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ABSTRACT

Despite conservation of the Lake and its peripheral vegetation, changes in the catchment have affected the habitat. Public interest ensures that adequate funds are available for reclamation and management of the areas included in the St. Lucia Game Reserve and Park. A conflict of interests has been inevitable in the use of the water from affluent rivers and as a result of settlement near the Lake. Many of the management proposals for St. Lucia have been either impractical or undesirable. The siltation of the Estuary that forced initiation of dredging in 1952 has been brought under control, but reclamation remains a vital management function. Hypersalinity becomes a threat in periods of subnormal rainfall. It is suggested that a firm policy be maintained of resisting demands for additional tourist accommodation on the main Lake shores.

INTRODUCTION

Management of Lake St. Lucia has been a perennial source of controversy. Not, however, because of any major disagreements on the overall objects of management. Ever since initial proclamation of the St. Lucia Game Reserve on

27 April 1897, the consensus has been that the Lake and its shoreline are to be maintained in its natural state, or at least as close to its natural state as possible. Differences of opinion have arisen over what should be done to maintain the system and how it should be done.

Man-made changes outside the Lake itself have been responsible for modifications to the natural ecosystem, of which St. Lucia is only a part. These changes have been the result of human settlement and of long-term land-use patterns. The impact of such factors on the Lake have been indirect and unintentional. St. Lucia has not suffered from the disruptive effects of developers deliberately modifying the natural features of the Lake. The Estuary has been extensively modified by deliberate action, but the motivation for this work has been to counteract the deposition of silt that threatened to destroy a vital element in the ecology of the Lake, through cutting off a free connection with the sea.

A measure of the importance accorded to conservation of Lake St. Lucia is that expenditure of funds controlled by the Natal Provincial Administration has continued to increase over the past 25 years and amounted to more than R500 000 in the current financial year. More than half of this was spent by the Department of Building Services on reclamation work and scientific research. The remainder was used by the Natal Parks Board for conservation, management, research and the provision of facilities for the public. Direct revenue in the form of payments for accommodation, boats and bait for angling amounted to R156 000 in the 1974/75 financial year. More than two thirds of what is being spent yields no cash return. The bulk of expenditure is for conservation work and it is encouraging that taxpayers are prepared to foot a bill of this size for the management of St. Lucia.

The fact must be faced, however, that financial

implications become serious in any attempt to reconcile developments in the catchment area and around the periphery of the Lake with the needs of the Lake itself. However highly we may value St. Lucia, we cannot ignore the legitimate requirements of those who are growing crops, planting trees, or developing townships. And such requirements may compete, indeed they have already competed, for the fresh water that gives life to the Lake in time of drought. All we can ask is that available resources be shared out fairly. One of the terms of reference of the Commission of Inquiry appointed by the Government in 1963 was to "investigate and determine the practical measures.... with due regard to the well-balanced utilization of the water sources of the lake and its tributaries in the best interests of the region and the country as a whole, from the point of view of agriculture, forestry, domestic water supply and stockwatering, mining, transport, the settlement of Whites and Bantu, border and other industries, urban consumption, nature conservation, recreation and tourism, within the total catchment area in which the water sources occur".

A realization of what is required is not necessarily enough to put control measures into effect. Kokot (1952) pointed out the problem created by soil erosion resulting from settlement of the whole Umfolozi catchment area. The problem remains acute today. So far as St. Lucia is concerned, the best solution appears to be a dam on the lower Umfolozi River, even though such a dam has other, undesirable implications for conservationists. Developments to meet the needs of our expanding population are inevitable and not necessarily unwelcome. Some require firm rejection. James (1973), for instance, put forward a proposal to create a vast storage scheme, that he estimated would yield 187 cumecs of fresh water, by impounding the whole St. Lucia basin plus the lower Umfolozi floodplain. While this plan might well be

considered merely an engineer's phantasy, the fact remains that taxpayers' money has ensured its perpetuation in the form of a printed document. Of an entirely different nature are suggestions for intensive commercial utilization of the resources of the Lake and its environs. Chapter 10 of the Report of the Commission of Inquiry makes out a case for commercial exploitation which is, in my opinion, unacceptable and at variance with the main findings of the Commission and with management policy as envisaged today.

#### BIOLOGICAL PROBLEMS

While it has long been recognized that the critical problems affecting the ecology of the Lake system relate to the physical factors that determine the suitability of the habitat for the biota, questions have arisen concerning direct management of the flora and fauna.

