DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

SUBMISSION REGARDING PUBLIC ENVIRONMENTAL REVIEW

CARBON PRODUCTS FROM PEAT PROJECT - LAKE MUIR

March 1990

CONTENTS

i **SUMMARY AND RECOMMENDATIONS:**

Magnet Industries (the proponent) already dry-mine peat from Cowerup Swamp, north of Lake Muir. They propose to establish a peat mining operation to wet dredge peat from the Tordit-Gurrup Lagoon in an area covered by coal mining leases.

Tordit-Gurrup Lagoon is part of the Lake Muir Nature Reserve which is the 4th largest nature reserve in the south west. Tordit-Gurrup is the third largest freshwater lake in the south west and has a unique closed rush swamp and deep open water combination. The catchment is largely uncleared and little disturbed and has long been recognised as a refuge for water fowl. The wetlands support both rare, scientifically interesting invertebrates and a very high species richness. However, they remain comparatively unknown in terms of invertebrate investigation.

An application for an A class reserve over the whole Lake Muir area was made to the Lands Department in 1961, thus pre-dating the coal mining leases by nearly nine years. The lake Muir Reserve is one of CALM's highest priorities for re-classification to A class under the Government's Policy on mining in national parks and nature reserves.

The values of the area were recognised by the listing in March 1978, of the Lake Muir complex, as part of the National Estate.

For mining of the Tordit-Gurrup Lagoon to be environmentally acceptable, it must be clearly demonstrated that significant damage will not occur to the conservation values of the Lagoon.

CALM maintains that the PER has not provided sufficient information to demonstrate that the mined areas can be rehabilitated, that sufficient unmined areas will be left to retain all of the identified values or that mining will not have an ongoing detrimental effect on the local flora and fauna.

1.0 INTRODUCTION

The Department of Conservation and Land Management (CALM) has statutory responsibility for the conservation of native plants and animals throughout Western Australia (under the Wildlife Conservation Act) and for the management of lands and waters, including nature reserves, entrusted to its care (under the CALM Act).

The five primary objectives of the Department are listed in the Strategic Plan, 1989-1993 and include the following:

* **Management:**
  To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

* **Conservation:**
  To conserve the indigenous plant and animals species and environmental processes in natural habitats throughout the State.

  Strategies identified to achieve those (and other) objectives include:

  to establish and maintain a system of secure reserves which protect viable representative samples of all the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas suitable for recreation and the production of renewable natural resources; and

to ensure that conservation and land management is carried out according to sound, well-researched scientific principles.

Given CALM's formal responsibilities and objectives, and that mining peat (the basic substratum) from the largest fully fresh wetland on the Lake Muir Nature Reserve is potentially in conflict with the purpose of conservation of flora and fauna, CALM's preferred position is that no mining should occur at Tordit-Gurrup Lagoon. That position is based on the following facts.

* Western Australia is the driest State in the world's driest continent. As a result peat swamps are rare (as the P.E.R. acknowledges) and they, and the flora and fauna they support, are of special value as a part of the State's natural heritage, and for scientific research.

* Activated carbon, although perhaps of varying kinds, can be produced from renewable carbon sources in Australia, or from much more abundant peat resources in other parts of the world. A "one-off" use for a single purpose, of a rare, essentially non-renewable resource with multiple values, is not in keeping with CALM's primary objectives.

* The Lake Muir Nature Reserve is the 4th largest nature reserve in the South West with substantial wetlands. Its wetland system is the 4th largest non-estuarine wetland, and among the two freshest, in the South West. The two largest freshwater lakes in the reserve (Byenup and Tordit-Gurrup

Lagoons) are the second and third largest in the South West.

* No other wetlands in the South West have the natural combination of deep open water making up about a third of the area, and closed rush swamp, that Byenup and Tordit-gurrup Lagoons possess.

* The reserve encompasses probably the widest range of types of wetlands in any comparably sized area in the South West. Salinity, depth, permenance, vegetative structure and size vary across the 30 distinct wetlands in the reserve.

* Most of the wetlands within the reserve have been little disturbed by human activities. All of the fresher swamps and lakes, including Tordit-Gurrup Lagoon, have entire catchments which are largely uncleared and little disturbed. Selective logging and regeneration has occurred adjacent to the Lagoon.

