

BEGA VALLEY SHIRE COUNCIL

**MERIMBULA LAKE AND BACK LAKE  
ESTUARY MANAGEMENT PLAN  
and  
MANAGEMENT STUDY SUMMARY**

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# FOREWORD

The Estuary Management Policy is one of a suite of natural resource management policies being implemented by the NSW Government using the principles of total catchment management and ecologically sustainable development. The policy focuses on tidal rivers and coastal lakes which have been adversely affected by catchment development, particularly over the last 20 years.

The goal of the policy is to achieve integrated, balanced, responsible and ecological sustainable use of the State's estuaries. A specific objective of the policy is to encourage preparation of a long term Management Plan for sustainable use of each estuary and its catchment in which all values and uses are considered. The policy promotes co-operation between various authorities, catchment management committees, landholders and estuary users in the development and implementation of the Management Plan.

The Plan should define strategies to:

- protect and conserve estuarine habitats and ecosystems,
- conserve aesthetic values of the estuaries and wetlands,
- undertake repair of past damage and prevent future degradation,
- achieve ecologically sustainable use of estuarine resources.

Preparation of the Merimbula and Back Lakes Estuary Management Plan and Study was carried out by Webb, McKeown & Associates under the direction and supervision of Bega Valley Shire Council's Merimbula/Back Lakes Estuary Management Committee.

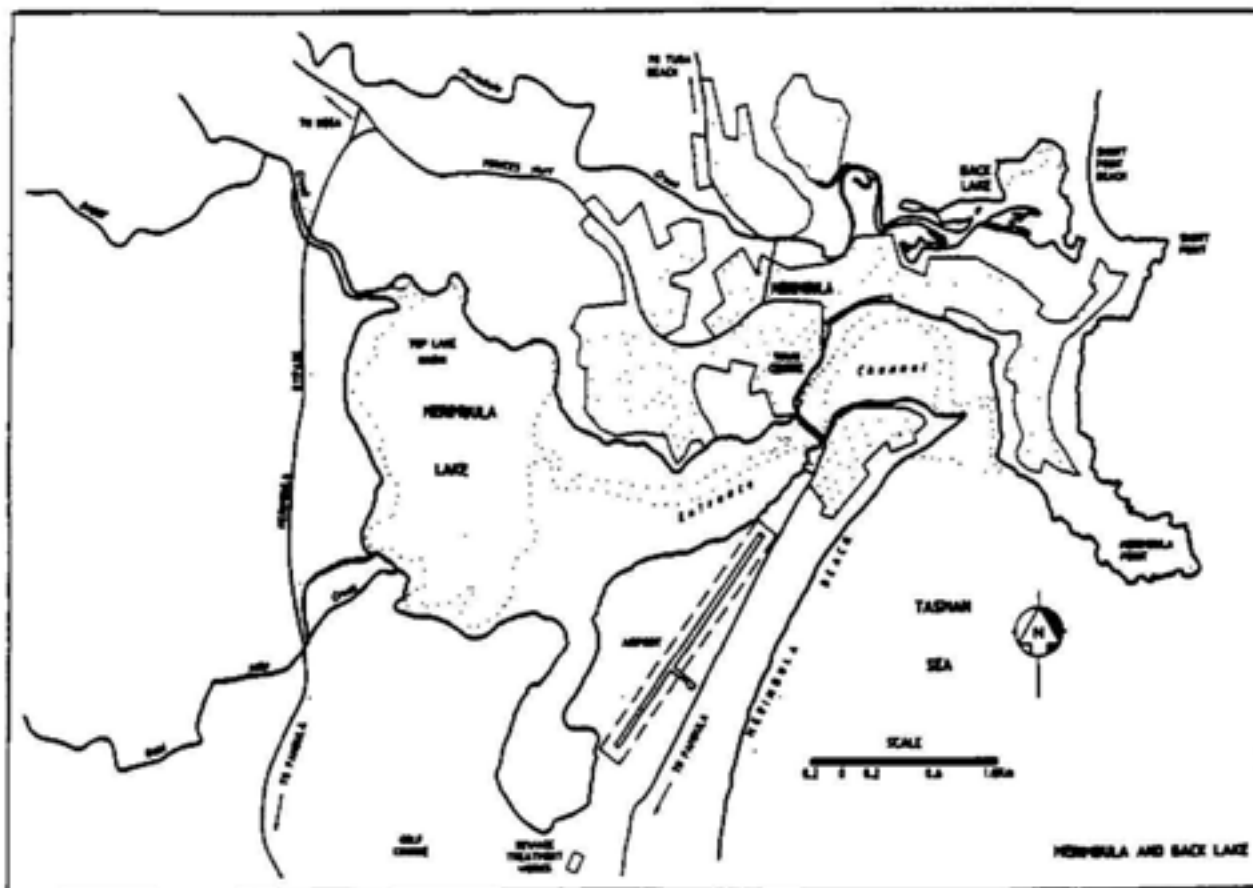
Having completed an investigation of estuary processes and received comment from the community and members of the Estuary Management Committee, management strategies for action were developed. Comment on the Draft Management Study and Plan was sought from individuals within the community and from interest groups, associations and government agencies. Responses received as a result of exhibition of the draft documents were addressed by the Estuary Management Committee and incorporated in the Management Plan for each lake. This Management Plan was then adopted by Council at their meeting on 17 December 1996.

# MANAGEMENT STUDY SUMMARY

## INTRODUCTION

This Management Study Summary outlines key features of Merimbula and Back Lakes, and summarises the issues, objectives and management options reviewed during formulation of the Merimbula Lake and Back Lake Estuary Management Plan. Details of the Plan formulation can be found in the Merimbula Lake and Back Lake Management Study.

Merimbula Lake and Back Lake are NSW estuaries on the far South Coast near the town of Merimbula. The catchments of both lakes are within Bega Valley Shire.



## MERUMBULA LAKE - KEY FEATURES

Merimbula Lake is a moderate sized estuary with a waterway area of some 450 ha and a total volume of around 12 500 ML. (One megalitre (ML) is approximately the volume of an olympic swimming pool.) The lake entrance is permanently open, narrow at the ocean, but increasing in width upstream. The Top Lake basin is two kilometres wide and up to 9 m deep.

Because of the entrance and basin shape the lake has very good tidal flushing. Each week tidal flows through the entrance are approximately equal to twice the total volume of the lake. Lake water quality is therefore usually very similar to the ocean. The catchment is not large, 4300 ha, and it is only for a few days after very heavy rain that catchment runoff affects lake water quality.

In response to the clear ocean waters, shallow areas in the lake support extensive seagrass meadows. Over 50% of the lake is covered, the fourth largest beds on the NSW South Coast. The lake foreshores and tributary streams also support fringing mangrove, saltmarsh and freshwater wetland areas. The lake fauna is both diverse and abundant, and includes most popular estuarine recreational fish species.