Plant communities subjected to management are mainly terrestrial, around the periphery of the Lake. Fire is the principal tool of management, especially where the object is to optimize grazing conditions for herbivores such as hippos and reedbuck. Since St. Lucia Game Reserve includes a strip of land around the Lake only 800m wide, a burning policy has been co-ordinated between the Natal Parks Board and the Department of Forestry, especially on the Eastern Shores where the Department controls large areas that are of prime significance for wildlife conservation. An initiative by the Department has led to a programme of joint planning with the Natal Parks Board for future use of the land. Within False Bay Park and along the Western Shores, inside St. Lucia Game Reserve, the Board annually carries out a limited culling programme to control herbivores, mainly nyala, impala and warthog.

In the waters of the Lake and the Estuary, biological management relates to control over the exploitation of fish and prawns. The fish are caught by anglers, who are subject

to restrictions on the sizes and numbers of fish they may take. Illegal netting at the north end of the Lake has, in recent years, sometimes reached a scale that has called for concerted action by the Board's rangers. Prawns are netted by the Board and sold to anglers for use as bait. It is not the Board's policy to increase exploitation beyond the present level, nor to allow sale away from the Estuary and Lake stations.

#### PHYSICAL PROBLEMS

Deposition of silt in the Estuary and high salinities in the Lake have been the two problems that physical management has been designed to meet since 1950. Kokot (1952) describes the sandbar that formed across the mouth on 20 April 1951 and sealed off the whole Lake system until 17 April 1956. A party of local people tried hopefully to open the mouth on 24 May 1951, but it was to take years of work by the newly-formed Provincial Reclamation Unit, and a great deal more than the original R40 000 estimated for the job, before success was achieved. Dredging the silted Estuary was by far the most important action that has been taken for restoring and maintaining the St. Lucia Lake system. Dredging remains an indispensable part of management. Thanks to the Reclamation Unit, the mouth has closed only occasionally, and for limited periods, since 1956.

Silt presented a fairly straightforward problem which has receded in urgency as a result of engineering work. The question of controlling hypersalinity was debated at length not only by the St. Lucia Scientific Advisory Council, set up in 1968, but by everyone associated with the Lake and even in the national Press. A succession of dry years culminated in 1970 with salinities in the northern part of the Lake exceeding 90‰.

Although hypersalinity had been recognized as a problem as early as 1947 (Day, 1948) and was a factor in motivating

the appointment of the Commission of Inquiry in 1963, the extreme conditions of 1969-70 led to almost a panic reaction. Statements such as that of Dutton (1970) indicated that unless the entry of marine water was stopped the Lake's flow would become so saline and sterile that it would never recover. A cycle of heavier precipitation, leading to the conditions in February 1976 with the northern part of the Lake almost fresh, has disproved such fears. The recurrence of dry cycles must be anticipated, requiring a decision on remedial action. At its meeting on 12 November 1970, the Technical Committee of SCADCO (the Scientific Advisory Council) listed 10 possible solutions for consideration. These included introducing Pongola water, making a canal to by-pass the Mkuze swamp, pumping sea water, building barrages and locks, reducing the area of the Lake, controlling the Estuary mouth and diverting Umfolozi water. Assessment of the various schemes was left to the mathematical simulation originally proposed by Dr. James, for which the Committee agreed to recommend R6 000 at its meeting on 27 August 1969. Practical action was taken in 1970 to connect the lower Umfolozi to the Estuary, resulting in an inflow of diluted water that helped to maintain a viable salinity in the southern part of the system. At the north end of the Lake, a canal was dug through part of the Mkuze swamp. This filled with water when rains fell at the end of 1971.

An important physical factor is Lake level, which is inversely correlated with salinity. Any management activity that involved restricting seawater inflows in time of drought would lower the Lake level, with serious management implications.

## CONCLUSIONS

Hydrologists and engineers are qualified to judge the technical possibilities and probable effects of physical management, subject to the provision of adequate data.

It is up to the biologists, however, to state which of the possible management options are, in fact, acceptable. Does one accept a suggestion for dredging the Lake to increase its depth and decrease its surface area? I would say No. Does one accept a structure to close the mouth of the Estuary? Again the answer must be No. Does one accept a management regime that allows the Lake level to fall below a certain level? If not, there can be no question of agreeing to a barrage that will keep out sea water in time of drought. And if management suggestions designed to improve some aspects of the Lake environment are to be turned down, in the interests of maintaining the natural integrity of the ecosystem, any developments leading to greater human utilization must be subject to a firm policy decision. There may well be pressure to increase visitor accommodation on the Lake shores, but there seem good reasons for further human influx to be restricted to the Estuary, already largely a modified environment, and to False Bay. The Lake itself must be managed as a wildlife reserve, part of it as wilderness area, and this involves a firm stand against pressures that would jeopardize the primary management objectives.

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