* The four major wetlands of the Lake Muir Nature Reserve are, in order of size Lake Muir, Byenup Lagoon, Tordit-Gurrup Lagoon and Poorginup Swamp. The direction of flow is from Poorginup Swamp "downstream", ie: from small to largest, and water quality, especially salinity, decreases in the same order. Any adverse effect on Tordit-Gurrup Lagoon, which is second in the chain, could flow through to Byenup Lagoon and Lake Muir.

* Peat mining is not a renewable or sustainable operation - peat accumulates at approximately 0.5 mm per year; ie: 1m in 2,000 years.

* Although the present proposal may only use 40% of the peat within Tordit-Gurrup Lagoon, a continuing market and successful industry will inevitably create pressures to continue mining once that first 40% of the reserve has been used. Further, the exhaustion of that 40% could occur much faster than the proposed twenty years if the market expands. Because readily exploitable peat resources in the State are almost restricted to the Lake Muir Nature Reserve, such continuing or expanding pressures would make it difficult to retain significant unmined areas of peat in Tordit-Gurrup Lagoon or Poorginup Swamp, both of which are covered by mining leases.

* The reserve has long been recognised as an important refuge for waterfowl in drier years. Its combination of open water and closed rushes make it especially important for breeding. Taken as a whole, the Lake Muir wetlands constitute one of the most important areas for waterbirds in south-western Australia. Their value has been recognised for a long time and Lake Muir, Byenup and Tordit-Gurrup Lagoons feature prominently in the bird notes of Tom Carter [Emu 23 (1923), 125-42; 223-35; 306-18].

* Recent research, since the issuing of the mining leases (and therefore unavailable to the then Department of Fisheries and Fauna) provides more evidence for the nature conservation value of the Lake Muir wetlands. This evidence is summarised in the next five points.

* Forty-six species of waterbird have been recorded in the reserve (Table 1) and it is likely that more intensive sampling at Byenup and Tordit-Gurrup Lagoons would reveal the presence of additional rush-dwelling species such as Buff-banded Rails and crakes. Additional wader species probably also occur through the system, including Sharp-tailed Sandpipers, Long-toed Stints and Bar-tailed Godwits. The large, dense stands of Baumea articulata and other sedges at Byenup and Tordit-Gurrup Lagoons provide an important habitat for Australasian Bitterns, a comparatively rare species that has been declining in numbers since the turn of the century (Carter 1923).

* As well as supporting high species richness, the lake Muir wetlands constitute extremely important moulting and drought refuge areas for ducks. In both the mid-1970's and in 1989 more than 50,000 ducks were recorded in Lake Muir in late summer, and in Decmeber 1982 12,000 Australian Shelduck were counted moulting in Tordit-Gurrup Lagoon (Table 2). Although large numbers of birds do not occur every year, maintenance of the State's waterbird numbers relies on sites such as the Lake Muir wetlands being available whenever climatic conditions dictate that birds should move there.

Table 1: Species of waterbird occurring in the Lake Muir wetlands (1981-85 RAOU study, 1986-87 RAOU study, 1988 + duck-counts, CALM files)

Species	Breeding recorded	Maximimum Count in any of the wetlands	Maximum Count in Tordit-gurrup Lagoon
Great crested Grebe	Y	20	
Hoary-headed Grebe		68	
Australasian Grebe		5	
Australian Pelican		46	10
Darter		20	1
Great Cormorant		5	5
Little Black cormorant		20	7
Pied Cormorant		4	
Little Pied Cormorant		24	22
White-faced Heron		133	9
Pacific Heron		3	
Great Egret		22	13
Little Bittern	Y	2	
Australasian Bittern		2	1
Sacred Ibis		6	
Straw-necked Ibis		4	
Yellow-billed Spoonbill		45	15
Black Swan	Y	3837	50
Australian Shelduck	Y	12000	12000
Pacific Black Duck	Y	18450	553
Grey Teal		16002	165
Australasian Shoveler		220	
Hardhead		550	550
Maned Duck		45	35
Blue-billed Duck		68	4
Musk Duck	Y	133	133
Marsh Harrier	Y	4	2
Purple Swamphen	Y	24	24
Eurasian Coot	Y	9628	201
Spotless Crake	Y	10	
Red-capped Plover		500	500
Black-fronted Plover		2	
Black-winged Stilt		10	
Banded Stilt		160	
Red-necked Arocet		3	3
Red-necked Stint		10	10
Curlew Sandpiper		1	
Common Sandpiper		1	
Greenshank		2	
Grey Plover		1	
Ruddy Turnstone		2	
Silver Gull	Y	700	18
Whiskered Tern		80	
Little Grassbird		2	
Clamorous Reed-Warbler		3	