Merimbula is also a regionally important tourist and oyster aquaculture centre. Recreational activities are centred around the lake entrance area, the town centre and sheltered estuary beaches. Recent lifting of the "dangerous" classification from the entrance bar has led to an increase in recreational and commercial boating, although this has been restricted by lack of suitable facilities. The aquaculture industry benefits from the very good water quality and facilities provided by the town.

## BACK LAKE - KEY FEATURES

Back Lake is very different to Merimbula Lake. Back Lake is a small estuary with a waterway area of 30 ha and an average volume around 500 ML. The ocean entrance is only occasionally open, about twice a year for around a week each time. Because of this tidal flows are small.

Back Lake catchment is similar in size and has a similar level of development to the Merimbula Lake catchment. This makes the catchment large in comparison to the lake size. Consequently, annual catchment runoff into the lake and breakout flows after entrance opening are greater than tidal flows. Back Lake water quality is therefore highly dependent on the quantity and quality of water from the catchment.

Immediately after the entrance closes, water quality in the lake is similar to the ocean. As catchment runoff gradually fills the lake, the lake becomes less salty, but nutrients and sediments are progressively added and bacteria levels can become high (particularly after rain). By the time the lake reaches the beach (dune) level, or the opening level set by Council, the lakes water is nearly fresh.

The change in salinity affects aquatic plant growth and is important in the life cycles of many aquatic animals including bird and fish species. The increase in nutrients is responsible for seagrasses covering up to 65% of the lake bed. However, if nutrient input levels increase excessively, or flushing opportunities decrease, algal blooms could occur. Similarly, excessive sediment inputs could affect seagrasses and the lake ecology. Excessive bacteria levels affect human health and recreational use.

## CATCHMENT DEVELOPMENT - KEY FEATURES

The Merimbula area has an estimated permanent population of 6500 which has been growing at a rate of around 6% per annum. During the summer holiday period the population more than doubles.

Catchment development is mainly concentrated around the Merimbula Lake entrance but has expanded over recent years to include the northern foreshore of the Top Lake and the hills surrounding Back Lake. In addition to the existing development, there are at least a thousand additional lots already zoned for residential development, mostly in the Back Lake catchment. Therefore, if the existing growth rates continue the population could exceed 10 000 within 8 years

In response to continuing growth pressures there have been a number of general and specific development proposals with the potential to impact on the lakes. These include:

- general proposals for a boating facility downstream of the bridge,
- redevelopment of the Merimbula Lake entrance foreshores,
- expansion of hanger and taxiway facilities at the airport,
- expansion of Pambula-Merimbula Golf Club,
- development of more farmlets and tourist facilities west of Merimbula Lake,
- development of a fish farm at the mouth of Boggy Creek,
- development of land zoned for residential development near Top Lake,
- redevelopment of the Town Centre to include a foreshore park and a town square,
- development of existing vacant urban allotments within the lake catchments,
- development of large areas of land zoned residential, immediately north and west of Back Lake.

## MANAGEMENT ISSUES

In response to development pressures and as a result of existing catchment development, a number of management issues have been identified. These issues have been set out in the attached series of Maps:

- Issues Map 1: Merimbula and Back Lakes, Base Map and Wider Catchment,  
Issues Map 2: Merimbula Lake, Entrance Area,  
Issues Map 3: Merimbula Lake, Top Lake Area,  
Issues Map 4: Back Lake.

To assist with the process of examining issues and determining management strategies, the Management Issues have been grouped into nine categories. These categories cover:

- Habitat Conservation,
- Water Quality,
- Erosion/Sedimentation,
- Waterway Access,
- Visual Amenity,
- Foreshore Erosion,
- Aquaculture and Commercial Fishing,
- Entrance Conditions and Entrance Opening,
- Community Involvement and Support.

# ESTUARY MANAGEMENT PLAN

## MANAGEMENT OBJECTIVES

The following management objectives were identified in relation to the major management issues.

### *Estuarine Habitat Conservation:*

- to preserve the abundance and diversity of estuarine flora and fauna,
- to maintain the productivity of the system for aquaculture, fishing and tourism.

### *Water Quality:*

- to maintain water quality at a level which protects ecological, recreational and aesthetic values in line with Australian Water Quality Guidelines for Fresh and Marine Waters,
- to determine an accurate picture of lake water quality and the nature of any pollutant sources.

### *Erosion/Sedimentation:*

- to reduce the rate of sediments entering the lakes to around pre-development levels,
- to restore where possible silted and degraded areas.

### *Waterway Access:*

- to improve waterway access for all lake users without adversely impacting on significant habitat areas or use and enjoyment of the lakes by others.

### *Visual Amenity:*

- to preserve the very high visual quality of the waterways and surrounding foreshores,
- to redress where possible the impacts of inappropriate development.

### *Foreshore Erosion:*

- to implement measures which prevent or substantially reduce the rate of erosion in an environmentally sensitive and cost effective manner.

### *Aquaculture and Commercial Fishing:*

- to resolve use conflicts between recreational waterway users and the oyster industry in Merimbula Lake and the fishing industry in Back Lake,
- to ensure water quality and estuarine habitat are maintained so as to preserve the abundance and diversity of aquatic flora and fauna (with particular emphasis on commercial species).

### *Entrance Conditions/Entrance Opening:*

- to maximise safety at the Merimbula Lake entrance,
- to implement an entrance opening policy for Back Lake which considers ecological impacts, recreational users, water quality, and visual and odour problems in addition to flood mitigation.

### *Community Involvement and Support*

- to facilitate implementation by increasing community awareness, support and involvement,
- to balance development expectations with other lake management objectives,
- to investigate the transfer of existing development opportunities from sensitive foreshore and waterway areas to more suitable sites.

## MANAGEMENT OPTIONS AND THE ESTUARY MANAGEMENT PLAN

Based on the issues and objectives, a range of management options were developed, including planning controls, physical works, education, monitoring and further studies. The attached series of "Options Maps" outlines the options examined and covers the same geographic areas as presented in the Issues Maps:

- Options Map 1: Merimbula and Back Lakes, Base Map and Wider Catchment,
- Options Map 2: Merimbula Lake, Entrance Area,
- Options Map 3: Merimbula Lake, Top Lake Area,
- Options Map 4: Back Lake.

Comment on the management options was sought from the community, interest groups and government agencies. The responses were incorporated into the Management Plan which was adopted by Council on 17 December 1996. This Plan, including the prioritised management strategies adopted by Council, plus costing and funding information, is presented in the following Estuary Management Plan table (over).

Most of the management strategies adopted in the Plan should attract some level of State or Federal Government funding. Generally the level of funding for State Government programs such as the Estuary Management Program (EMP) or the Waterways Infrastructure Development Program (WIDP) is 50%. Funding levels for Federal Government programs, such as the Landcare and the Environment Action Program (LEAP) or the Jobskills Program can be much higher.

