LESCHENAULT INLET MANAGEMENT AUTHORITY,

CITY OF BUNBURY,

SHIRE OF HARVEY

AND

SHIRE OF DARDANUP

COLLIE RIVER ISLANDS
DRAFT MANAGEMENT GUIDELINES

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COLLIE RIVER ISLANDS DRAFT MANAGEMENT GUIDELINES

Report to the Leschenault Inlet Management Authority, City of Bunbury, Shire of Harvey and Shire of Dardanup

Prepared by E Wright, C Derrington and L Barrett

Waterways Commission
216 St Georges Terrace
Perth WA 6000

Report No 58,
November, 1995

ACKNOWLEDGMENTS

The members of the working group assisted with preparation of the recommendations.

Staff of the Waterways Commission assisted with information included in this report, and with editing the document.

Dr Michael Walker assisted with the collection and identification of vegetation samples and with the survey of the three islands.

Maps and plans prepared by Brett Harrison.

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FOREWORD

The waterways and foreshores of the Leschenault Estuary and associated rivers combine to form a singular significant conservation resource providing a recreation focus for the Bunbury region.

The Collie River Islands, that is, Bar Island, Alexander Island and Snake Island, contain some of the least used and isolated river foreshore in the region. With access only by boat, few people have visited the Islands and generally there is little understanding within the community of the conservation and ecosystem values of the Islands.

The Islands provide a refuge for waterbirds, both local and migratory. River foreshores close to the Estuary are under intense pressure for development and recreational use, and safe breeding and roosting areas for waterbirds around the Estuary are decreasing.

The purpose of these management guidelines is to identify the environmental values of the Islands, and integrate these with the recreational and amenity needs of the community to maintain and enhance their conservation values.

These draft management guidelines have been prepared by a working group involving the local community. The guidelines are designed to promote a better understanding of the area and to provide a formal agreement between all the parties involved on how the area is to be used and managed.

It is the aim of the guidelines to develop the recreational and conservation opportunities of the Islands, and to protect fringing vegetation, and riverbank and foreshore stability. In order to achieve these objectives a series of recommendations has been developed. It is intended that these recommendations be implemented over a five year period, and to involve the community as much as possible in actively managing the area.

We urge you to read the draft guidelines and should you wish to make a submission you may use the enclosed form which has been prepared to assist in this process. We trust you will forward your comments to the Leschenault Inlet Management Authority so they may be considered before the final management guidelines are prepared.

Cr John Sabourne
Shire President
Shire of Harvey

Dr Ern Manea AM.
Mayor
City of Bunbury

Mr Vern Haley
Chairman
Leschenault Inlet Management Authority

Cr Michael Bennett
Shire President
Shire of Dardanup

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GUIDE FOR READERS

How can I make a submission

Public submissions on the Collie River Islands Draft Management Guidelines are now invited. All public submissions will be considered before preparation of the final Management Guidelines.

If you would like to make a submission towards preparation of the final document please comment on any part of the document you agree or disagree with. A tear out form is provided on the following page for this purpose. Send this to the Leschenault Inlet Management Authority by the end of March 1995 at the address provided on the top of the form. Please note that submissions do not have to be confined to the length or layout of the form provided.

If more information is required prior to making your submission, officers of the Leschenault Inlet Management Authority will be available to discuss any aspect of the draft guidelines.

Where can I get other copies of this document

Further copies of the draft management guidelines are available for viewing at:

- Local government public libraries in the Shire of Harvey, Shire of Dardanup and City of Bunbury.

Copies of the document can also be obtained free of charge from:

- Leschenault Inlet Management Authority
  Inner Harbour Road
  Bunbury
  WA 6230
  (097) 211 666

Collie River Islands Draft Management Guidelines

Public submission form

Project Officer
Collie River Islands Draft Management Guidelines
C/- Leschenault Inlet Management Authority
PO Box 261
Bunbury WA 6231

Name:.....
Title:.....
Organisation:.....
Address:.....
.....
.....

I would like to make the following comments on the Collie River Islands Draft Management Guidelines and would like them considered in the preparation of the Final Management Guidelines.

Comments:

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I would also like a copy of the Final Management Guidelines sent to the above address on its completion.

Signed

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1. INTRODUCTION

The Collie River lies in the south east region of the Leschenault catchment, where it extends beyond the township of Collie (60 km east of Bunbury), to its mouth at the Leschenault Estuary (Figure 1). There are three islands in the lower reaches of the Collie River (Figure 2). The first, Bar Island, is located in the mouth of the river in the Leschenault Estuary. The second, Alexander Island, is located approximately 2 km upstream from Bar Island and the third, Snake Island lies approximately 6 km upstream from the river mouth. These three islands differ in terms of exposure and influence from both the Collie River and Leschenault Estuary, thus explaining the differences in vegetation distribution and composition.

The Islands provide a refuge for both local and migratory waterbirds. River foreshores close to the Estuary are under intense pressure for development and recreational use, and safe breeding and roosting areas for waterbirds around the Estuary are decreasing. Occasional camping on Alexander and Bar Islands has led to the accumulation of rubbish, and the lighting of fires which has damaged vegetation.

It is important to protect and manage these Islands as they provide an opportunity to monitor and conserve foreshore vegetation and animal populations which have had minor human disturbances in comparison to the adjacent foreshore areas.

2. DEVELOPMENT OF THE PLAN

A working group was formed in March 1995 to prepare management guidelines for the Collie River Islands. The management guidelines have been prepared as a draft document to present background information, and recommendations for management and use, to the community. Once community input has been received, final management guidelines will be prepared and implemented.

2.1 Working group members

The Working Group comprises eight members drawn from the local community, the City of Bunbury, the Shire of Harvey, the Shire of Dardanup and the Leschenault Inlet Management Authority (LIMA). The owners of Alexander Island, Greycote Pty Ltd were invited to be a part of the Working Group but declined.

Mr Eric Wright	Chairman
Mr Adam Czernowski	Community Representative
Mr Kevin Carnall	Community Representative
Mrs Margaret Radge	Community Representative
Mr Kevin Ryan	Shire of Dardanup
Mr Tim Hunter	City of Bunbury
Mr Morgan Smith	Shire of Harvey
Mrs Maidee Smith	Leschenault Inlet Management Authority

2.2 Relevant studies and reports

The following studies and reports have been considered in the preparation of this draft management plan. Some of these studies influence how the area is to be managed and/or used and readers are referred to consult these reports for further information, and understanding of the approach taken with the preparation of the draft management guidelines.

Leschenault Estuary, Collie River, Preston River Regional Flood Study (George 1981)

System 6 Report (Department of Conservation and Environment 1983)

Clifton Park Foreshore Reserve Management Plan (Waterways Commission 1989)

Leschenault Waterways Management Programme (Waterways Commission 1992)

Collie and Brunswick Rivers Foreshore Study (Woodcock 1993)

Fringing Vegetation of the Lower Collie and Brunswick Rivers 1992 (Pen 1992)

Lot 131 Clifton Park Management Plan (Wright 1993)

Eaton Foreshore Draft Management Plan (Wright et al 1995)

2.3 Public consultation

The draft management guidelines are scheduled for release for public comment during December 1995. The draft guidelines will be launched at a public meeting to provide initial explanation of the guidelines and provide guidance on the contents of the document and how to make a submission. A public workshop is planned to be held during the submission period, at which members of the working group will be available to explain the draft recommendations, and to listen to additional comments and points of view from the community.

2.4 Schedule

March 1995	Form Working Group
October 1995	Draft Plan completed
November 1995	Refer Plan to local government authorities for ratification
December 1995	Release Plan for public comment
March 1996	Finalise Plan from public input
April 1996	Plan Completed
April 1996	Release Final Plan and Commence Implementation
April 2001	Review Plan

3. TERMS OF REFERENCE

The following terms of reference for the working group were prepared by Mr Eric Wright, and amended by the working group after discussion at its first meeting.

3.1 Aim

To identify issues relating to the use and management of the Collie River Islands, and to prepare recommendations for the development and maintenance of the area to protect the foreshore and river environment.

3.2 Objectives

3.2.1 Recreation

Define appropriate levels of access to and on the Islands.

3.2.2 Conservation

Protect and improve the indigenous flora and fauna on the Islands within the river system in order to maintain their natural conservation values.

3.2.3 Landscape protection

Protect the island foreshores from erosion.

Provide a mechanism for rehabilitating river bank and island foreshore vegetation.

3.2.4. General

Develop a suitable management structure for the Islands which is acceptable to landowners, local government, state agencies and the local community.

Recognise the importance of the area for the passage of floodwaters.

Ensure protection of vegetation through the control of fire.

Ensure mosquito breeding levels conform with local government and Health Department guidelines for the area.

Provide public education and information on the environmental and recreational value of the Islands.

Involve the public with the ongoing management of the Islands where appropriate in order to protect them from vandalism.

Address issues of public safety.

3.3 Study area

The study area is defined as the land area to the low water mark of the three Collie River islands, Bar Island, Alexander Island and Snake Island (see Figure 2).

4. DEFINITION OF THE STUDY AREA

4.1 Bar Island

4.1.1 Vegetation

A number of comprehensive vegetation surveys of the Leschenault catchment were undertaken by Pen (1992, 1993, 1994). Pen describes six major categories of fringing vegetation:

(1) Salt marsh
(2) Fringing vegetation
(3) Estuarine vegetation
(4) Freshwater (riverine) fringing forest and sandy rise vegetation
(5) Sandy rise vegetation
(6) Other plant communities and vegetation types

These categories were adhered to in this investigation.

Bar Island is comprised of four major vegetation communities: salt-marsh vegetation; fringing estuarine forest vegetation; sandy rise vegetation and other plant communities. Figure 3 illustrates the distribution of vegetation on Bar Island, while Appendix 1 lists the plant species found on Bar Island.

(Plate 1: Bar Island - sand flats exposed during low tides provide a good opportunity for bird life to feed on invertebrates)

4.1.1.1 Salt - marsh vegetation

An extensive salt marsh occurs at the northern end of Bar Island adjoining the shore and its sand bar and is influenced tidally by several drainage channels. This area has apparently increased over the last 30 years due to the colonisation of bare sand by salt marsh species. The salt marsh community is dominated by the seablight *Suaeda australis*, the beaded samphire *Sarcocornia quinqueflora,* couch grasses and various other salt shrubs and heaths. From Pen's (1992) vegetation categories the area is classified as *Sarcocornia quinqueflora* salt marsh complex and *Sporobolus virginicus* grassland.