Table 2: Number of ducks, swans and coot in Lake Muir, Byenup Lagoon and Tordit-gurrup Lagoon 1988-89

Lake	Nov 88	March 89	Nov 89
Muir	4302	51613	4705
Byenup	267	318	607
Tordit-gurrup	267	1467	210

* There has been little work on the invertebrates of the Lake Muir wetlands. However, studies by Mark Harvey on water mites and Maureen De Haan on general invertebrate communities have shown that the wetlands support both rare, scientifically interesting invertebrates and a very high species richness.

* A single brief collecting trip by Dr Mark Harvey of the Western Australian Museum, yielded a remarkable assortment of water mites from Poorginup Lagoon over which mining leases are also held. Of five undescribed species, so far collected from nowhere else, three are of great zoogeographic significance, having their closest known relatives in northern Europe and North America. This may indicate a common ancestry on Pangaea, the original "supercontinent" which is thought to have broken up about 300 million years ago. This is consistent with observations by other biologists that the fauna and flora of the general area contain many relict species representing surviving taxa which flourished prior to the formation of the Australian continent. The scientific and conservation value of such relicts is inestimable. It seems likely that this system of relatively pristine lakes and swamps with their permanent water and

deep peat beds may be acting as important refugia for many species of invertebrates which were more widespread in previous times.

* De Haan's brief sampling program recorded 103 taxa from the Muir wetlands which, had they been fully identified, represented probably 110-120 species. Wider sampling than that possible during an Honours year project would almost certainly find significantly more species. Tordit-Gurrup Lagoon had the highest species richness (60 taxa) and contained as many species as Davis and Rolls (1987, EPA Bulletin 265) recorded in a far more intensive sampling program at Thomsons Lake near Perth. Thomsons Lake had the highest species richness of any of the five metropolitan lakes sampled by Davis and Rolls, which had a total fauna of only 87 taxa compared with the 103 recorded in the Muir wetlands. A series of wetlands sampled around Kemerton contained 83 taxa (Bunn, 1983 remainder of ref in de Haans thesis).

* While the Muir wetlands remain comparatively unknown in terms of their invertebrate populations, even at this early stage of investigation it is clear that they represent one of, if not the best, wetland systems for invertebrates in the South West. This reflects the fact that the system is comparatively undisturbed and makes the area especially important for conservation and research. These biological values are likely to be seen as greater and greater as more information is gathered.

* An application for an A class reserve over the whole Lake Muir area (including Cowerup Swamp and Red Lake) was made to the Lands Department on 30th August 1961 - thus pre-dating by eight and a half years the application for coal mining leases by (then) Cladium Mining Pty Ltd.

* Lake Muir Nature Reserve is also one of CALM's highest priorities for reclassification to A class under the Governments policy on mining on national parks and nature reserves. Despite CALM's preferred position that Tordit-Gurrup Lagoon not be mined, it is a fact that legal mining leases do exist over that and most of the peat habitat on the Lake Muir Nature Reserve. The values of the reserve are now known to be such that if mining constitutes a significant threat to them, compensation of the leasee, if legally required for foregoing the leases, should be considered.

For mining at Tordit-Gurrup Lagoon to proceed it must be clearly demonstrated that significant damage will not occur to the conservation values identified above.

For this to be demonstrated, the key question is whether successful rehabilitation of the mined areas can be achieved, or whether sufficient unmined areas can be left to retain all of the identified values. This Department does not believe that the PER provides sufficient information to answer this question. The reason for this concern are discussed below in a detailed analysis of the PER, and summarised in the conclusions.

2.0 ANALYSIS OF THE PUBLIC ENVIRONMENTAL REVIEW:

An analysis of the Public Environmental Review (PER) document has raised the following additional points. These points were raised either because it was thought that they were unclear in the document, or because they were treated with insufficient detail in the text.

2.1 Water:

Local knowledge suggests that Tordit-Gurrup Lagoon has not overflowed since 1968. Although there is probably some underground water movement, the flushing referred to in the report has not been proven. In 1986 the Lagoon almost dried up. There only remained a small section of open water in the middle of the lake, not enough to float the dredge. It has not been established, what would happen to the dredge in similar conditions, given that water could not be pumped into the Lagoon from elsewhere.