On a priority basis the value of the management strategies recommended in the Merimbula Lake and Back Lake Estuary Management Plan for the next four years can be divided into:

Very High	\$1,060,000
High	\$1,085,000
Moderate	\$805,000

There are also a number of strategies, particularly Planning Controls, for which no estimate of cost can be made. For example the provision of vegetation corridors along drainage paths has a cost to the developer in terms of lost allotment space. However, it also has a far greater value in the protection of estuarine habitats and ecosystems, and in the achievement of ecologically sustainable development.

The Estuary Management Plan is intended to be a dynamic planning instrument. To remain current and useful, the Plan needs to be updated as new data and analyses become available and community perceptions change. Not all the recommendations in the Plan will be implemented concurrently, and the passage of time may date the priority list and options initially adopted.

Monitoring of Plan implementation and of its effect on the environment of the lakes is essential if the base knowledge on which planning decisions are made is to improve. This particularly applies to lake water quality for which identified guideline conditions exist. It could also be extended to include habitat mapping and monitoring and user/tourist surveys of facilities, etc., although initial baseline surveys would be required.

The implementation of the Management Plan is mainly the responsibility of Bega Valley Shire Council (through its nominated committee). However, the environment of the Merimbula Lake and Back Lake Estuary is the heritage of all the people of the area. It is through all individuals, organisations, businesses and Government authorities that the plan should be implemented.



## MERIMBULA LAKE AND BACK LAKE ESTUARY MANAGEMENT PLAN

Management Strategies	Implementation	Responsible Authority	Estimated Cost	Possible Funding Source	Priority	Note
<b>HABITAT CONSERVATION:</b>						
Zone waterway areas.	Change Local Environmental Plan	Council	nominal	Council	high	B
Zone foreshores and sensitive areas for environmental protection.	Amend LEP	Council	indeterminant	Developer, Council, Crown	very high	B
Require vegetation corridors along streams and drainage paths.	Introduce development controls	Council	indeterminant	Developer, Council, Crown	very high	B
Extend fencing/boardwalk program.	Construct fencing & boardwalks	Council	\$200,000	Council, Jobskills	high	B
Control weeds in foreshore bushland.	Clear weeds with community support	Council	\$20,000	Council, LEAP**	high	B
Erect signs near sensitive habitat areas.	Erect signs	Council	\$5,000	Council, EMP*	high-low	B
Investigate & re-map seagrass and wetland areas.	Survey & study areas	Council	\$10,000	Council	high	B
Undertake fauna studies of forest areas.	Undertake scientific studies	Council	\$25,000	Council, landowners	high	B
<b>WATER QUALITY:</b>						
Adopt ANZECC Guidelines.	Council resolution	Council	no cost		very high	B
Establish catchment runoff controls.	Introduce development controls	Council	indeterminant	significant developer costs	very high	B
Construct & maintain pollution controls structures for urban and infrastructure developments.	Construct GPT, sediment basins, etc.	Council	\$50,000 pa	Council, developers, EMP	very high	B
Monitor lake catchment runoff and water quality.	Ongoing WQ sampling & testing study	Council	\$20,000 pa	Council, EMP, Streamwatch	very high	B
Review settling pond performance at Top Lake.	Investigation pond operation	Council	\$5,000	Council, developer, EMP	moderate	M
Undertake community education on water pollution.	Newsletters & Meetings	Council	\$5,000 pa	Council, EMP	moderate	B
Review water pollution disaster plan.	Review plans	Waterways	\$10,000	Waterways Authority	high	B
<b>EROSION/SEDIMENTATION:</b>						
Establish soil and water management controls.	Introduce development controls	Council	indeterminant	Significant developer costs	very high	B
Allow only essential clearing.	see Habitat Conservation					B
Construct sediment traps.	see Water Quality					B



### MERIMBULA LAKE AND BACK LAKE ESTUARY MANAGEMENT PLAN

Management Strategies	Implementation	Responsible Authority	Estimated Cost	Possible Funding Source	Priority	Note
Locate and treat active erosion.	Establish Landcare Group	Dept. L&WC	\$500,000	Landowners, Landcare	very high	B
Undertake maintenance dredging.	Prepare REF & dredge	Council	\$250,000	Council, EMP	moderate	B
Establish Foreshores Committee as umbrella group.	Council resolution	Council	nominal costs		very high	B
Undertake land use education program for rural owners.	Newsletters and meetings	Council	\$10,000 pa	Council, EMP	moderate	B
Monitor water turbidity	see Water Quality					B
<b>WATERWAY ACCESS:</b>						
Acquire selected foreshore areas for recreation.	Investigate and purchase	Council	indeterminant	Council	low	B
Undertake maintenance dredging at boat ramp.	Undertake investigation & works	Council	\$100,000	Council, WIDP*	very high	M
Develop/improve walkways in foreshore zone.	Construct walkways	Council	\$300,000	Council, Jobskills	high	B
Improve recreational user facilities & amenities.	Construct fishing platforms, tables, etc.	Council	\$50,000 pa	Council, Jobskills, WIDP	high	B
Create waterway access areas along walkways.	Construct platforms, parking & facilities, etc.	Council	\$200,000	Council, Jobskills, WIDP, EMP	very high to high	B
Limit disturbance to wetland.	Erect barriers	Council	\$15,000	Council, EMP	high	B
Investigate location for larger vessel facilities.	Undertake investigation with boaters	Council	\$25,000	Council, WIDP	very high	M
Investigate possible boating facilities for Back Lake and Top Lake.	Undertake investigation	Council	\$20,000	Council, WIDP	high	B
Survey user boating/recreational requirements.	Survey users with boat owners	Council	\$20,000	Council, WIDP	high	M
<b>VISUAL AMENITY:</b>						
Develop a system of visual management.	Prepare Development Control Plan	Council	nominal	Council	very high	B
Review environmental impacts of Back Lake sewer crossing	Prepare REF or EIS	Council	\$60,000	Developers	high	B.L
Undertake works to improve visual amenity downstream of bridge.	Develop Town Square or similar	Council	\$300,000 for Town Square	Council, developers, LEAP, EMP	moderate	M
Develop new walkway viewing locations.	see Waterway Access					B
*Implement visual enhancement program.	Undertake works with community	Council	nominal		high	B