The saltmarsh complex adjoins the sand bar and woodland communities and is influenced tidally by several drainage channels through its midst.

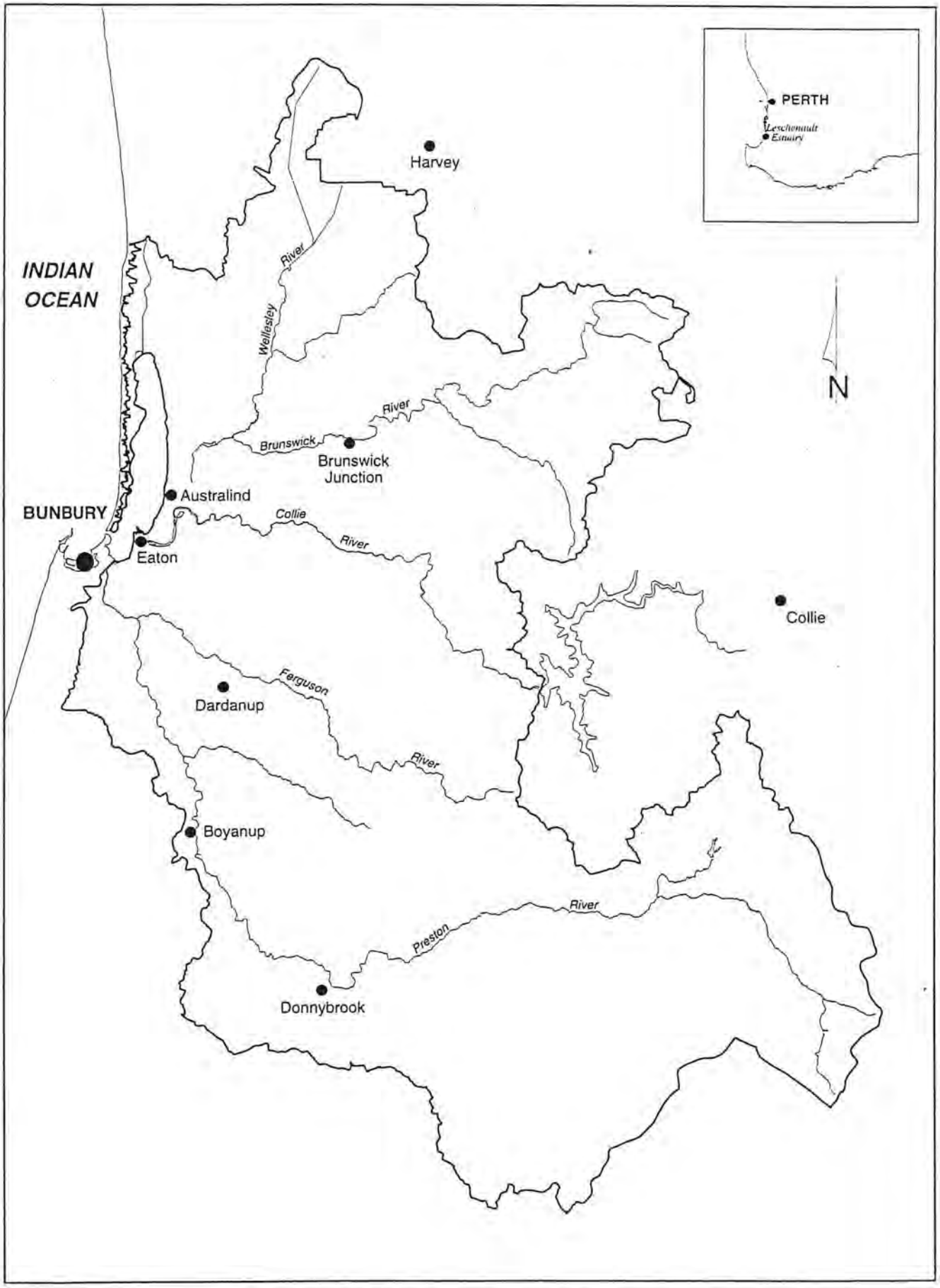

Figure 1 : Leschenault catchment

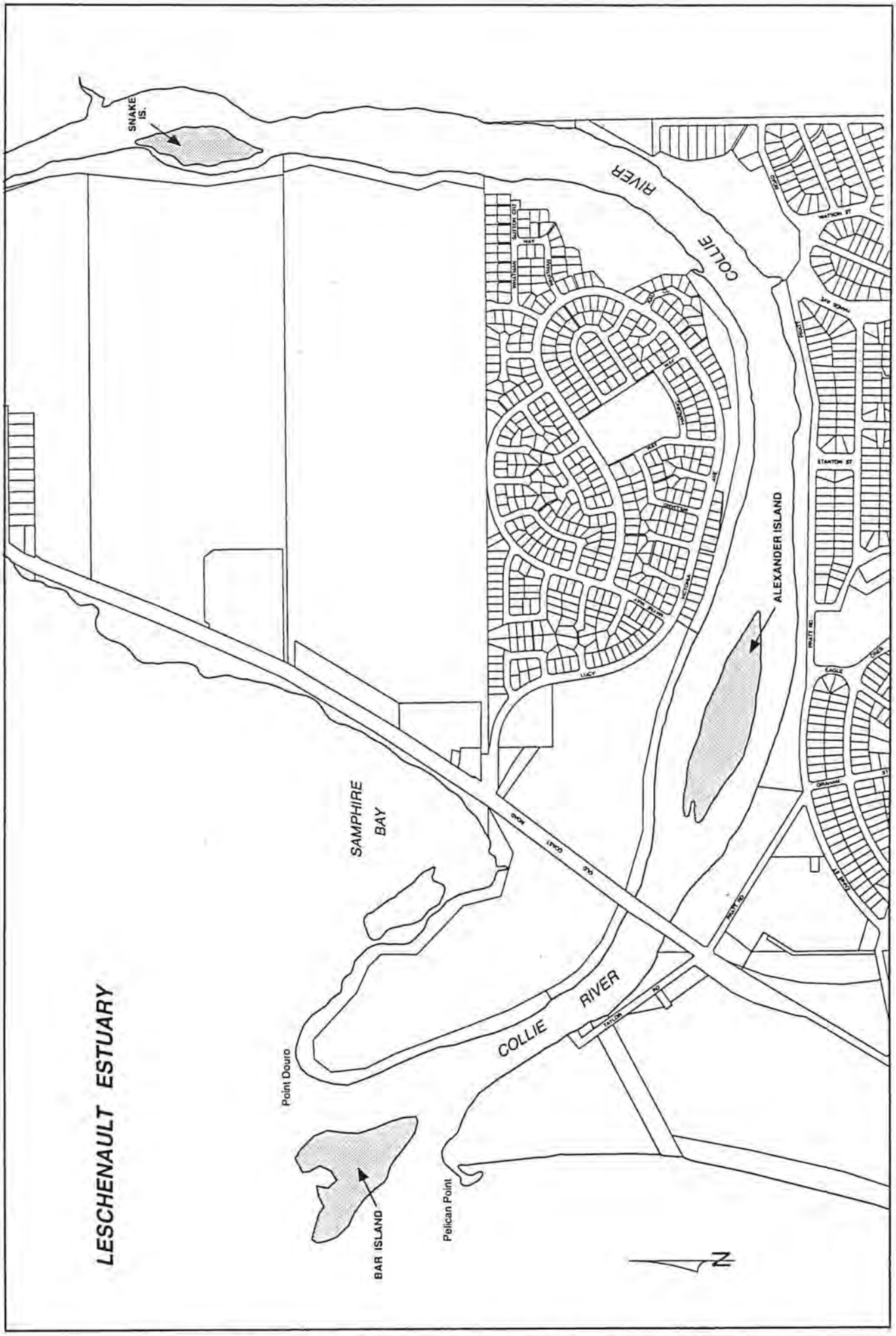

Figure 2 : Bar, Alexander and Snake Island

4.1.1.2 Sandy-rise vegetation

Pen's (1992) vegetation categories classifies this area as *Jacksonia furcellata* open-closed forest. This sandy rise community consists of a grassland/sedge understorey adjacent to the salt marsh and is made up of many plants. It is dominated by *Sporobolus virginicus*, *Juncus kraussii*, couch grasses and sedges, as well as the samphire *Sarcocornia quinqueflora*. This community lies under the open-closed forest of *Jacksonia furcellata* which forms an extensive area dominating most of the middle portion of the Island. In sections the *Jacksonia* is dense making access difficult. *Hakea prostrata* is the only other commonly occurring tree that mixes in with *J. furcellata*. A number of small channels weave through this community and their banks are dominated by *Juncus kraussii*.

(Plate 2: Bar Island - erosion due to powerboat wash can result in the destabilisation of river banks)

4.1.1.3 Fringing estuarine forest vegetation

Pen's (1992) vegetation categories divide this area into two separate vegetation classes. The first is *Melaleuca viminea* low open-closed forest which dominates the southern end of Bar Island. The second classification is *Casuarina obesa* low open-closed forest which dominates the shoreward fringe of the island (see Figure 3 for illustrated vegetation distributions). Several large *Casuarina* trees have fallen over and are lying, but still living, at the water's edge. It is not known whether this is a natural occurrence or has been influenced by man-made erosion caused by the wash of power boats. Other plants which occur in abundance throughout both classes are:- pigface (*Carpabrotus edulis);* geranium (*Geranium molle);* cutleaf Hibbertia (*Hibbertia cuneiformes);* couch grasses; *Juncus kraussii; Eucalyptus rudis* (planted seedlings); and a mixture of herbs, weeds and sedges.

Stands of the introduced pampas grass *Cortaderia selloana** have been observed on Bar Island in the *Melaleuca viminea* low open-closed forest.

