if it is allowed to gain a foothold.

4 Fauna

No detailed faunal surveys have been conducted in the area.

4.1 Invertebrates

Little information at all is available for the invertebrates of the area. Appleton (1977) collected fresh-water mollusca in Tongaland. His collection sites included the Mbazwane Stream, the Mosi Pan, and the Mkuze River at the Lower Mkuze bridge. He recorded the following species:

Gastropoda

Prosobranchia

Thiaridae

Melanoides tuberculata Lower Mkuze

Pulmonata

Lymnaeidae

Lymnaea natalensis Mbazwana Stream

Ancylidae

Burnupia sp Mbazwana Stream

Ferrissia sp. Mbazwana Stream

Planorbidae

Gyraulus costulatus Lower Mkuze
Mbazwana Stream

Bulinus (Bulinus) natalensis Mozi Pan

Bulinus (Bulinus) tropicus Lower Mkuze

Lamellibranchiata

Eulamellibranchiata

Cyrenidae

Corbicula africana Lower Mkuze

Sphaeriidae

Sphaerium incomitatum Mbazwana Stream

Psidium langleyanum Mbazwana Stream

4.2 Fishes

Bruton & Kok (1980) recorded the following species from the Mkuze river near the lower Mkuze bridge or in the pans of

that region:

Barbus paludinosus
Clarias gariepinus
Pseudocrenilabrus philander
Oreochromis mossambica
Tilapia sparrmanii
Ctenopoma multispinis

The following species were collected from the Hlabinyathi pan which drains into the Mbazwane stream (Taylor, unpublished).

Barbus paludinosus
Clarias theodora
Aplocheilichthys katangae
Pseudocrenilabrus philander
Tilapia rendalli
Ctenopoma ctenotis

4.3 Amphibians and reptiles

No checklists are available for either of these groups.

The most important reptile of the system is the crocodile. It is largely a fish feeder and breeds in significant numbers in the lower areas of the swamp. Prior to April 1969 crocodiles were freely hunted in the area, but since then they have been protected under the reptile protection ordinance and are now listed as an endangered species.

In 1973 the IUCN crocodile specialist group motivated that the lower portion of the swamps should be declared a crocodile sanctuary. This has been accepted in principle by the Province and by the Department of Community Development, but the boundaries have not yet been defined in the field.

4.4 Birds

Waterbirds tend to concentrate in the area in early summer and then the major pans may each accommodate several ducks and geese. The main species found include White-faced duck, Fulvous whistling duck, Knob-billed duck, Spurwinged and Pygmy geese. These pans are an important feeding area for both the Pink-backed and the White pelicans. Indications are that these pans, together with those of the Pongola, are essential for the successful breeding of the White pelican as much of the food for their chicks is obtained here.

4.5 Mammals

In 1975 there were estimated to be 40 hippopotamuses in the Mkuze swamps (Taylor, 1981). These probably have a

significant effect on the hydrology of the area by creating channels and pathways through the vegetation. It is doubtful if there are any other mammals in the area which have a significant influence on the ecological functioning of the swamp.

5 Man's activities

5.1 Land ownership (fig. 2)

The eastern half of the swamp (from the Mkuze river course) falls within the Eastern Shores Nature Reserve which is jointly administered by the Directorate of Environment Affairs (Dept. of Forestry) and by the Natal Parks Board.

The northern portion of the Mbazwane stream and its catchment fall in KwaZulu while the triangular piece of land westwards from the Mbazwane stream to the lower Mkuze bridge is managed by the Directorate of Environment Affairs (Dept. of Forestry). The western half of the swamps falls into the area formerly designated as Native Reserve Number 1 and now is administered by the Department of Community Development. The southern area of the swampland has been set aside as a crocodile sanctuary administered by the Natal Parks Board. Much of the area, including the whole of the crocodile sanctuary falls within the area used by the South African Defence Force as a missile testing range and as a training area.