## MERIMBULA LAKE AND BACK LAKE ESTUARY MANAGEMENT PLAN

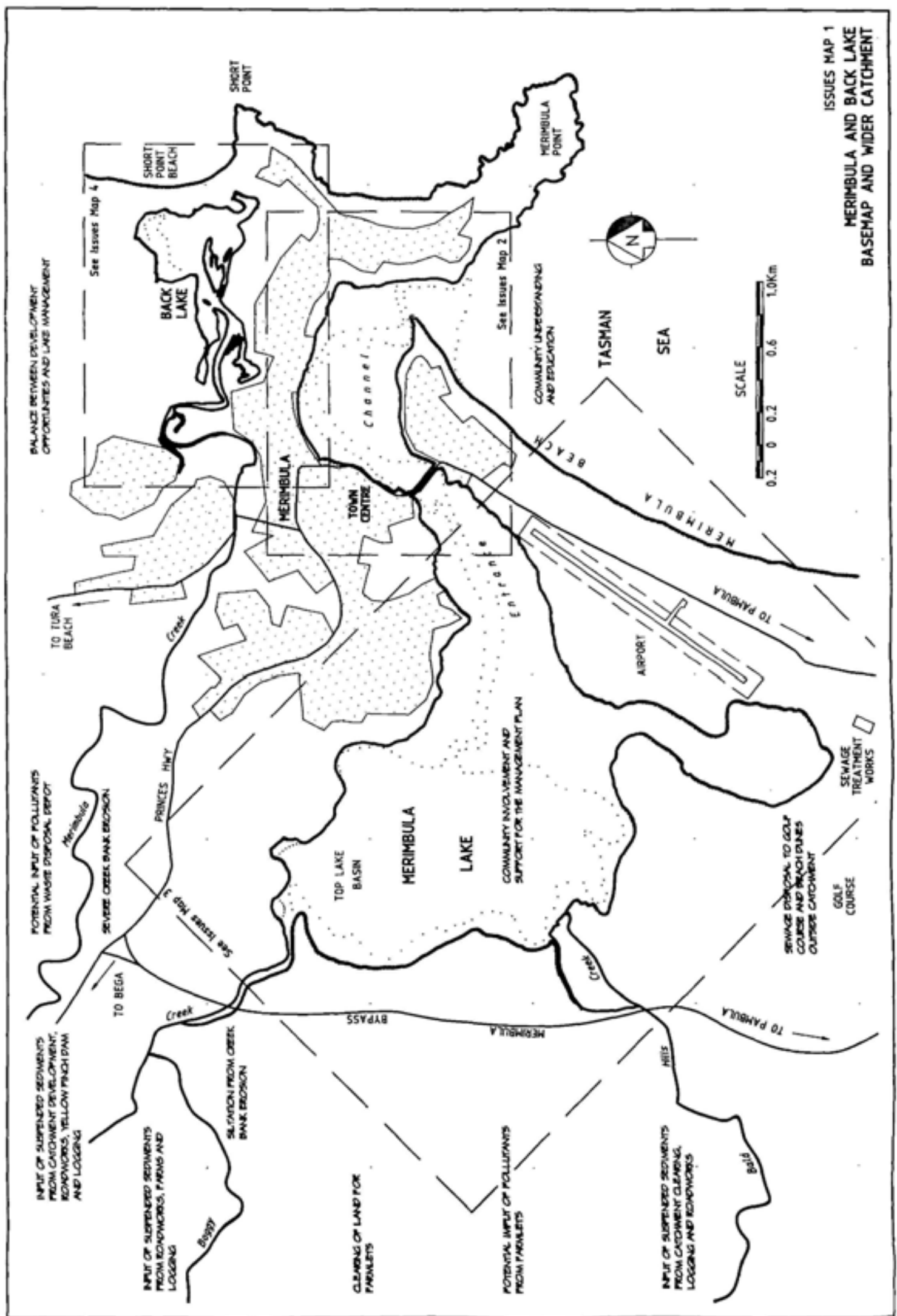
Management Strategies	Implementation	Responsible Authority	Estimated Cost	Possible Funding Source	Priority	Note
<b>FORESHORE EROSION:</b>						
Repair existing log retaining wall.	Undertake repair works	Council	\$80,000	Council, Jobskills	very high	M
Redevelop foreshores along Merimbula Lake entrance.	Construct soft bank protection works	Council	\$200,000	Council, Jobskills	moderate	M
Establish foreshore erosion monitoring program.	Survey erosion	Council	nominal	Council	high	M
<b>AQUACULTURE AND COMMERCIAL FISHING:</b>						
Implement management strategies to protect water quality and habitat.	see Habitat Conservation					B
Prepare fishery management plan for lakes.	Study fishery	NSW Fisheries	\$20,000	Fisheries	high	B
<b>ENTRANCE CONDITIONS/ENTRANCE OPENING:</b>						
Develop and implement comprehensive entrance opening strategy for Back Lake.	Prepare REF & Council resolution	Council	\$5,000	Council, EMP	very high	B.L
Monitor Back Lake water levels & entrance openings	install recording & monitoring procedures	Council	\$5,000 pa	Council, EMP	very high	B.L
Provide entrance bar warning at appropriate locations.	Erect signs	Waterways	nominal	Waterways Authority	very high	M
<b>COMMUNITY INVOLVEMENT AND SUPPORT</b>						
Investigate exchange of land requiring environmental or foreshore protection	Planning Study	Council	\$50,000	Council, EMP	very high	B
Investigate partial rezoning to increase foreshore and waterway protection	Planning study	Council	indeterminant	developer/landowner	very high	B
Implement education and community assistance programs	see previous Strategies					B
Involve community in implementation of the Plan	Estuary Management Committee	Council	minimal		very high	