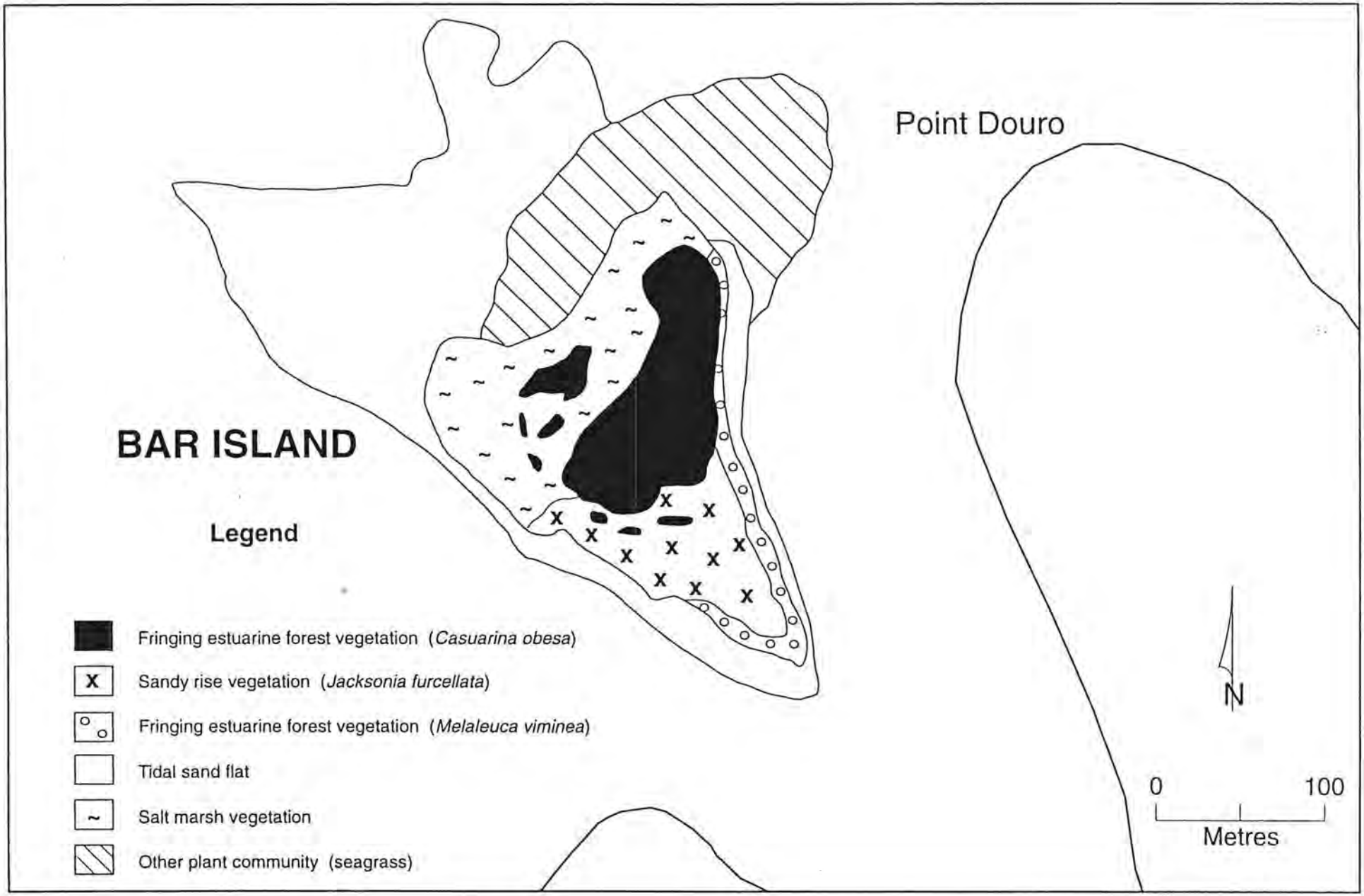

Figure 3 : Bar Island - Vegetation

4.1.1.4 Other plant communities

The tidal sand flats located on the northern section of Bar Island contain a sparse coverage of sea grass (*Heterozostera tasmanica*) and green algae.

4.1.2 Fauna

Bar Island was observed to be a good habitat for seabirds. Rabbits are evident on Bar Island and an eradication program should be established. There is little evidence of other vertebrate life, however the invertebrate population was abundant.

(Plate 3: Pampas grass *Cortaderia selloana** should be removed from the islands)

4.1.2.1 Avian

Bar Island is a haven for sea birds, wading birds and migratory birds. The following species have been observed on the Island:

Great cormorant	*Phalacrocorax carbo*
Pied cormorant	*Phalacrocorax varius*
Banded stilt	*Cladorhychus leucocephalus*
Black duck	*Anas supercilosa*
Australian pelican	*Pelecanus conspicillatus*
Pied oyster catcher	*Haematopus longirostris*
Australian shell duck	*Tadorna tadornoides*
Silver gull	*Larus novaehollandiae*
Great Egret	*Egretta alba*
White Faced Heron	*Ardea novaehollandiae*

Unidentified terns have also been seen on the Island.

The remains of a hatched egg was found adjacent to an area frequented by a pair of pied oyster catchers. It is surmised that this pair have bred successfully on the island and may have been protecting their young. Ospreys have been observed roosting on Bar Island and hunting and feeding on adjacent foreshore.

The birds listed above feed on a combination of invertebrates, fish and frogs all of which are likely to be abundant on and around the island.

4.1.2.2 Mammals

It is likely that predators, possibly domestic or feral cats and/or foxes, have been hunting on the Island and are responsible for bird remains seen on the Island.

4.1.3 Hydrology and drainage

Figure 4 details the drainage on Bar Island. The major features are a number of man-made channels that allow for intertidal flows and drainage within the salt marsh areas which were dug by the Shire of Harvey to drain pools of water as a means of controlling mosquito breeding.

The island is relatively flat, containing very slight sandy rises within the Jacksonia community. The sand flat at the northern end of the Island is exposed during low tides and provides good opportunities for bird life to feed on invertebrates, and also possible access for predatory mammals which are able to swim short distances.

(Plate 4: Channels have been dug through samphire marsh on Bar Island to control mosquito breeding)

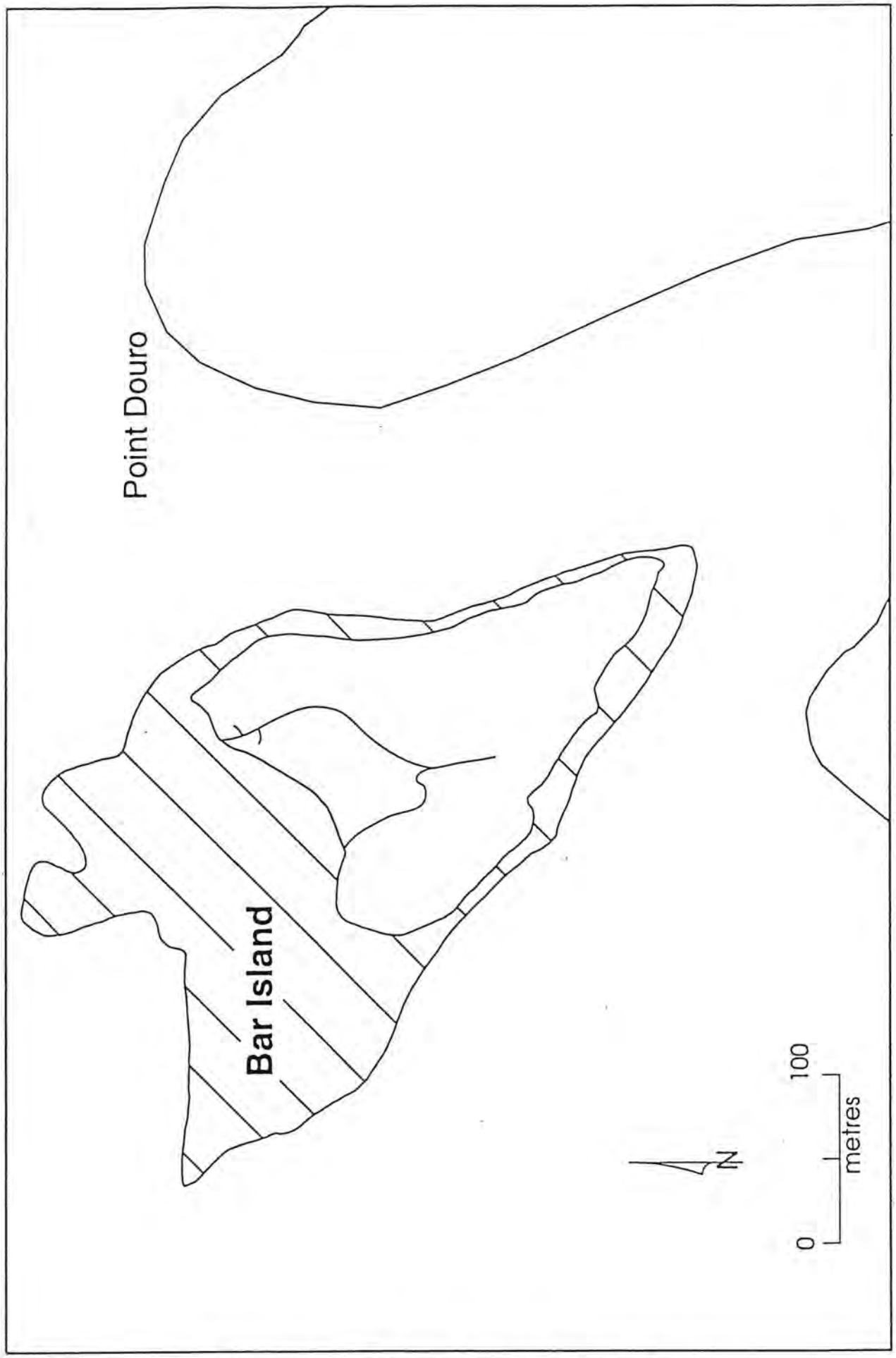

Figure 4 : Bar Island - Hydrology

4.1.4 Visual qualities

Bar Island provides an undeveloped and vegetated backdrop to Collie River and Leschenault Estuary. The Island is used infrequently because access is by boat only. The area holds an attraction for bird enthusiasts as wading and migratory birds use the tidal sand flats for feeding.

To the north lies Point Douro, as yet undeveloped with a 30 metre foreshore reserve along the River and Estuary edge. The reserve is lined with casuarinas, melaleucas and eucalypts providing shady areas. Point Douro has no amenities for recreation and is rarely used.

Pelican Point lies south of Bar Island and has a similar foreshore to that of Point Douro. The area has been developed and has a boat ramp, toilets and picnic facilities. This area is frequently used and provides a number of attractions. Pelican Point has a large sand bar extending into the Estuary that attracts a large number of wading and migratory birds. Additionally, the area provides access to the foreshore and the surrounding vegetation.