5.2 Land use

The indigenous population living on the western margins of the swamps practice subsistence agriculture. They cultivate to the edge of the swampland and dig drainage channels. They also cut reeds in the swamps for hut building and net the pans for fish. In the past they had little influence on the system, but as their population increases, so do their effects on the swamps. Most of the fires which burn a large proportion of the swamp each year are ignited by these people.

5.3 Management

During 1970 the Mkuze riverbed was cleared of tree-stump blockages which restricted water flow. In 1970-1971 a canal 13.5 km was excavated from Mpempe pan to a point in the swamp 1 km south of the Demezane Pan. Over the last 4.5 km the canal follows the existing river channel through the swamp (Alexander, 1973). This canal was excavated to bring fresh water into the hypersaline St Lucia, however the beneficial effects of the canal were out-weighed by the detrimental effects. This canal now causes adjacent areas of swampland to be charged less frequently and less fully

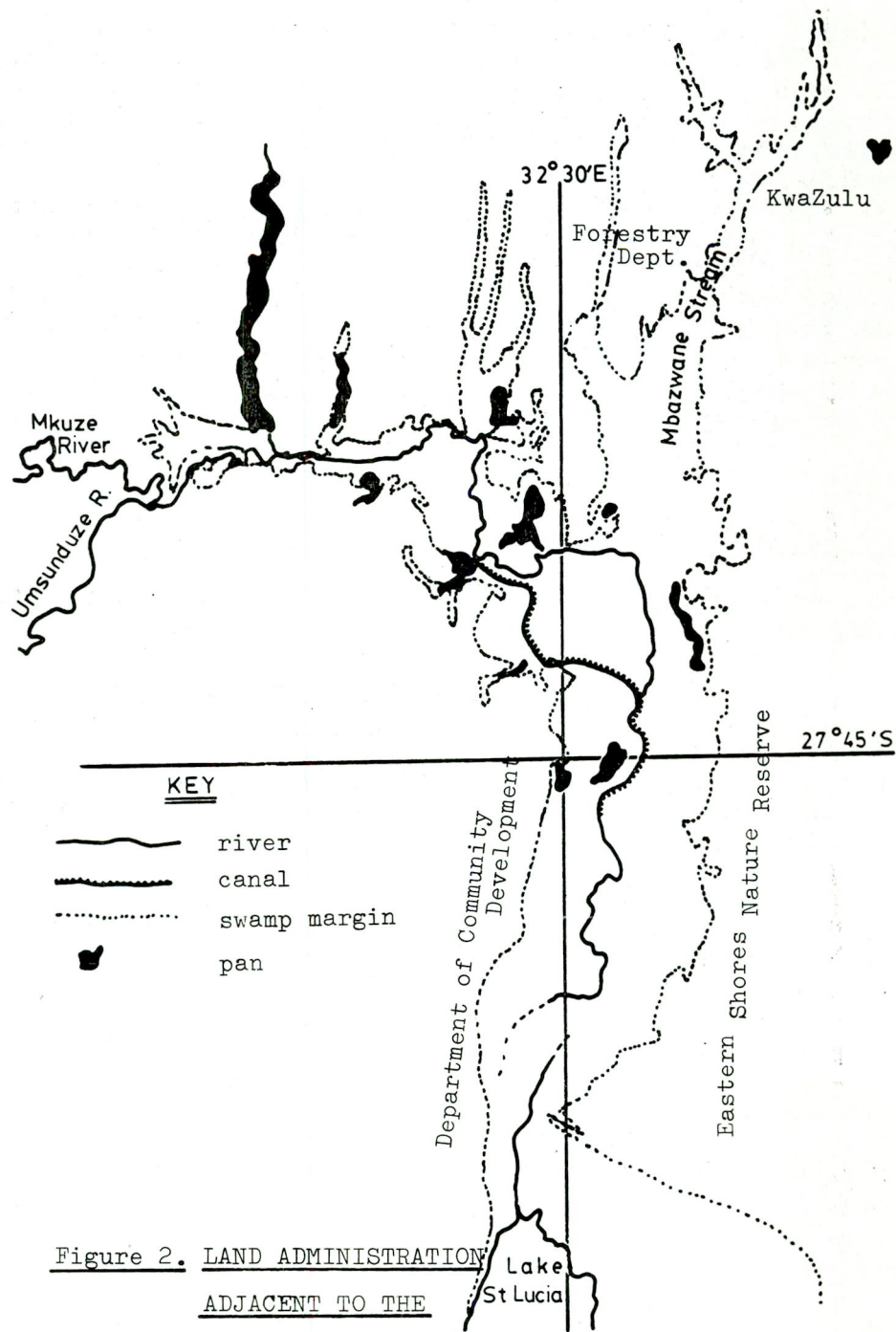


Figure 2. LAND ADMINISTRATION
ADJACENT TO THE
MKUZE SWAMPS

than before, resulting in it being more vulnerable to droughts. There is a greater chance of sediments entering the lake, and although the flow of water into the lake is increased in early summer, correspondingly less fresh water is discharged in winter.

The canal also has eroded badly downstream of Mpempe pan and to counteract this an earth wall was built at Mpempe in the latter part of 1974 to plug the canal. Reclamation work was then carried out to slope the eroding banks of the canal and stabilise them with grass. In April 1975 the earth wall at Mpempe washed away. This wall was reconstructed in 1979 with pipes passing through the wall so that a limited quantity of water could flow down the canal.

6 Research

6.1 Surveys and hydrological research

A height control survey was carried out by the students of the Survey Department of the University of Natal (Jones, 1973).

The Department of Water Affairs carried out further ground control, and surveyed the height of the water level recorders they had installed in the swamps. These level recorders have been in operation - with several gaps in the recording - since July 1973.

Currently further surveying is being carried out by the Reclamation Unit of the Roads Department to determine the area of the swamps at different water levels.

Several air-photo jobs have been carried out in the area since 1937 by the Department of Trigonometrical Survey and by private companies on contract to the Natal Provincial Administration.