B = Both Lakes      M = Merimbula Lake      B.L = Back Lake

\* LEAP - Landcare & Environment Action Program, Commonwealth Government

EMP - Estuary Management Program, NSW Government

WDP - Waterways Infrastructure Development Program, NSW Government



BALANCE BETWEEN DEVELOPMENT OPPORTUNITIES AND LAKE MANAGEMENT

See Issues Map 4

See Issues Map 2

See Issues Map 3

COMMUNITY INVOLVEMENT AND SUPPORT FOR THE MANAGEMENT PLAN

COMMUNITY UNDERSTANDING AND EDUCATION

POTENTIAL INPUT OF POLLUTANTS FROM WASTE DISPOSAL DEPOT

SEVERE CREEK BANK EROSION

INPUT OF SUSPENDED SEDIMENTS FROM CATCHMENT DEVELOPMENT, ROADS, FIELDS, LOGGING AND LOGGING

INPUT OF SUSPENDED SEDIMENTS FROM ROADS, FIELDS AND LOGGING

SILTATION FROM CREEK BANK EROSION

CLEARING OF LAND FOR PANELS

POTENTIAL INPUT OF POLLUTANTS FROM PANELS

INPUT OF SUSPENDED SEDIMENTS FROM CATCHMENT CLEARING, LOGGING AND ROADS

SEWAGE DISPOSAL TO GOLF COURSE AND BEACH DUNES OUTSIDE CATCHMENT

SEWAGE TREATMENT WORKS

SCALE

0.2 0 0.2 0.6 1.0km



TASMAN SEA

SEA

BEACH

MERIBULLA

TO PAMBULA

AIRPORT

TO PAMBULA

HILLS

Bega

BYPASS

MERIBULLA

Creek

TO BEGA

TO TURA BEACH

Creek

PRINCES HWY

Meribulla

MERIBULLA

TOWN CENTRE

Canal

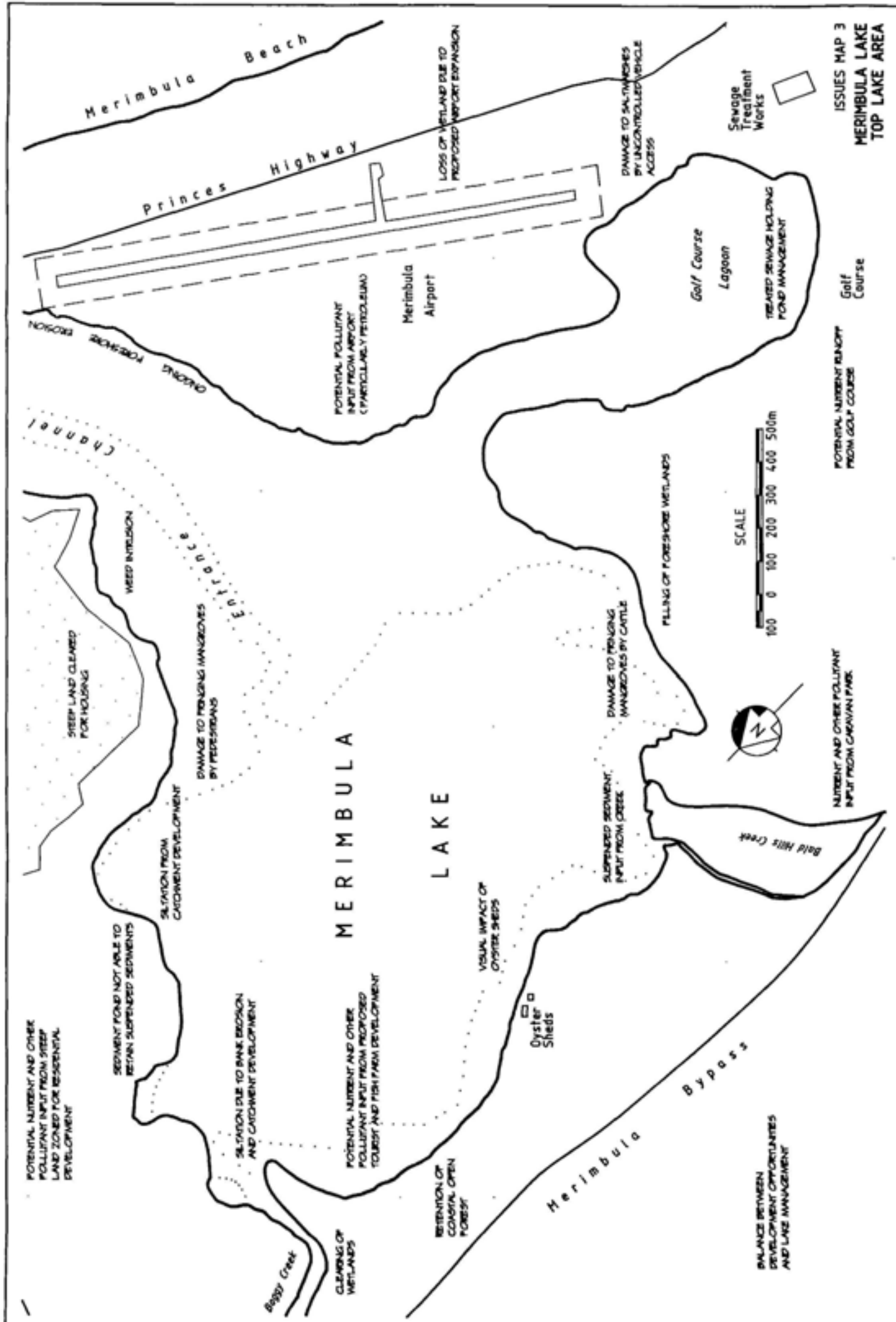
BACK LAKE

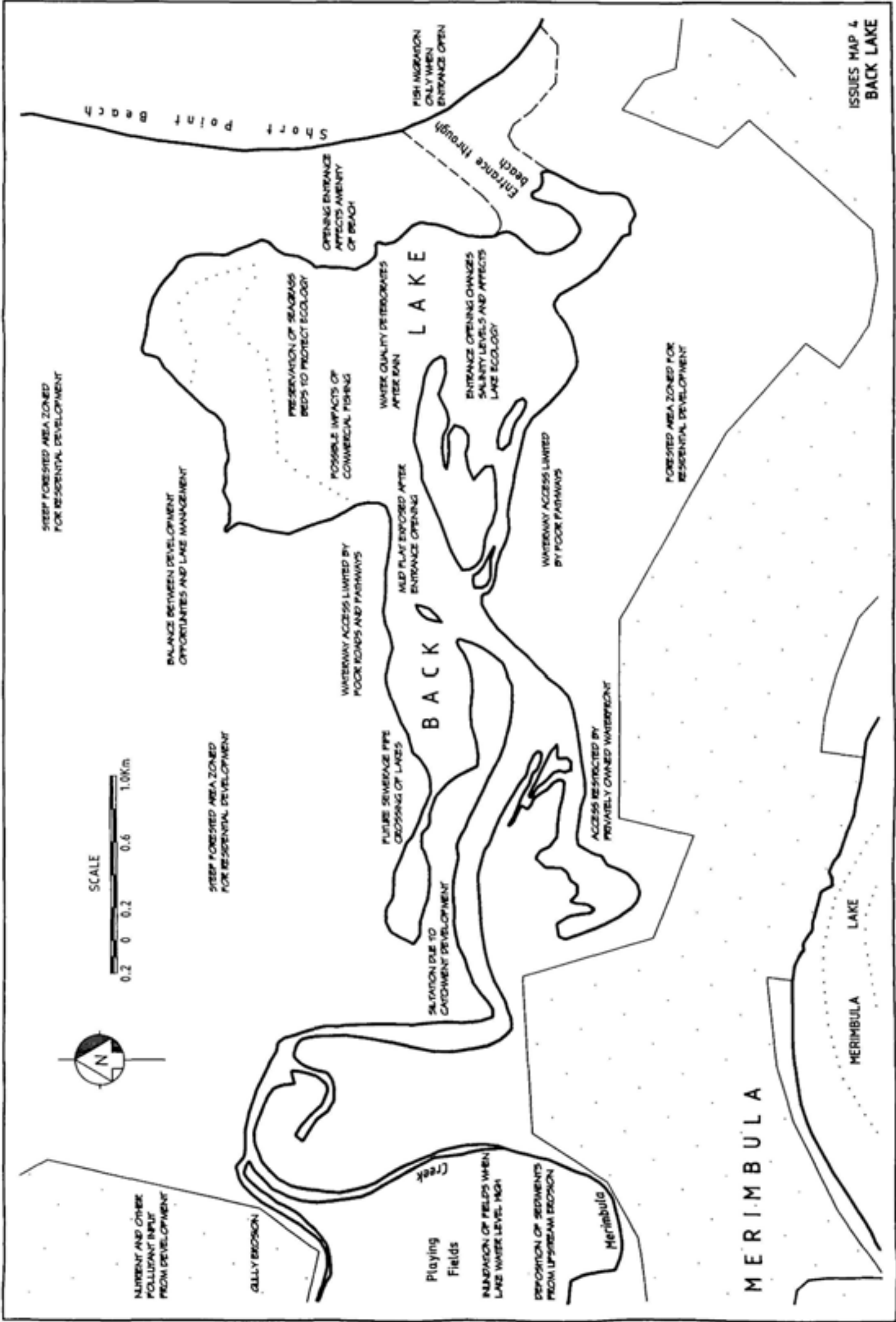
SHORT POINT BEACH

SHORT POINT

MERIBULLA POINT







SHEEP FORESTED AREA ZONED FOR RESIDENTIAL DEVELOPMENT

BALANCE BETWEEN DEVELOPMENT OPPORTUNITIES AND LAKE MANAGEMENT

SHEEP FORESTED AREA ZONED FOR RESIDENTIAL DEVELOPMENT

WATERWAY ACCESS LIMITED BY POOR ROADS AND PATHWAYS