4.2 Alexander Island

4.2.1 Vegetation

Alexander Island is characterised by two of Pen's (1993) vegetation communities, that is, salt-marsh vegetation and estuarine fringing forest vegetation. These vegetation communities are presented in Figure 5 and a list of plant species is found in Appendix 1. A fire swept Alexander Island a few months prior to this investigation, and, due to this disturbance, vegetation distribution and patterns are likely to change in the future.

(Plate 5: Fire on Alexander Island severely damaged the native vegetation. Few signs of regeneration have been noted)

4.2.1.1 Salt-marsh vegetation

According to Pen (1993), this area is classified as *Juncus kraussii* closed sedgeland and is located at the western end of the island. Underneath this rush are pools of stagnant water which contain filamentous green algae.

4.2.1.2 Estuarine fringing forest vegetation

Pen (1993) categorises this area with two classes, the first is *Casuarina obesa* open-closed forest. This vegetation class occurs as a stand of *C. obesa* located along the north western edge and western end of the island and within a mix of *J. kraussii* which encircles the island in a thin band. The former vegetation type was burnt by a fire in early 1994 and as a result the stand is mostly dead or dormant. If this area does not regenerate, the vegetation pattern in the area will change.

Pen's second vegetation class for this area is *Casuarina obesa - Melaleuca rhaphiophylla - Eucalyptus rudis* low open forest. This low open forest consists of the above three species, regenerating blackboy *Xanthorrhoea preissii*, small herbs, mosses, grasses and weed species, and open ground. Fire damage is extensive within this community, however many of the *M. rhaphiophylla* and *E. rudis* are regenerating from stumps. The introduced exotic bugle lily *Watsonia bulbillifera* is present in a few patches and is likely to spread due to the opportunity created by the fire. It is therefore likely to dominate the understorey in the future. The large amount of various weeds in this area is likely to be reduced to a few hardy weeds as competition for niche space begins.

(Plate 6: Vegetation not destroyed by fire on Alexander Island forms a dense cover for birdlife)

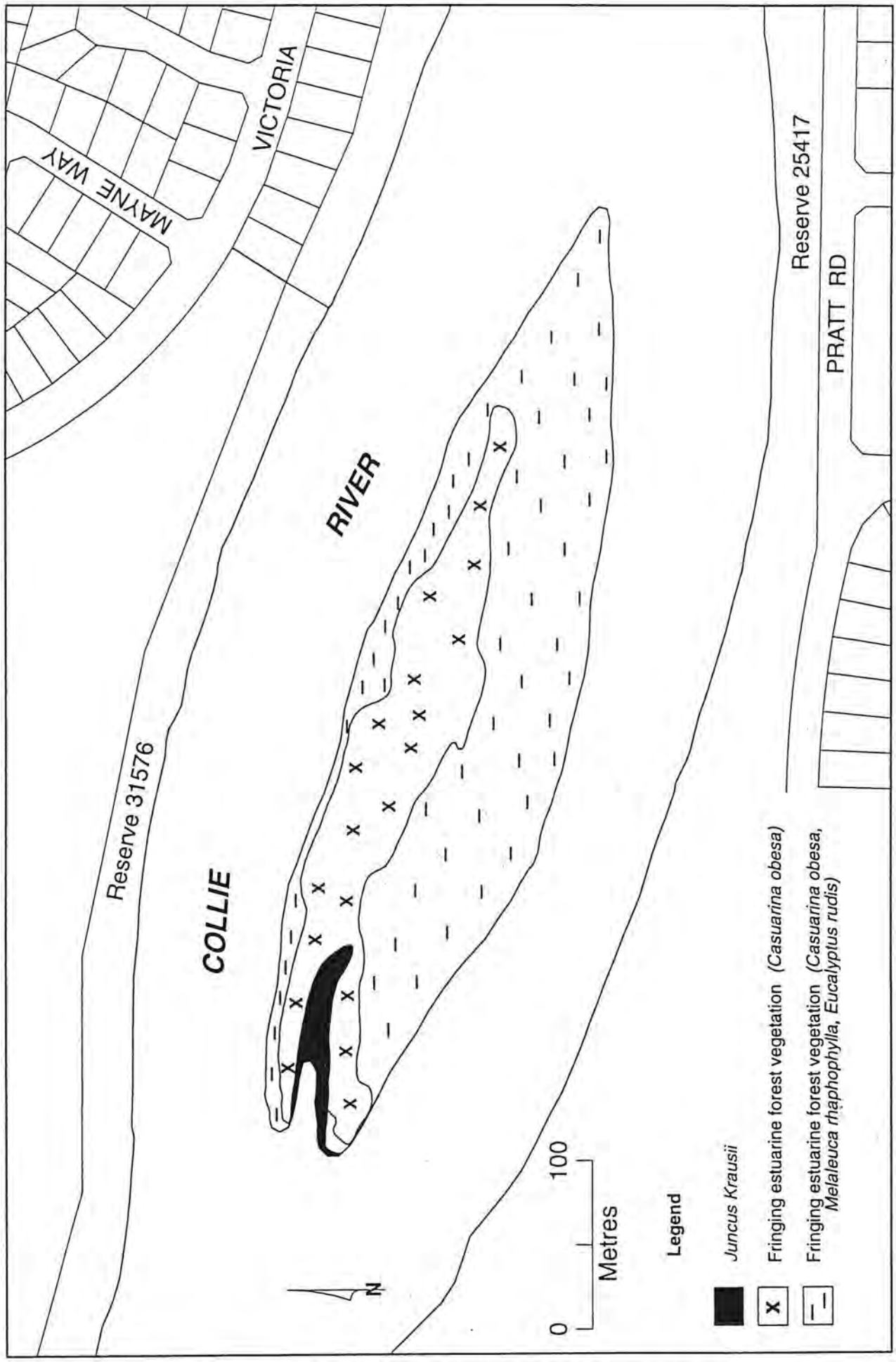

Figure 5 : Alexander Island - Vegetation

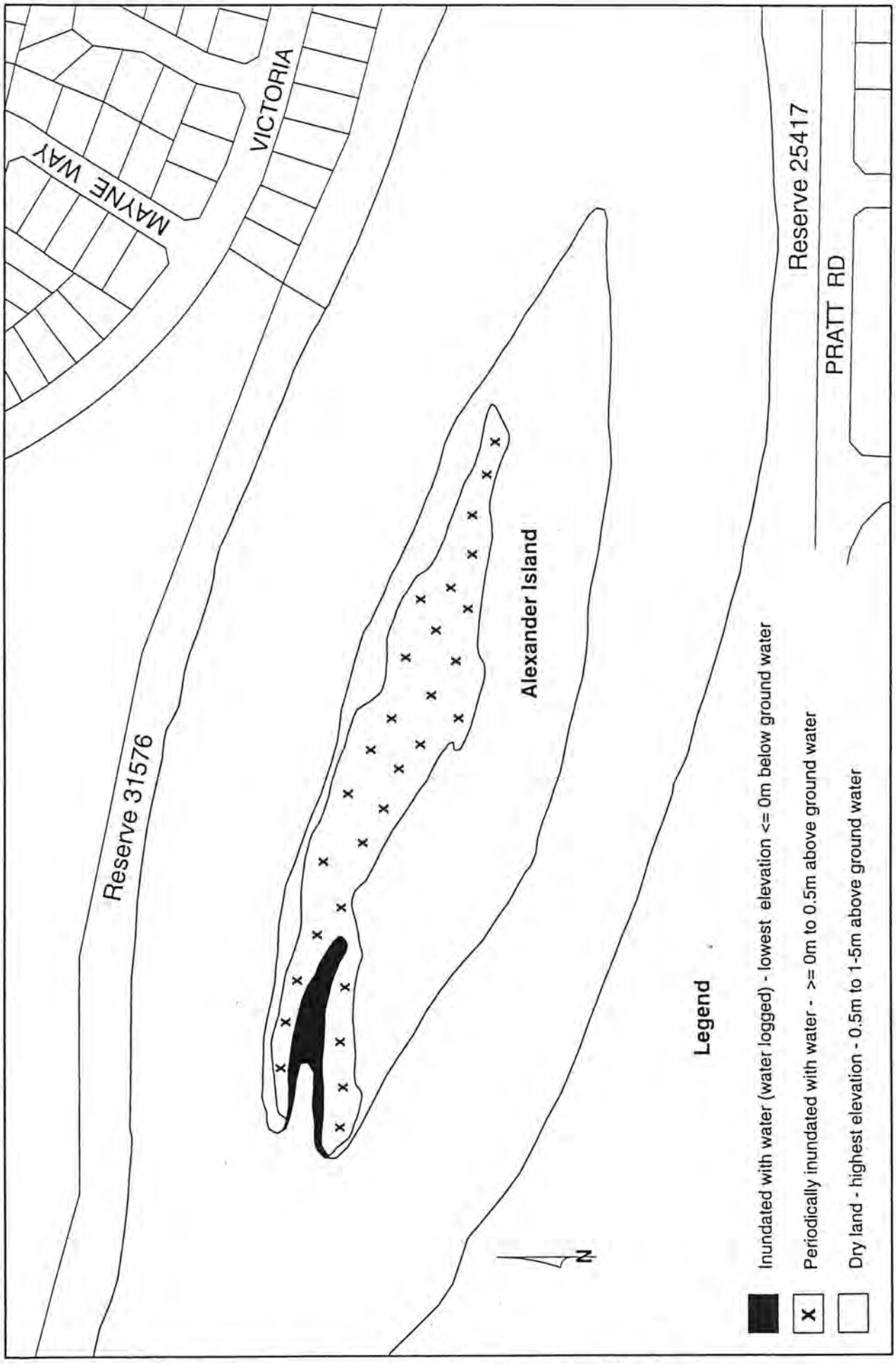

Figure 6 : Alexander Island - Hydrology

4.2.2 Fauna

Some signs of small animal activity such as holes and scrapings were noted during site inspections. These are presumably from rabbits. An ants' nest was also observed, as were two black duck *(Anas supercilosa)* nests amongst the shore rush containing 8 and 9 eggs respectively. Cormorants roost in the trees on Alexander Island and fly out to the Estuary early in the morning and return late in the afternoon. Birds seen feeding off the eastern tip of the island include:

Australian pelican	*Pelecanus conspicillatus*
Yellow Spoonbill	*Platelea flavipes*
White Faced Heron	*Ardea novaehollandiae*
Great Egret	*Egretta alba*
Black Duck	*Anas superciliosa*
Great cormorant	*Phalacrocorax carbo*
Pied cormorant	*Phalacrocorax varius*

4.2.3 Hydrology and drainage

Figure 6 shows the drainage pattern and elevation of Alexander Island. There are three levels of drainage which correlate with the vegetation distribution. At the western tip of the Island an area is inundated with tidal estuarine water and is covered with *J. kraussii*. Beyond this region following the *C. obesa* stand is an area that is periodically inundated with water, presumably in the wet season. The rest of the Island is above waterlogging and tidal influence and it would appear that most run off drains into the *C. obesa* low-open forest and the *J. kraussii* wetland at the western tip of the island.