LANDSAT imagery is available for the area and has been used with limited success by the Hydrological Research Institute of the University of the Witwatersrand, to correlate the extent of water area with observed water levels.

Hutchison (1976) developed a hydrological model of the swamps. The accuracy of this model has however been queried as Hutchison regards the swamp as a simple reservoir and not as a multi-stepped sponge.

6.2 Ecological research

Virtually no ecological work has been conducted in the Mkuze swamps.

7 The importance of the Mkuze Swamps

The Mkuze swamps have international importance as a valuable wetland. This area is the largest papyrus swamp in South Africa and one of the largest conserved areas of swamp forest occurs along the Mbazwane stream.

The swamp has a high primary productivity which is passed up the food chain.

The swamps are most important to Lake St Lucia as they act as a filter preventing sediments from reaching the lake. The drastic implications of removing a similar swamp filter have been seen in the Umfolozi mouth area which was completely blocked up with sediments after the Umfolozi swamps were canalised in the period 1918 to 1950.

The swamp also acts as a sponge which slowly releases freshwater into the lake and thus ensuring a fresh water supply in the Mkuze mouth area for most of the year.

The water emerging from the swamps carries a high organic load which is an important energy source for the lake.

8 Further research recommendations

8.1 Hydrology

Further monitoring of water levels and flow patterns is required. Once better data are available the swamp can be remodelled.

8.2 Ecology

A multidisciplinary ecological survey should be conducted to acquire an overview of the area. The survey should include basic limnological work, the mapping of vegetation and the collection and compilation of plant and animal species checklists.

8.3 Land-use

A land-use study should be conducted to the north and west of the area to determine the effects the local population are having on the swamplands.

9 Conclusions

Our knowledge of this important area is minimal and it is essential that hydrological and ecological data be collected for the Mkuze Swamps, an area so important for the well being of St Lucia.

The conclusions of Alexander (1976) are still so pertinent that I repeat them here ".....it is unlikely that the diversion of water from the Mkuze River or the swamp system will have a significant effect on alleviating the conditions in St Lucia without having serious detrimental effects on the ecology of the swamps.

No further channels within the swamp system should be excavated until the consequences can be predicted with a fair degree of confidence. This prediction will not be possible without accurate hydrological data".

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