FUTURE SEWERAGE PIPE CROSSING OF LAKES

SILTATION DUE TO CATCHMENT DEVELOPMENT

NUTRIENT AND OTHER POLLUTANT INPUT FROM DEVELOPMENT

GULLY EROSION

Merimbula Creek

PLAYING FIELDS

INUNDATION OF FIELDS WHEN LAKE WATER LEVEL HIGH

DEPOSITION OF SEDIMENTS FROM UPSTREAM EROSION

Merimbula

MERIMBULA

MERIMBULA LAKE

FORESTED AREA ZONED FOR RESIDENTIAL DEVELOPMENT

LAKE

BACK

Entrance through Beach

PUSH MIGRATION ONLY WHEN ENTRANCE OPEN

OPENING ENTRANCE AFFECTS AMENITY OF BEACH

PRESERVATION OF SEAGRASS BEDS TO PROTECT ECOLOGY

POSSIBLE IMPACTS OF COMMERCIAL FISHING

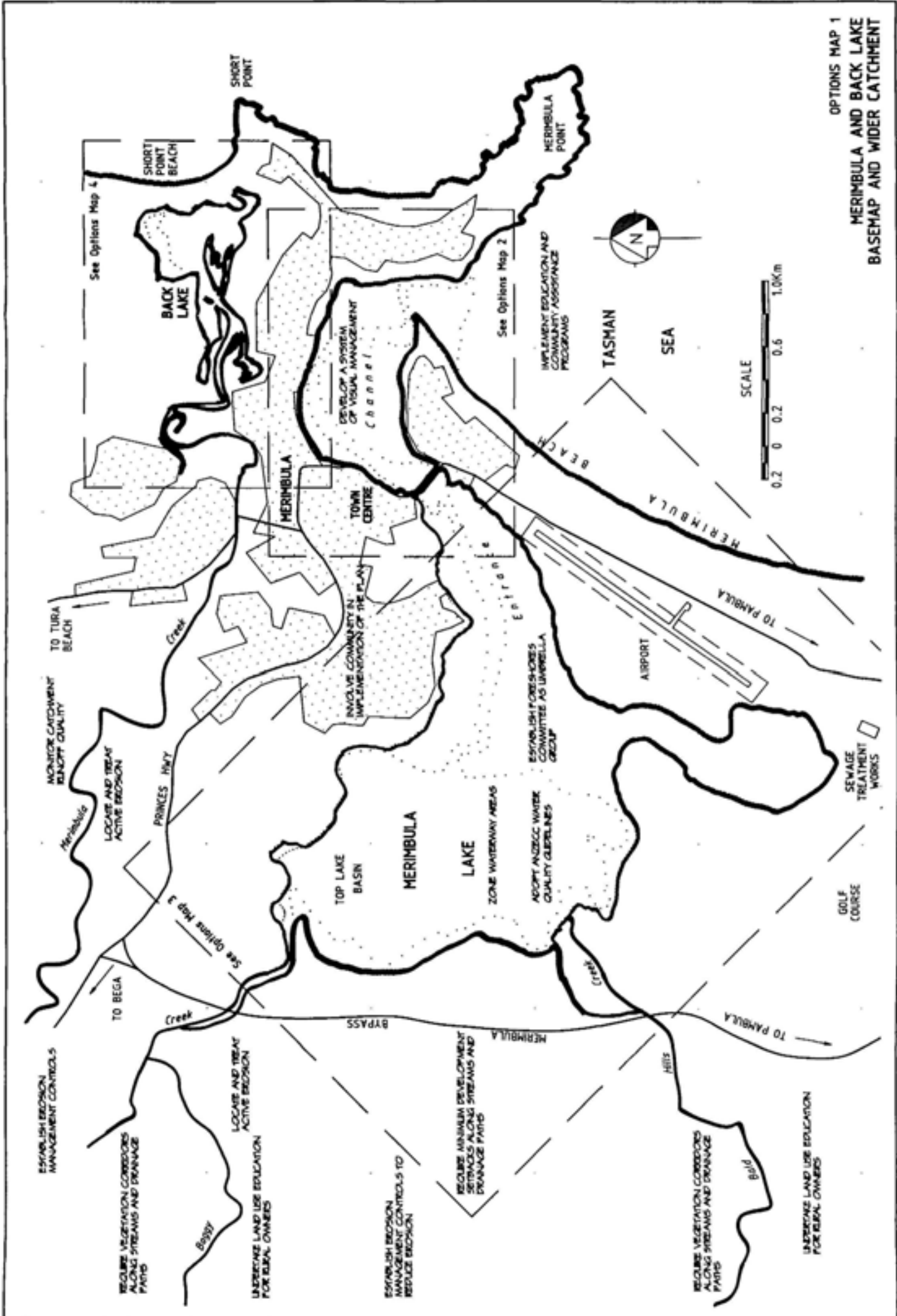
WATER QUALITY DETERIORATES AFTER RAIN

ENTRANCE OPENING CHANGES SALINITY LEVELS AND AFFECTS LAKE ECOLOGY

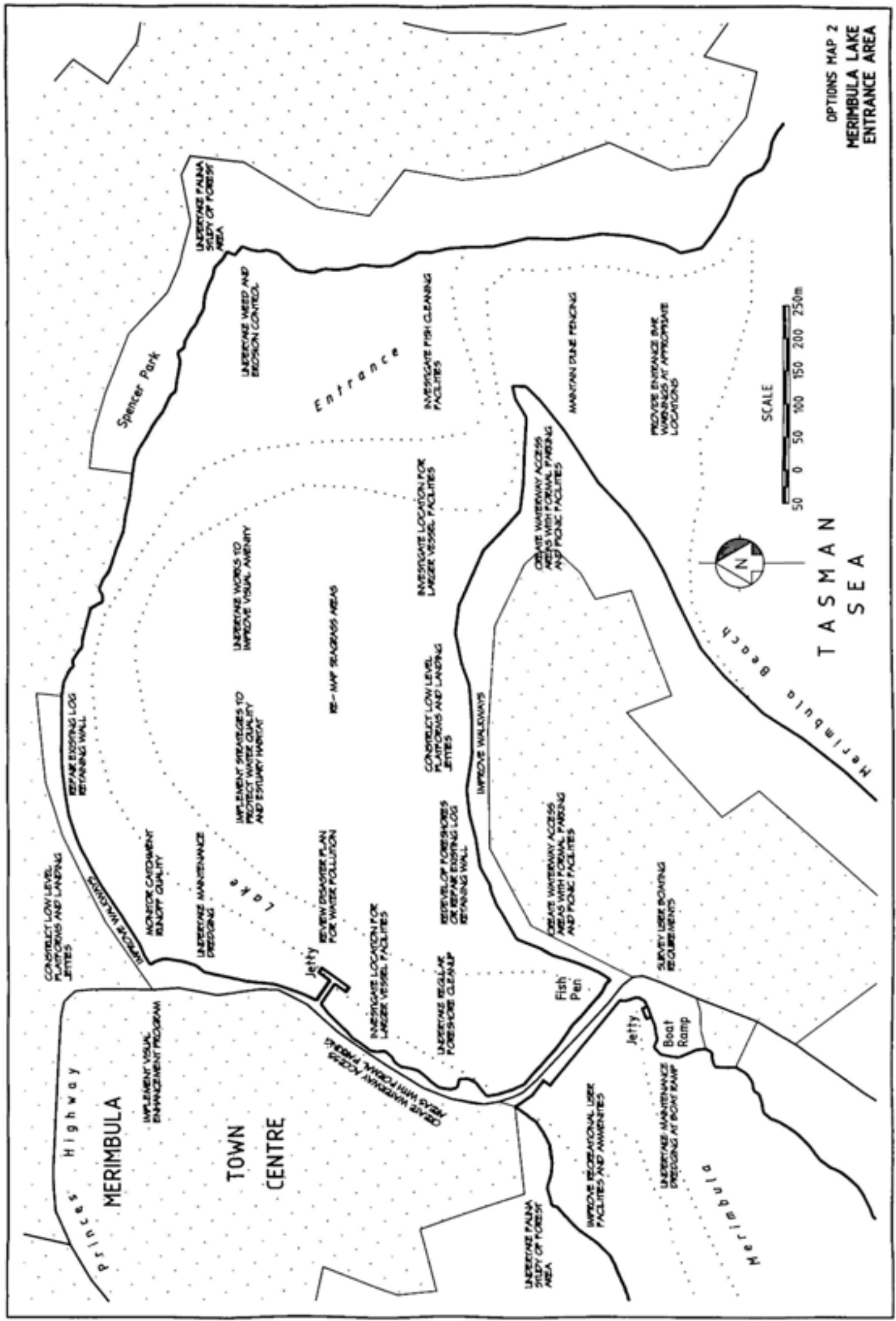
WATERWAY ACCESS LIMITED BY POOR PATHWAYS