4.2.4 Visual qualities

Alexander Island is lined with shady trees and provides attractive views across the river from all perspectives. The Island is infrequently used as no amenities are provided. The Island is carpeted with attractive wild flowers and aesthetically pleasing low-open forest. The Island attracts numerous birds and is a haven for the avian community.

To the north of Alexander Island is the Clifton Park foreshore reserve, lined with shady baring casuarinas, melaleucas and eucalypts. The walk along the foreshore provides a distinctive and attractive variation to the open parkland on the southern bank of the Collie River.

The Eaton foreshore reserve lies on the southern banks of the Collie River and south of Alexander Island. The river is lined with shady trees and there are groups of shade trees throughout the well maintained and reticulated grassed areas which are attractive to picnickers. This area has good amenities including a frequently used boat ramp and jetties. There is also a swimming beach which is popular in summer.

4.3 Snake Island

4.3.1 Vegetation

Snake Island is characterised by Pen (1993) as a low open/closed forest *of Casuarina obesa, Melaleuca rhaphiophylla* and *Eucalyptus rudis. Acacia saligna* and *Agonis flexuosa* occur intermittently within this forest and a dense understorey of the shore rush *Juncus kraussii* is interspersed with the introduced bugle lily *Watsonia bulbillifera* and the common saw sedge

Lepidasperma longitudinale. This vegetation community is very uniform apart from the distinct differences in canopy density. Figure 7 indicates the density differences, the western side of the island containing more sedges, while the eastern side has a denser canopy. Appendix 1 contains a list of common plant species found on the Island.

4.3.2 Fauna

The island is infested with mosquitoes particularly in the wet season. Evidence of invertebrates such as ant hills and spider webs were common. Rabbit warrens were also common as were scrapings and potential habitat trees for mammals and birds.

Birds sighted on the island include:

Black duck	*Anas superciliosa*
Australian pelicans	*Pelecanus conspicillatus*
Great Egret	*Egretta alba*
Ringnecked Parrot	*Platycercus zonarius*
Willy Wagtail	*Rhipidura leucophrys*
Pied Cormorant	*Phalacrocrax varius*

4.3.3 Hydrology and drainage

The western section of the Island has a high water table and, when inspected, was wet and spongy underfoot, supporting a large mosquito population. This water logging was only apparent in the wet season and was moist in summer. Figure 8 shows the area susceptible to waterlogging. There was no drainage or channels on the Island.

Plate 7: (Vegetation on Snake Island is largely undisturbed)

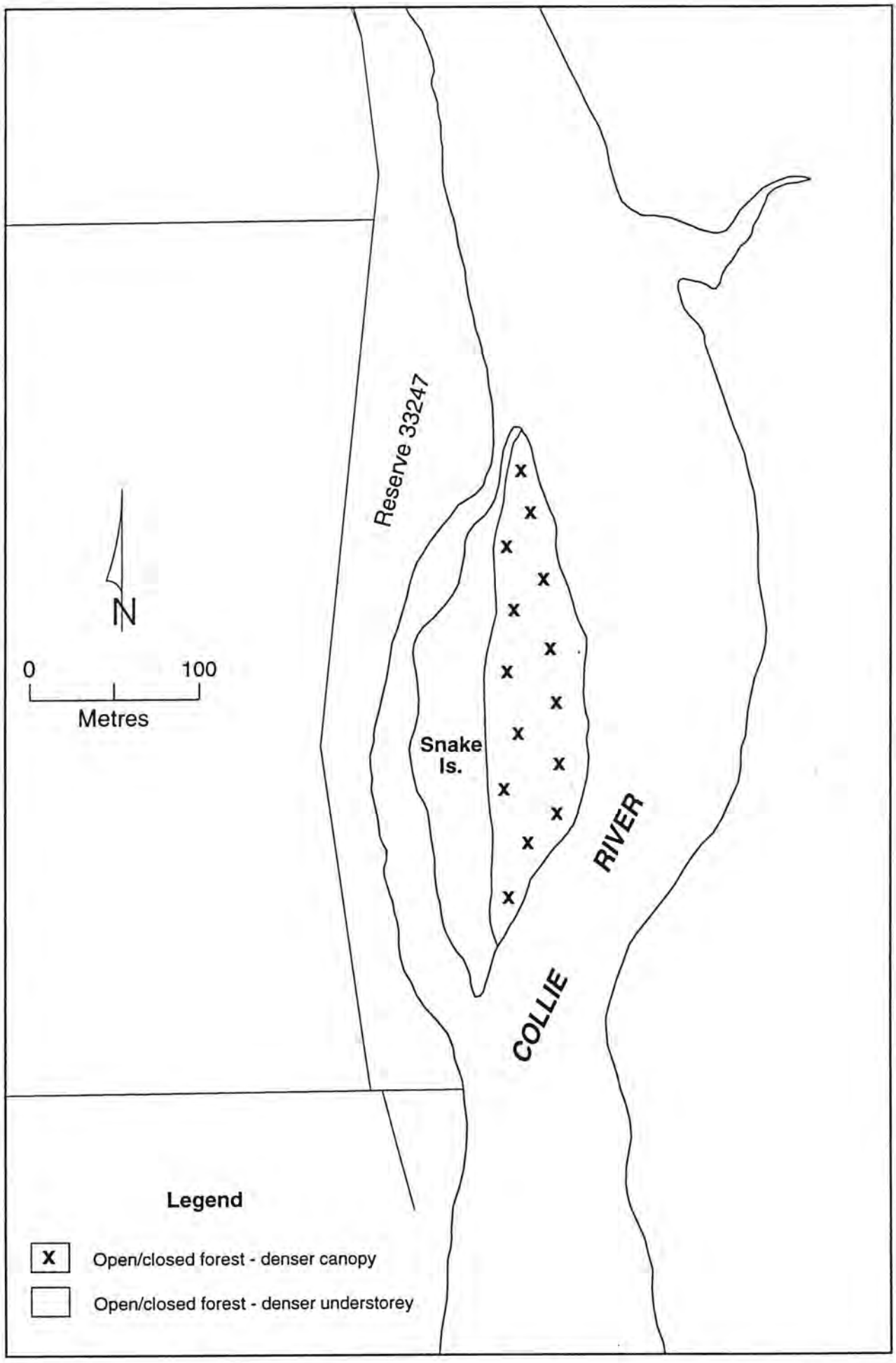

Figure 7 : Snake Island - Vegetation

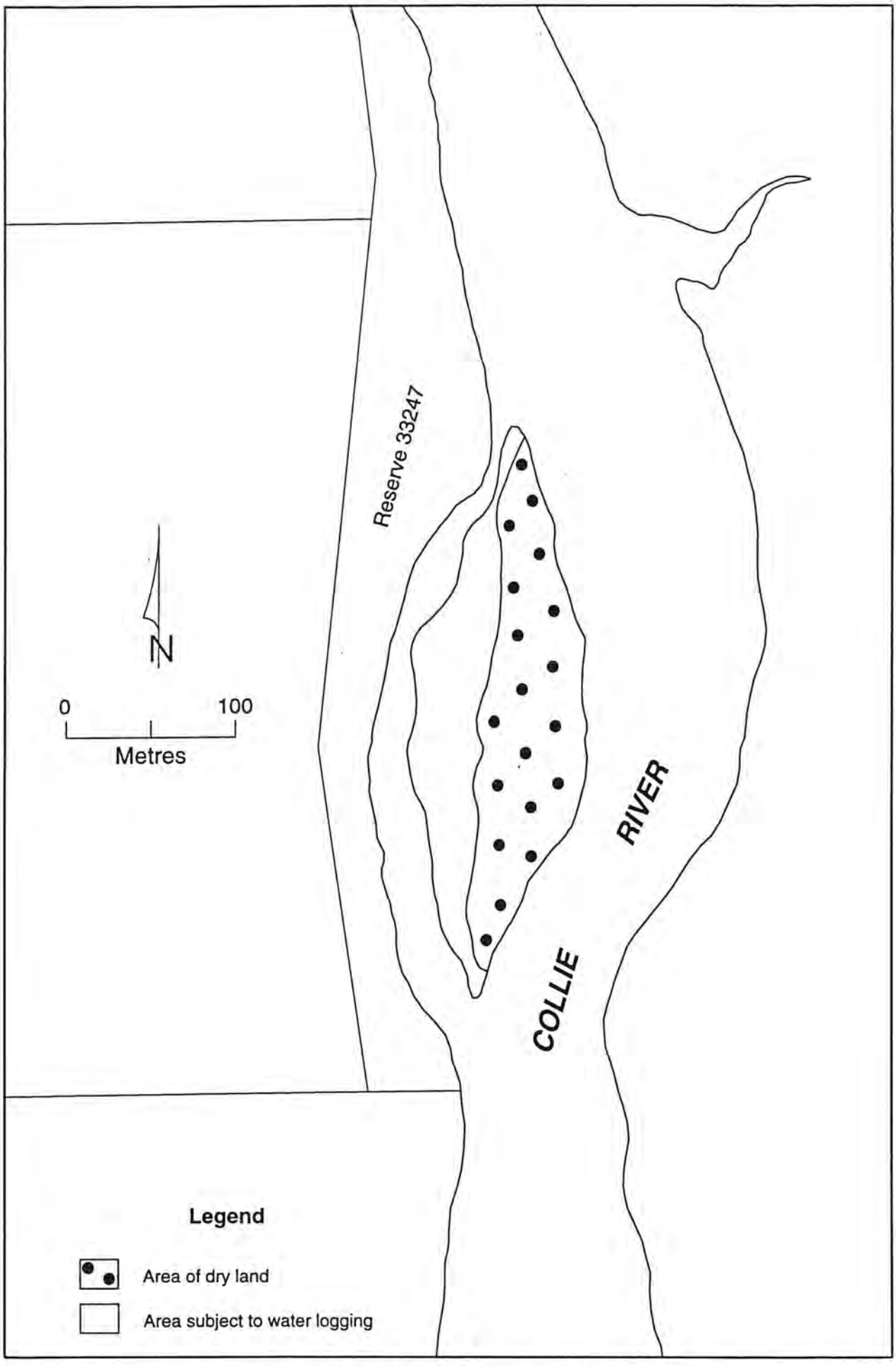

Figure 8 : Snake Island - Hydrology

4.3.4 Visual qualities

Snake Island is undeveloped and possesses an aesthetically pleasing coverage of lush vegetation. There are no amenities on the Island and it is rarely used for recreation. The island is attractive as it is thickly vegetated and mostly undisturbed and provides a haven for numerous species of birds.