If the open water area is increased, this may create a "wick" effect on the Lagoon and result in greater evaporation rates.

The report claims an annual flushing of the Lagoon occurs which allows for the natural salt balance to be maintained and is critical to the maintenance of the salinity and pH levels. There is not sufficient evidence of seasonal flushing. The pH is of particular concern when other layers are exposed. Flushing may occur, but not every year. The report also claims that the seasonal variation in water level appears to contribute to the ongoing maintenance of the density and growth of the natural species. The thick vegetation at

Poorginup is given as proof of the above and it is also claimed that this indicates that a reduction in the water level to 1 metre below the peat surface (as at Poorginup at the time of the Martin 1982 survey) was beneficial to plant habitat. The report also claims that seasonal variation in the water level has shown an increase in overall biotic activity as demonstrated by the thick vegetation, high species richness and six new species of water mite collected from Poorginup Lagoon. There is no scientific data to back these claims. The significance of Poorginup can be simply explained by the fact that it is a small, enclosed lake with extensive peat and very fresh water. In fact, it may be argued that the condition of Poorginup is good <u>because</u> of the peat.

The depth of peat may act as a refuge as the water levels drop. Invertebrates may follow the water levels into the peat. There will not be any seasonal drying of floating mats unless all the water dries out. The effects of changing this seasonal cycle and removing the peat refuge are unknown.

Since the Martin report in 1982, the Government has continued to monitor water levels in the lakes complex. These data have not been included in the data used for this PER, and strongly suggest a drying of the lake. In fact, the summer water levels since 1982 have been significantly lower than those predicted by the PER. There have also been contrary indications of pH, flushing and water levels.

There is some doubt that if transport waters are to be returned to the lake, a 60 minute retention time will be sufficient to remove the turbidity. No tests have been carried out in this regard. With the dredge in free water, there is a potential for turbidity to effect the entire lake. Any adverse effects in this regard will also effect the private property at the top of the Lagoon. Monitoring programme details are required, including who will carry it out and to the satisfaction of which Department.

2.2 **Operations**:

There is no mine plan (as such) or project management plan. There is no indication of batters, mining widths, whether there will be mining "fingers" or the mining sequence.

The report talks of "reclaiming". It should be stressed that this project will be "mining" the peat. This will constitute a "one-off" non-sustainable use for a rare, essentially non-renewable resource with multiple values.

There are no details in the report of the method proposed for "cutting up" the reed mats. In addition, there are no details of proposals to anchor the "mats", no details on where reed mats will be stored, and no statement or estimate of additional open water to be maintained for access to dredge or dredging operations.

There is little information as to peat quality. If the quality is variable, the company may have to blend the peat or "high grade" it. If the quality of the peat is not as good as expected or

the local horticultural market will not accept as much of the poor quality peat as expected, will there be any stockpiling of peat, peat products or peat wastes? The products and production levels quoted are confusing. It appears that the quantities quoted may be mutually exclusive. The combinations, options and low value waste quantities need to be more clearly defined.

There is no definition of batter or batter angles. The barge is said to be anchored by spuds but there are no suggested details of their effect. There are no details as to how the dredge pipes will be run, whether the pipes would pass over rehabilitated areas and whether this would have any effect.

Details of how the mats will be anchored for rehabilitation and how they will be moved are required. Suggestions that effects on the lake will be minimal do not include consideration of the use of dredge, dredge tender, tug for reed relocation and transport, vehicles to transport anchoring spuds and cables and vehicles to cart and install pipe lines.

There is no detail provided as to how much peat will remain covering the clay on the bottom of the lake and how that depth of clay will be measured, given that the lake floor is not regular.

The Company have not explained how they will ensure that 30cm of peat is left on top, or how this will be measured.

De Haan has estimated the peat depth as 3 ± 1m maximum depth, shallowing near the lagoon edges or in the open water areas. If 30cm (say) is left at the bottom, 30cm is left at the top and 45m is left on the bank, this may affect the 8 ha/year estimate of mine area. A depth of resource and resource quality plan is required for the mine operations (similar to the Alcoa bauxite operations mine plan and ore assay).