MUD PLAY EXPLORED AFTER ENTRANCE OPENING

ACCESS RESTRICTED BY PRIVATELY OWNED WATERFRONT







CONSTRUCT LOW LEVEL PLATFORMS AND LANDING JETTIES

Princes Highway

MERIMBULA

IMPLEMENT VISUAL ENHANCEMENT PROGRAM

TOWN CENTRE

REPAIR EXISTING LOG RETAINING WALL

MONITOR CATCHMENT RUNOFF QUALITY

UNDER TAKE MAINTENANCE PREDISING

IMPLEMENT STRATEGIES TO PROTECT WATER QUALITY AND ESTUARY HABITAT

UNDER TAKE WORKS TO IMPROVE VISUAL AMENITY

Spencer Park

UNDER TAKE PALMA STUDY OF FOREST AREA

UNDER TAKE WEED AND BRUSH CONTROL

Entrance

REVIEW DISASTER PLAN FOR WATER POLLUTION

Jetty

INVESTIGATE LOCATION FOR LARGER VESSEL FACILITIES

UNDER TAKE REGULAR FORESHORE CLEANUP

REDEVELOP FORESHORES OR REPAIR EXISTING LOG RETAINING WALL

CONSTRUCT LOW LEVEL PLATFORMS AND LANDING JETTIES

INVESTIGATE LOCATION FOR LARGER VESSEL FACILITIES

INVESTIGATE FISH CLEANING FACILITIES

UNDER TAKE PALMA STUDY OF FOREST AREA

IMPROVE RECREATIONAL USER FACILITIES AND AMENITIES

Jetty

Fish Pen

CREATE WATERWAY ACCESS AREAS WITH FORMAL PARKING AND PICNIC FACILITIES

IMPROVE WALKWAYS

MAINTAIN DUNE FENCING

PROVIDE ENTRANCE BAY WARNINGS AT APPROPRIATE LOCATIONS

SURVEY USER BOATING REQUIREMENTS

Boat Ramp

UNDER TAKE MAINTENANCE PREDISING AT BOAT RAMP

Merimbula

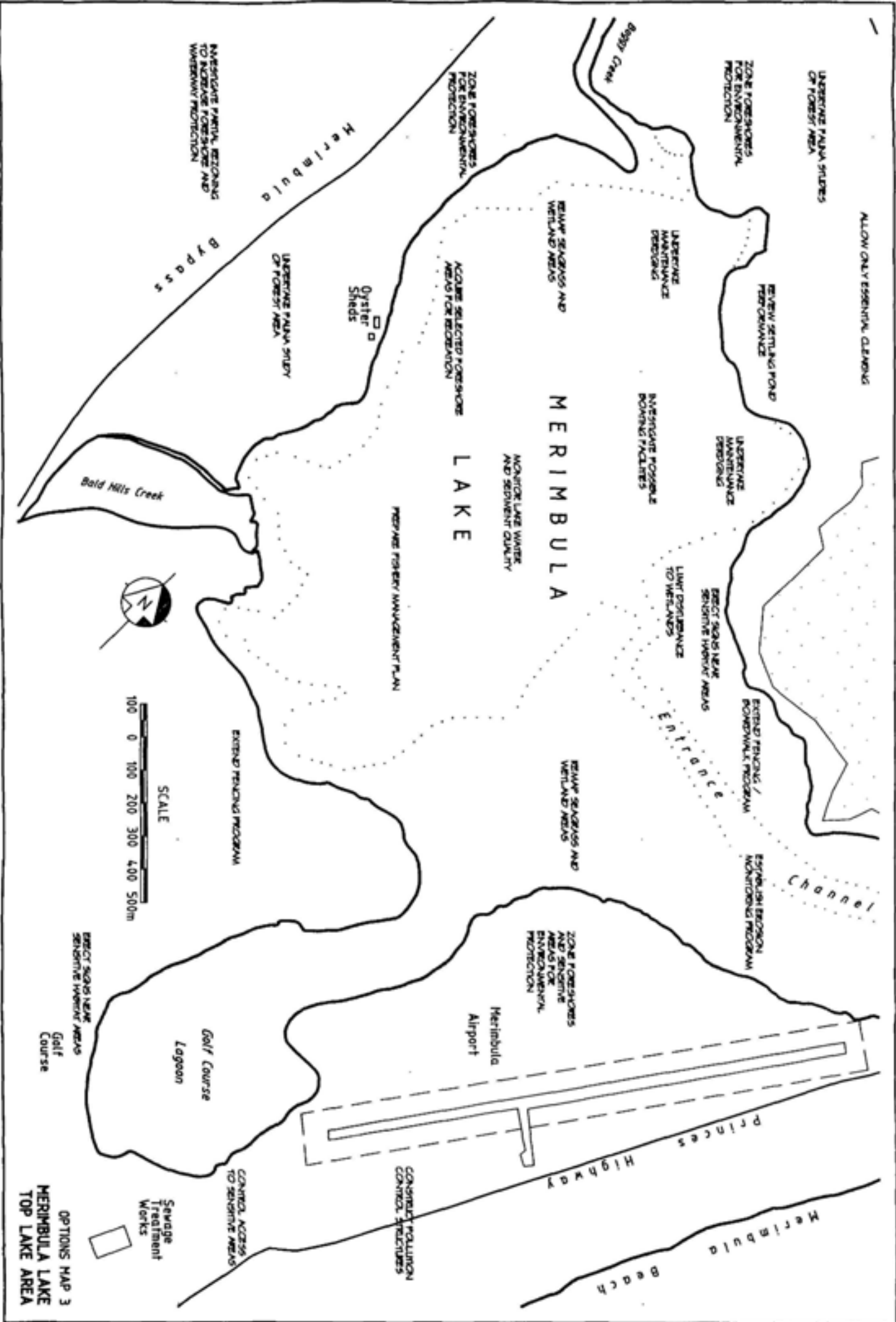
Merimbula Beach



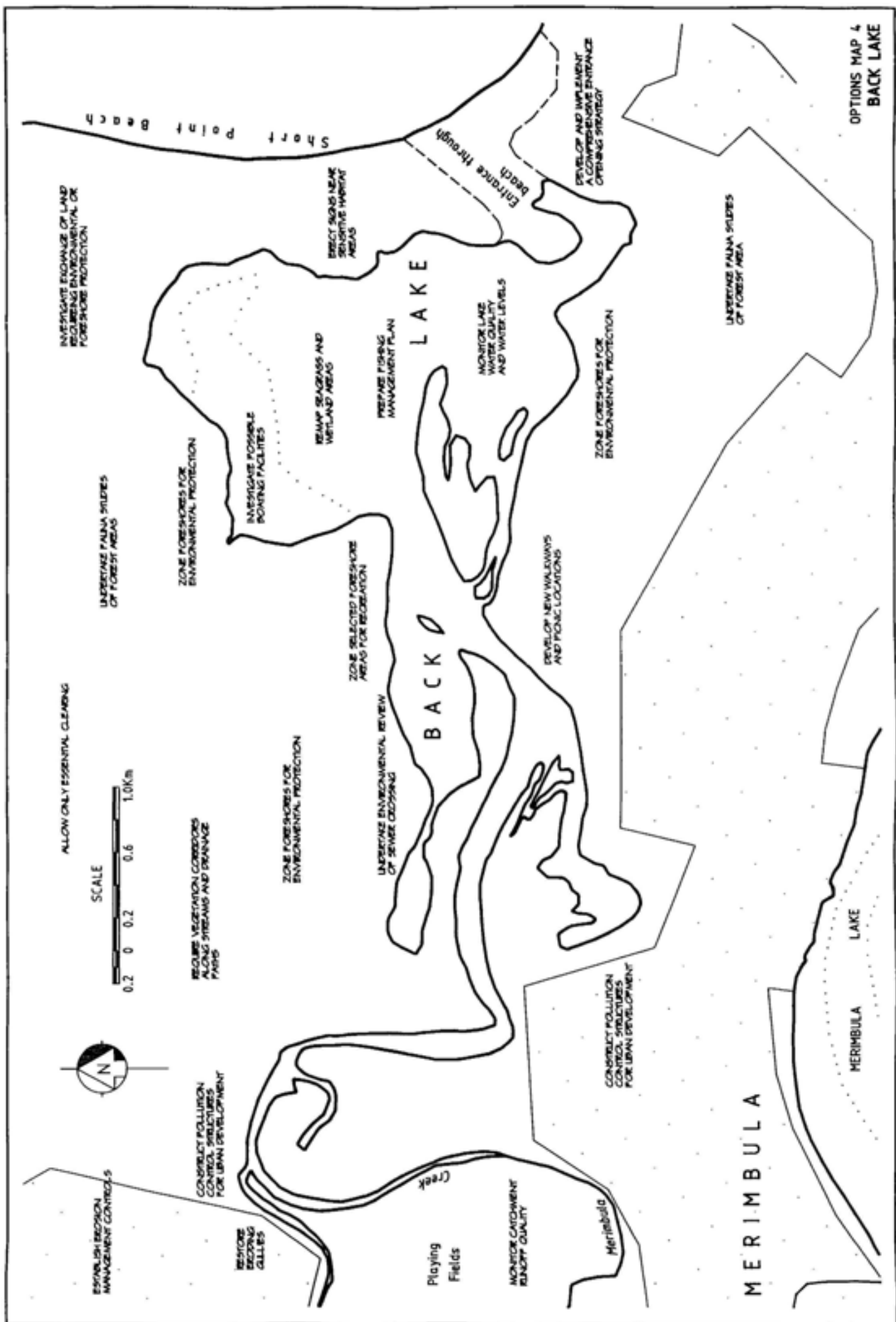
SCALE



TASMAN SEA



OPTIONS MAP 3  
 MERIMBULA LAKE  
 TOP LAKE AREA



ALLOW ONLY ESSENTIAL CLEARING

SCALE



ESTABLISH REGIONAL MANAGEMENT CONTROLS

CONSTRUCT POLLUTION CONTROL STRUCTURES FOR URBAN DEVELOPMENT

REQUIRE VEGETATION CORRIDORS ALONG STREAMS AND DRAINAGE PATHS

ZONE FORESHORES FOR ENVIRONMENTAL PROTECTION

ZONE SELECTED FORESHORE AREAS FOR RECREATION

UNDERTAKE ENVIRONMENTAL REVIEW OF SEWAGE CESSPINGS

ZONE FORESHORES FOR ENVIRONMENTAL PROTECTION

INVESTIGATE POSSIBLE BOATING FACILITIES

REMAP SEAGRASS AND WETLAND AREAS

PREPARE FISHING MANAGEMENT PLAN

MONITOR LAKE WATER QUALITY AND WATER LEVELS

ZONE FORESHORES FOR ENVIRONMENTAL PROTECTION

UNDERTAKE FAUNA STUDIES OF FOREST AREA

MERIMBULA

MERIMBULA LAKE

LAKE

BACK

LAKE