To the west of the Island lies the Clifton Park foreshore reserve, lined with shady clusters of casuarinas, melaleucas and eucalypts. This foreshore provides an attractive walking track, allowing users to walk in a semi-forested area. Colourful wild flowers are scattered throughout the foreshore attracting people, birds and other local fauna.

Farmland lies to the east of Snake Island, and the foreshore is lined with shady trees which provide roosting sites for birds. This area could be upgraded by planting additional trees and sedges along the rivers edge.

5. LAND DEVELOPMENT AND USE

5.1 Land tenure and ownership

Bar Island forms Reserve 13531. The reserve's vested purpose is as a camping and picnic ground. Although the Island is located within the boundaries of the Shire of Harvey, it is vested with the City of Bunbury. This situation arose a number of years ago when the local authority boundaries were amended but Bar Island was inadvertently overlooked.

Both LIMA and the Shire of Harvey have requested that the vesting of the Island be changed. The City of Bunbury are unwillingly for this to occur and would prefer the local authority boundaries be amended so that the Island is then located within the City's boundaries.

Alexander Island, part Leschenault Location 23, is under the private ownership of Greycote Pty Ltd.

Snake Island, along with an area of foreshore on the north bank of the Collie River forms Reserve 33247. The Reserve is currently unvested.

5.2 Land zoning

Under the Shire of Harvey's current Town Planning Scheme Number 10, the zoning of both Bar Island and Alexander Island is "General Farming". The proposed District Planning Scheme Number 1 proposes a zoning of "Reserve for Recreation" for both Islands.

Snake Island is currently zoned "Recreation". It is proposed that under District Planning Scheme Number 1 the Island be zoned as "Reserve for Recreation".

5.3 Patterns of human use

Bar Island is regularly used during the summer months by fishermen who clean their catch on the island. It is also used infrequently by campers.

Alexander is not used on a regular basis although there is some evidence of camping and other human activity. It is likely that the fire which swept the Island in January 1994 was the result of an abandoned campfire.

Snake Island is rarely used.

Human activity on any of the Islands can have serious consequences as is evidenced by the fire on Alexander Island. Human use must therefore be carefully managed to avoid such occurrences in the future.

6. MANAGEMENT ISSUES

The following issues have been identified by the working group for the management of the Collie River islands.

- protection for wildlife habitats
- ownership and management of Alexander Island
- resolution of management responsibility for Bar Island between City of Bunbury and Shire of Harvey
- single point management responsibility for the three Islands
- rubbish on the Islands
- erection of signs
- provision for public access
- control of public access
- control of weeds and introduced grasses, and exotic plants
- control of mosquito breeding
- erosion control
- fire control
- control of speeding boats
- provision of public facilities
- public education and information
- control of vandalism
- protection for vegetation
- suitable management structure for the Islands
- limiting impacts from recreational remote camping

6.1 Bar Island

The structure and vegetation on Bar Island is in good condition and represents relatively undegraded values for wildlife habitat and ecosystem function. It had, on inspection, a minimum amount of litter including jetsam on the shoreline and supported several interesting plant communities. There is evidence that the salt marsh community is increasing with time, as salt marsh plants are encroaching on the growing sand bar. The growth of the sand bar and the salt marsh community is worthy of monitoring, as it probably represents a measure of siltation of both the Collie River and the Leschenault Estuary.

The reasons for fallen casuarinas along the shoreline of Bar Island should be investigated. If it is due to wash power boat wash, management measures may be required.

Pampas grass (*Cortaderia Selloana**)on the island should be removed to prevent its spread and the possible existence of cats and foxes on the Island should be investigated and methods to eliminate their populations developed if necessary.

Recreation facilities should be minimised to limit disturbance to bird and animal life, however, a bird hide would be a useful facility to allow people access with minimal impacts on the bird habitat areas.

Bar Island lies within the Shire boundary for the Shire of Harvey, and through an oversight with boundary changes some years ago, is currently vested with the City of Bunbury. This situation has lead to confusion over management responsibilities, and should be resolved.

6.2 Alexander Island

Alexander Island was in a generally poor condition. The recent fire damaged and killed vegetation some of which is regenerating. Rehabilitation of vegetation may be required. Measures to prevent further fires are also required to protect both vegetation and fauna.

Several recent camp sites were evident on the Island and litter including broken glass, cans, plastic, bricks and other building materials was distributed over most of the island. This was made more obvious after the fire. A clean up day should be organised to remove the rubbish.

The ecological and wildlife values of Alexander Island could be improved in a number of ways including

- Removal of the litter and building materials;
- Discouraging camping, or by providing an established but restricted camping facility
- Removal and/or monitoring of weed species

Regular monitoring of the vegetation on Alexander Island over time should be undertaken, as it provides a unique opportunity to observe the regeneration process and ecological succession with limited human influence.

Mosquito control has yet to be implemented on Alexander Island. Small channels dug within the areas which are suitable for mosquito breeding would assist in reducing the mosquito population.

Alexander Island is owned in Fee Simple by a private company. The Island lies entirely within the floodplain of the Collie River, and has significant wildlife and landscape amenity values. Development options for the owners would be limited, difficult to achieve given the location in the middle of the river, and unlikely to be supported by the overall community and decision making authorities. The most appropriate outcome for Alexander Island is for the State Government to acquire the Island and establish it as a conservation reserve.

6.3 Snake Island

Rubbish on Snake Island was minimal but its removal is still required. Although there was evidence of human activity such disturbance is minimal. This may be due to the mosquito infestation of the area. This Island, with its lush forest, is suitable for conservation, and its proximity to surrounding foreshore vegetation makes it a haven for birds. Pampas grass and Watsonia occur on the Island and should be removed immediately before either species has the opportunity to spread.

Mosquito control practices must be implemented on Snake Island. Fog spraying is not recommended due to its adverse effects on the Island's fauna. Small channels could be dug

through the western side of the island to drain pools of water although it should be noted that this method may change the current vegetation pattern and reduce the amount of sedge understorey.

7. RECOMMENDATIONS FOR MANAGEMENT

The following recommendations for management have been prepared by the Working Group after consideration of previously discussed issues.

7.1 Land use and management

R1 Request the State Government to arrange for Alexander Island to be acquired by the State for use as a conservation reserve.

R2 Place responsibility for management of all three Islands with the Waterways Commission.

R3 Establish a joint management committee to oversee the ongoing management of the Islands. Membership of this committee to include the City of Bunbury, Shires of Harvey and Dardanup, and local community groups.

R4 Promote the ethos that the principle management aim for the Islands is for conservation of their environmental and landscape values. Recreational access to the Islands will be discouraged, except for the eastern end of Bar Island where recreational access will be tolerated and controlled.

R5 Change the vesting of Bar Island from "Picnic and Camping" to "Conservation and Recreation" which is a more appropriate vesting to protect the wildlife habitats on the Island, while still allowing limited public access.

R6 Encourage the management committee to include in its charter the protection and enhancement of wildlife and landscape amenity values for the islands.

R7 Involve the general community in the provision of resources for recommended works, and in seeking sponsorship and grant funding to assist with the works program and general maintenance in conjunction with the Waterways Commission.

7.2 Environmental

R8 Ensure public access to the islands is minimised by promoting the management structure and objectives within the local community, and strategic placement of signage.

R9 Establish understorey and tree plantings of indigenous species on Bar Island and Alexander Island. Establish plantings of Swamp Sheok along the shoreline of Bar Island where older trees have fallen into the water.

R10 Maintain drainage on Bar Island for samphire areas, to reduce mosquito breeding using methods in accordance with the Mosquito Control Strategy and to the satisfaction of the Local Authorities (Chester and Klemm 1990).

R11 Spray weeds in specific locations on the Islands with environmentally friendly herbicide to allow regeneration of native species, and control growth of weeds.

R12 Remove rubbish accumulations from the Islands.

R13 Remove exotic species which have established on Bar Island and Alexander Island. Specifically target the Pampas Grass on Bar Island.

R14 Carry out further investigations to establish whether control measures for cats, rabbits and foxes are required on the Islands.

7.3 Recreational

R15 Limit public access to the Islands to a small area on the eastern end of Bar Island, as shown on the Management Plan. This access to be day visitor picnic use only, with no camping permitted and no lighting of fires permitted. No recreational access is recommended for Alexander Island and Snake Island.

R16 Establish signage at local boat launching ramps, and on the Islands, detailing levels of access recommended for the Islands.

R17 Construct fencing on Bar Island as shown on the Management Plan, to protect the western side of the Island from people access.

R18 Construct picnic area, walk trail and bird hide on Bar Island as shown on Management Plan.

7.4 Other

7.4.1 People access

R19 Limit people access to Bar Island to the eastern area as shown on the Management Plan.

R20 Prohibit people access to Alexander Island and Snake Island

7.4.2 Fire control

R21 Control grasses and other weeds by slashing and mowing grassed areas.

R22 Monitor fuel levels within the vegetation communities in conjunction with the fire brigade over the first three years to determine whether a fuel reduction strategy should be developed. An annual inspection of the Islands to be made in conjunction with the fire brigade to determine fuel levels.

R23 Prohibit lighting of fires and barbeques on the Islands.

8. REVIEW OF PUBLIC CONSULTATION

Comments and suggestions received during the public consultation period will be reviewed by the Working Group. A public workshop will be held to promote the draft guidelines within the community. A final report will be prepared by the working group based on public comments.