The scope and life of the project depends upon the thickness of the peat. Given that peat depth estimates are given as "3 ± 1", the peat resource does not seem to have been accurately delineated. Probe tests by local citizens (personal communications) have indicated a realistic peat depth of 1-2m, with a maximum of 2+m. This will have to be confirmed as area mined per annum will increase sharply if the depth has been over estimated.

Shallower peat depths will require larger mine areas. A comprehensive analysis of the resource and mining method is required to estimate the likely effects. There may be nutrient release from the reed mats and studies should be carried out in this regard.

This Department has some concerns regarding fuel leak impacts. No mention has been made regarding provisions for the pump out of barge bilges.

The proposed bore has a stated output of 20 l/s. This is 72kl or 72 tonnes of water per hour which is a significant amount. What will the water be

used for and will it cause any significant groundwater drawdown effects?

There are no firm commitments as to how the Company will act to ameliorate any adverse ecological changes.

2.3 **Birds**:

Although large numbers of birds do not occur every year, up to 12,000 Shelducks have been counted at one time. Maintenance of the State's waterbird number relies on sites such as the Tordit-Gurrup Lagoon being available whenever climatic conditions dictate that birds should move there. It is claimed that the mining will not appreciably change the rush or open water areas and hence have little effect on birdlife. Given that the lake is in a bird sanctuary, and includes "secretive" birds, there is concern that there will be adverse effects from dredge noise, plant noise and close human proximity.

2.4 **Safety**:

What are the safety implications of the proposed floating mats and will the mats be dangerous if walked on by humans or animals? If so, how can they be made safe, given that the peat will not reform (for thousands of years) and that the mats will always remain floating?

2.5 **Rehabilitation**:

There is concern that the Company has not carried out any new trials or research, sufficient to demonstrate the effectiveness of rehabilitation proposals. There is no information presented to allow evaluation of the likely success or

otherwise of rehabilitation, supposing that the reed mats will float. There is no reference to overseas studies. The Department of Conservation and Land Management (CALM) has serious concerns regarding the claims of Magnet Industries, which are largely unproven.

Specifically, CALM has concerns regarding:-

- whether the reed mats will float in a stable state, how they will be moved and how they will be anchored.

- given the peat was deposited over a period of over 5000 years, the removal of peat may create a new ecosystem which will replace the peat adopted ecosystem.

- given that the reed mats will not now dry out as water levels fall (the mats will fall too), the ecosystem may change from the existing ecosystem where invertebrate numbers fall in summer and increase in winter.

- the ecology of the lake may change with the new water depths.

- there have been no studies done by the Company to demonstrate that there will be no deaths of either reeds or invertebrates in the floating mats. If there is loss of habitat, the effect this will have on invertebrate and bird numbers is unknown.

- peat is extremely slow to regenerate (0.5mm/year). It is unclear how the laying of floating mats as a surface "skin", can be construed as total rehabilitation.

- there are no agreed criteria for acceptable rehabilitation.

2.6 **Surveys**:

No new surveys or research projects have been carried out by the proponents themselves. The four existing area surveys which have formed the basis for some of the statements in the PER were useful, but brief and incomplete. The vegetation survey was very brief with little emphasis on community types and water level influence. There was no "real" information on sedges, reeds or fringing vegetation. The hydrogeology report was completed in 1982 using limited data. Extensive sampling has been carried out since 1982 and has strongly suggested much lower water levels with associated effects on pH and salinity. These later data have not been used in the PER. The current level of knowledge of the biological processes of the Lagoon is poor and there is no review of the local or regional significance of the peat resource, flora or fauna. There is a lack of detail of the impact of the extraction

process on the immediate and surrounding areas and there is nowhere near enough hydrological or biological knowledge available to enable proper assessment of environmental consequences.

There are no data presented as to what other peat swamps are available in the south west or are available in other parts of Australia.

2.7 **Fire:**

The Lake Muir system is very susceptible to fire. Any mining proposal in the area will have to be taken into account both in the local fire management scheme (to protect the operation) and in its own fire protection policy (to avoid any potential to cause fires). This has not been addressed in the PER.

3.0 **CONCLUSION:**

Tordit-Gurrup Lagoon is the third largest freshwater lake in the south west, at a time when more and more freshwater lakes are becoming saline. The lake system is largely undisturbed and has long been recognised as a refuge for water fowl. The wetlands support both rare, scientifically interesting invertebrates and a very high species richness. However, they remain comparatively unknown in terms of invertebrate investigation.