9. IMPLEMENTATION

9.1 Funding and management responsibilities

Management responsibility for the three Collie River islands currently lies with a number of different bodies. Bar Island is currently vested for management with the City of Bunbury. Alexander Island is under private ownership and Snake Island is part of an unvested reserve.

The Working Group consider that to ensure appropriate and co-ordinated management of the Collie River Islands, all three should be vested with the Waterways Commission for management by the Leschenault Inlet Management Authority. A community based management committee should be established to oversee the ongoing management of the islands.

It has been recognised however, that funding for general works and maintenance by government departments is decreasing and that significant community input will be required in order to implement all the recommendations.

The community can assist with construction and maintenance through direct sponsorship - provision of equipment, materials or labour; and by seeking State and Federal Government grants for community based programs or environmental programs. Individuals within the community are welcome to approach the Waterways Commission with suggestions on how they may assist.

9.2 Implementation schedule

The recommendations developed in the final management plan will be implemented over a five year period, subject to sufficient funding and resources being available from managing authorities or the community.

July 1996 to June 1997

- Request the State Government acquire Alexander Island for use as a conservation reserve.
- Vest Bar, Alexander and Snake Islands with the Waterways Commission for management by the Leschenault Inlet Management Authority. The vesting purpose for Bar Island be changed from "Picnic and Camping" to "Conservation and Recreation".
- Establish a joint management committee to oversee the ongoing management of the Islands. Membership of this committee should include representatives from the City of Bunbury, the Shire of Harvey, the Shire of Dardanup and local community groups.

  The management committee should be encouraged to include in its charter the protection and enhancement of wildlife and landscape amenity values for the islands.

  The assistance of the general community should be enlisted in the provision of resources for recommended works and in seeking sponsorship and grant funding to assist with the works program and general maintenance in conjunction with the Waterways Commission.
- Promote the ethos that the principle management aim for the islands is for conservtion of their environmental and landscape values.
- Restrict recreational access to the eastern end of Bar Island, where access will be controlled. Access to Alexander and Snake Islands will be prohibited. Ensure access to the islands is minimised by promoting the management structure and objectives within the local community and the strategic placement of signs at boat launching ramps and on the islands. Access to Bar Island will be for day use only. Camping and lighting of fires will be prohibited.
- Maintain drainage of samphire areas on Bar Island to reduce mosquito breeding.
- Spray weeds in specific locations on the islands with appropriate herbicides to allow regeneration of native species and to control weed growth.
- Control grasses and other weeds by slashing and mowing grassed areas.

- Inspect islands in conjunction with the fire brigade to determine fuel levels and whether a fuel reduction strategy is required.
- Plant indigenous understorey and tree species on Bar and Alexander Islands.

July 1997 to June 1998

- Remove rubbish from islands.
- Remove exotic species which have established on Bar Island and Alexander Island.
- Maintain drainage of samphire areas on Bar Island to reduce mosquito breeding.
- Spray weeds in specific locations on the islands with appropriate herbicides to allow regeneration of native species and to control weed growth.
- Construct barrier fencing and picnic area on Bar Island as show on Figure 9 to encourage conservation of the western side of the Island.
- Control grasses and other weeds by slashing and mowing grassed areas.
- Inspect islands in conjunction with the fire brigade to determine fuel levels and whether a fuel reduction strategy is required.
- Determine whether cat, rabbit and fox control measures are required on the islands and implement control strategy if required.
- Plant indigenous understorey and tree species on Bar and Alexander Islands.

July 1998 to June 1999

- Construct walk trail and bird hide on Bar Island as shown on Figure 9.
- Maintain drainage of samphire areas on Bar Island to reduce mosquito breeding.
- Spray weeds in specific locations on the islands with appropriate herbicides to allow regeneration of native species and to control weed growth.
- Control grasses and other weeds by slashing and mowing grassed areas.
- Inspect islands in conjunction with the fire brigade to determine fuel levels and whether a fuel reduction strategy is required.
- Plant indigenous understorey and tree species on Bar and Alexander Islands.

July 1999 to June 2000

- Maintain drainage of samphire areas on Bar Island to reduce mosquito breeding.
- Spray weeds in specific locations on the islands with appropriate herbicides to allow regeneration of native species and to control weed growth.
- Control grasses and other weeds by slashing and mowing grassed areas.
- Inspect islands in conjunction with the fire brigade to determine fuel levels and whether a fuel reduction strategy is required.

July 2000 to June 2001

- Maintain drainage of samphire areas on Bar Island to reduce mosquito breeding.
- Spray weeds in specific locations on the islands with appropriate herbicides to allow regeneration of native species and to control weed growth.
- Control grasses and other weeds by slashing and mowing grassed areas.

- Inspect islands in conjunction with the fire brigade to determine fuel levels and whether a fuel reduction strategy is required.

10. REVIEW OF MANAGEMENT PLAN

The management plan is to be reviewed and revised after five years. This process will include further public consultation and review of existing recommendations and implementation progress.

11. REFERENCES

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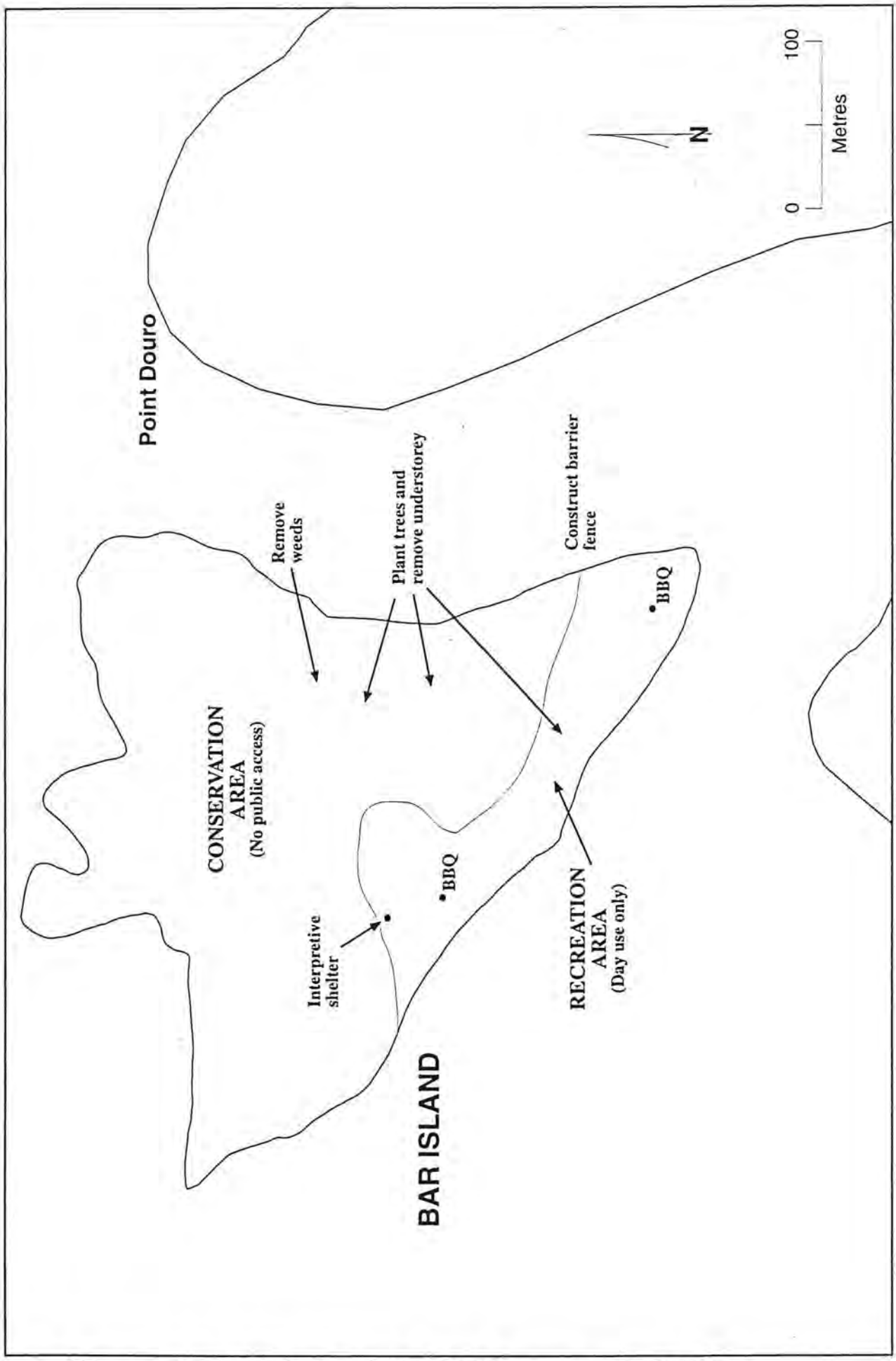

Figure 9 : Bar Island Draft Management Plan

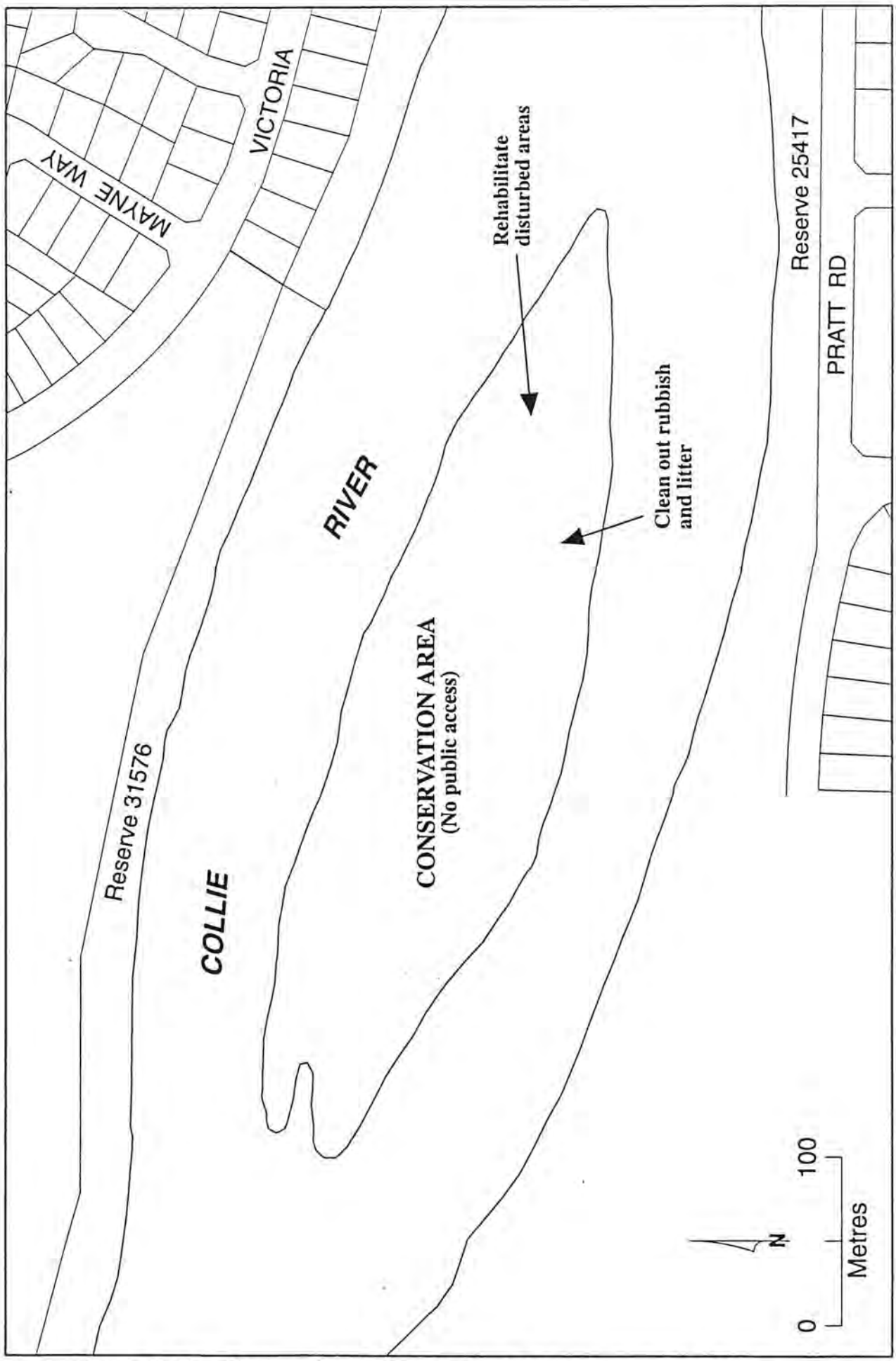

Figure 10 : Alexander Island Draft Management Plan

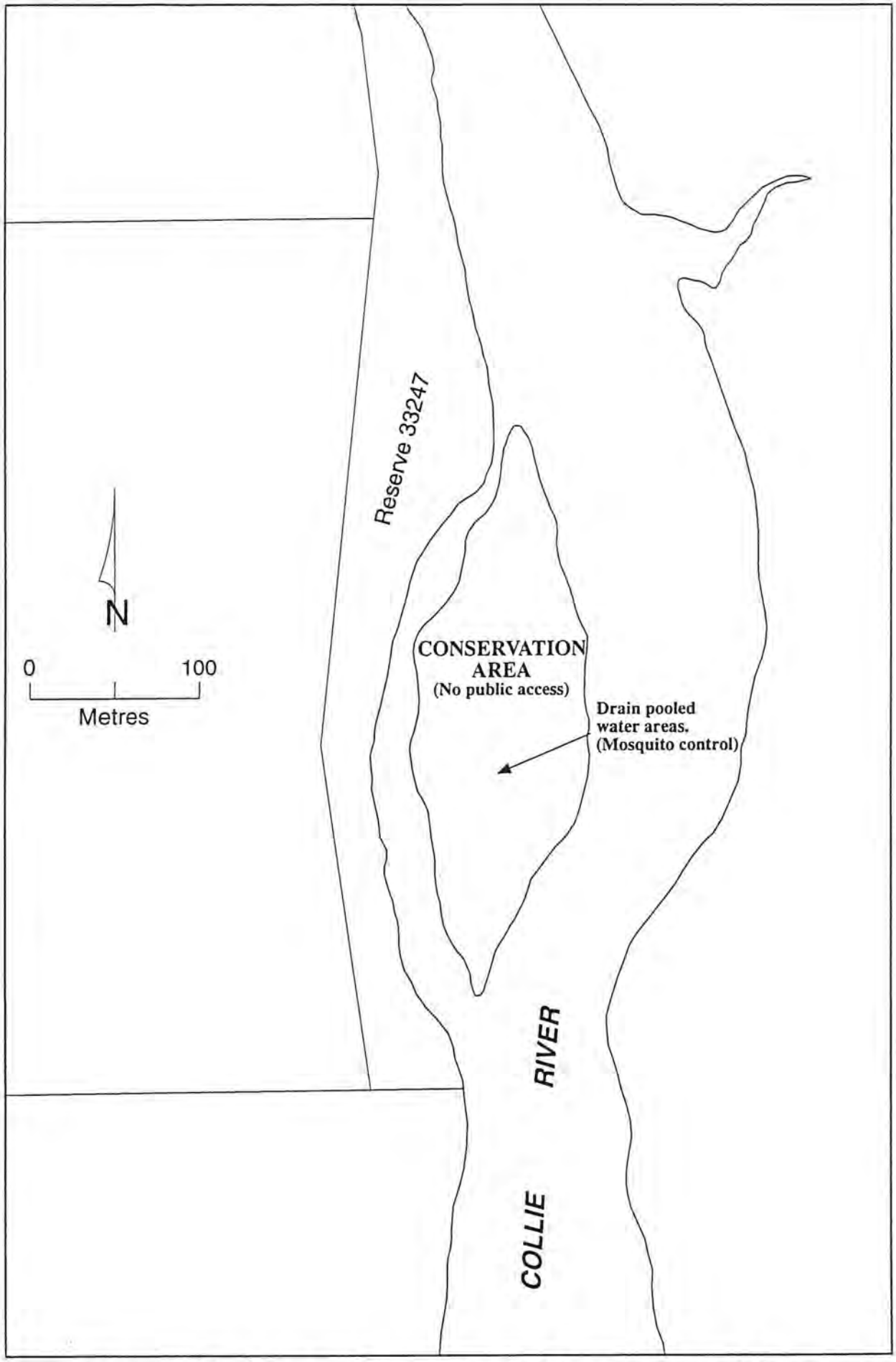

Figure 11 : Snake Island Draft Management Plan

APPENDIX A
PLANT SPECIES LIST

Bar Island

Family	Species	Common Name
Aizoaceae	*Carpobrotus edulis*	pigface
	Tetragonia decumbens	
Asphodelaceae	*Trachyandra divaricata*	
Asteraceae	*Hypochaeris glabra**	smooth catsear
	*Senecio sp**	
	*Ursina anthemoides**	
Casuarinaceae	*Casuarina obesa*	swamp sheoak
Chenopodiaceae	*Rhagiodia baccata*	
	Sarcocornia quinqueflora	samphire
	Suaeda australis	seablite
Cyperaceae	*Bolbschoenus caldwellii*	marsh club rush
	Schoenus subfasciflora	
Dilleniaceae	*Hibbertia cuneiformis*	cutleaf hibbertia
Frankeniaceae	*Frankenia pauciflora*	seaheath
Geraniaceae	*Pelargonium capitatum*	rose pelargonium
Iridaceae	*Patersonia occidentalis*	purple flag
Juncaceae	*Juncus kraussii*	shore rush
Juncaginaceae	*Triglochin striata*	streaked arrowgrass
Myrtaceae	*Eucalyptus rudis*	flooded gum
	Melaleuca rhaphiophylla	swamp paperbark
	Melaleuca viminera	paperbark
Myoporaceae	*Myoporum sp*	
Oxalidaceae	*Oxalis pers-caprae*	soursob
Papilonaceae	*Jacksonia furcellata*	grey stinkwood
	*Trifolium campestra**	hop clover
	Viminaria juncea	golden spray
Poaceae	*Briza maxima**	blow fly grass
	*Cortaderia selloana**	pampus grass
	Cynodon dactylon	couch
	*Lolium rigidum**	
	*Lolium sp**	
	Sporobolis viginicus	saltwater couch
Primulaceae	*Samolus repens*	creeping brookweed
Proteaceae	*Hakea prostrata*	harsh hakea
Santalaceae	*Exocarpus sp*	
Zosteraceae	*Heterozostera tasmanica*	seagrass

Alexander Island

Family	Species	Common Name
Anthericaceae	*Tricoryne elatior*	yellow autumn lilly
Apiaceae	*Daucus glochidatus*	native carrot
Aponogetonaceae	*Aponogeton sp*	

Asteraceae	*Conyza sp**	
	*Sonchus oleraceus**	common sowthistle
Casuarinaceae	*Casuarina obesa*	swamp sheoak
Crassulaceae	*Crassula natans*	
Cyperaceae	*Gahnia trifida*	saw sedge
	Isolepis sp	
	Lepidosperma gladiatum	coast sword sedge
	Lepidosperma longitundinale	common sword sedge
Geraniaceae	*Geranium sp*	
Iridaceae	*Watsonia bulbillifera**	watsonia
Juncaceae	*Juncus kraussii*	shore rush
Menyanthaceae	*Villarsia sp*	
Mimosaceae	*Acacia sp*	
Myrtaceae	*Eucalyptus rudis*	flooded gum
	Melaleuca rhaphiophylla	swamp paperbark
Oxalidaceae	*Oxalis pers-caprae*	soursob
Papilionaceae	*Lotus sp**	
Poaceae	*Briza maxima**	blow fly grass
	*Briza minor**	lesser quaking grass
	*Lagurus ovatus**	hare's tail grass

Snake Island

Family	**Species**	**Common Name**
Casuarinaceae	*Casuarina obesa*	swamp sheoak
Cyperaceae	*Lepidosperma longitudinale*	common sword sedge
Iridaceae	*Watsonia bulbillifera**	watsonia
Juncaceae	*Juncus kraussii*	shore rush
Mimosaceae	*Acacia saligna*	golden wreath wattle
Myrtaceae	*Agonis flexuosa*	peppermint
	Eucalyptus rudis	flooded gum
	Melaleuca rhaphiophylla	swamp paperbark
Poaceae	*Briza maxima**	blow fly grass
	*Cortaderia selloana**	pampas grass