The whole Lake Muir system, including Tordit-Gurrup Lagoon, was proposed as an A class reserve in 1961.

The system is currently one of CALM's highest priorities for re-classification to A Class under the Government's Policy on Mining in National Parks and -

Nature Reserves, and has been listed as part of the National Estate since 1978 (see attachment).

Many questions and unknowns have been identified from the Company's PER. This document has raised serious doubts regarding water quality and maintenance, operational matters including basic mine planning and maintenance of the bird sanctuary and invertebrate refuge functions of the lake.

Most seriously, the rehabilitation question, which includes all of the above, is still open to question.

The Magnet Industries PER has failed to clearly demonstrate that significant damage will not occur to the conservation values of the Tordit-Gurrup Lagoon. Most importantly, CALM believes that the PER has not provided sufficient information to demonstrate that the mined areas can be rehabilitated, that sufficient unmined areas will be left to retain all of the identified values or that mining will not have any ongoing detrimental effect on the local flora and fauna.

NAME OF PLACE LAKE MUIR AREA

009556 5/02/054/0002/01
REGISTERED

LOCATION/BOUNDARIES:

INCLUDES LAKE MUIR & RESERVES SURROUNDING A NUMBER OF SMALLER LAKES TO EAST & NORTH. COMPRISES RESERVES 26677-82, 29601, 6549, 14739, 25798 & 31880 & NELSON LOCATIONS 12694 AND 12556-58

TITLE INFORMATION:

STATEMENT OF SIGNIFICANCE:

THE AREA IS SIGNIFICANT BECAUSE IT CONTAINS VEGETATION ASSOCIATIONS NOT REPRESENTED ELSWHERE. IT IS ONE OF THE MOST IMPORTANT WATERFOWL AREAS IN THE SOUTHWEST AND SUPPORTS LARGE POPULATIONS OF A WIDE RANGE OF SPECIES. MANY SPECIES ARE MIGRATORY.

DESCRIPTION:

A SYSTEM OF FRESH WATER AND BRACKISH LAKES AND SWAMPS OF BOTH PERENNIAL AND SEASONAL TYPES. MANY LAKES AND SWAMPS SUPPORT A TALL CLOSED HEATH OF MYRTACEOUS SHRUBS. PAPERBARKS (MELALEUCA RAPHIOPHYLLA AND M. PREISSIANA) ARE COMMON. PERMANENTLY WET AREAS SUPPORT A HEATH-RUSH ASSOCIATION. JOINTED RUSH (BAUMEA ARTICULATA) IS BECOMING LESS ABUNDANT DUE TO INCREASING SALINITY OF THE WATERS. LAKE MARGINS SUPPORT WOODLAND DOMINATED BY PAPERBARKS, FLOODED GUM (E. RUDIS), YATE (E. CORNUTA) AND SWAMP BANKSIA (B. LITTORALIS). LAKE MUIR ITSELF IS AN EXTENSIVE SALT FLAT SUPPORTING ALGAE, LAMPROTHAMNION SP. ALTHOUGH THE FLORA SPECIES OF THE LAKE MUIR AREA ARE MOSTLY WIDE-SPREAD, THE FORMATIONS IN WHICH THEY HERE OCCUR ARE NOT DUPLICATED ELSEWHERE.
THE LAKE MUIR AREA IS ONE OF THE MOST IMPORTANT WATERFOWL AREAS IN THE SOUTHWEST, PROVIDING RESTING FEEDING AND BREEDING GROUNDS. IT SUPPORTS ONE OF THE LARGEST BLACK SWAN POPULATIONS (OVER 50,000 RECORDED ON ONE OCCASION). MANY OTHER WATERBIRD SPECIES HAVE ABUNDANT POPULATIONS. PEAT DEPOSITS UNDERLIE MANY OF THE WETLANDS.

CONDITION:

THE LEVEL OF SALINITY OF THE LAKES AND SWAMPS APPEARS TO BE INCREASING, DUE TO THE AGRICULTURAL CLEARING OF SURROUNDING BUSHLAND. THERE EXIST PLANS FOR THE EXTRACTION OF PEAT FROM THE AREA WHICH HAS THE POTENTIAL TO DISTURB WATERBIRD POPULATIONS, DESTROY THE VEGETATION AND UPSET THE HYDROLOGICAL REGIME OF THE AREA.

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