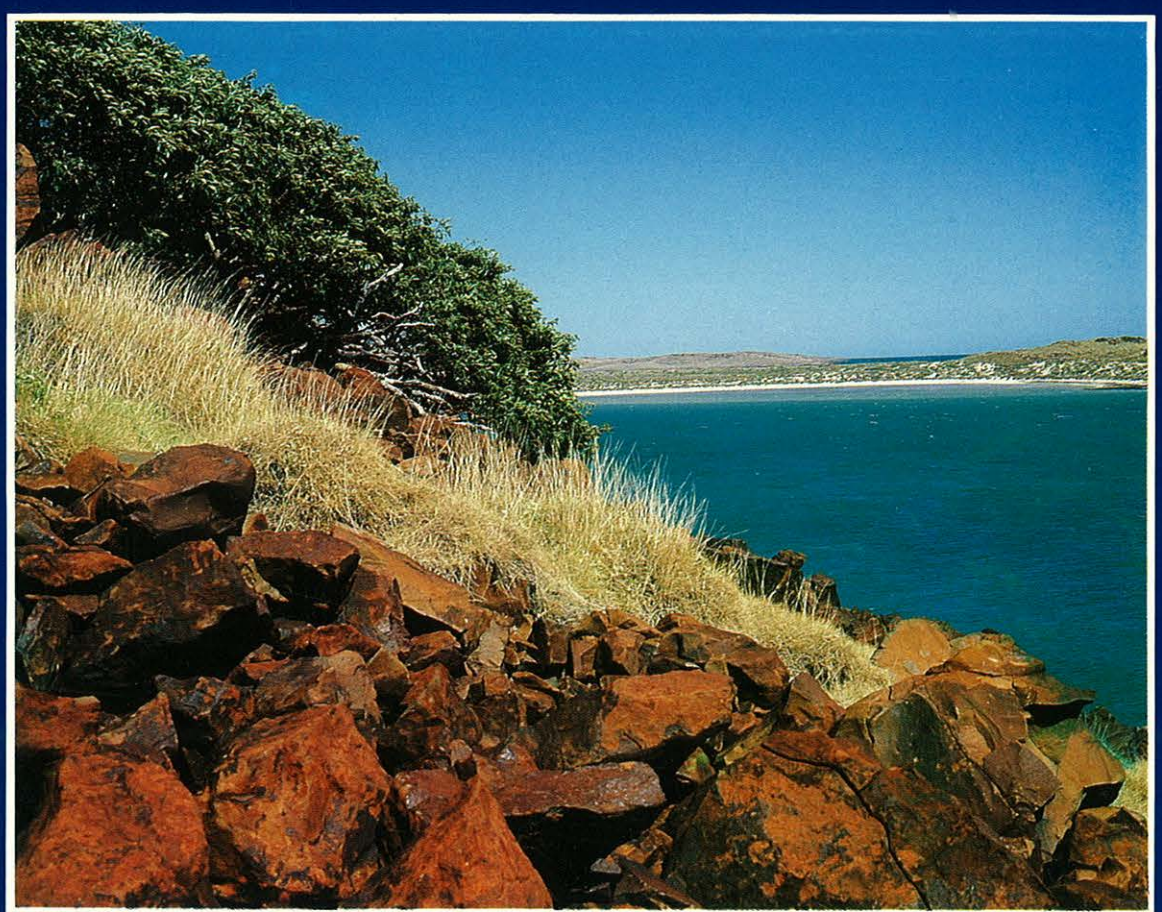
Dampier Archipelago Nature Reserves

Management Plan 1990-2000



MANAGEMENT PLAN No 18

Department of Conservation and Land Management

DAMPIER ARCHIPELAGO NATURE RESERVES

MANAGEMENT PLAN

1990 - 2000

Prepared by
Keith Morris

Project Team
Allan Padgett (Co-ordinator)
Keith Morris
Hugh Chevis
Greg Oliver

Department of Conservation and Land Management

PREFACE

The islands of the Dampier Archipelago, located off the Pilbara coast, have significant conservation, historic and archeological values. Since 1965 they have also been a valued recreation resource for the public from nearby Pilbara communities.

Many of the islands are nature reserves, vested in the National Parks and Nature Conservation Authority (NPNCA), and managed by the Department of Conservation and Land Management (CALM). In addition to these, there are other islands and parts of islands in the Archipelago also vested in the NPNCA and managed by CALM, which are reserved for conservation and recreation. This plan proposes management programs only for the nature reserves of the archipelago, and recommends that their purpose be changed to National Park to allow for the recreational use of the islands. Parliament needs to approve of the change of purpose before actions proposed within this plan and requiring National Park status are able to proceed.

Within the term of this plan, the islands presently reserved for conservation and recreation will be incorporated into the national park and a comprehensive management plan produced.

The NPNCA is responsible for the preparation of management plans for all lands which are vested in it. A draft management plan for Dampier Archipelago Nature Reserves was prepared by officers of CALM and issued by the Authority for public comment. After consideration of public comment, the NPNCA submitted the revised draft plan to the Hon. Minister for the Environment for approval. The Minister approved this document as the Management Plan for Dampier Archipelago Nature Reserves on 6 June 1990.

The final plan will be current for up to ten (10) years, from the date of adoption, but may be revised within this period, following statutory requirements for public review.

On 24 May 1990, the Bush Fires Board endorsed this plan under Section 34(i) of the Bush Fires Act 1954.

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Many other people (from within and outside CALM) and organisations (both government and community-based) have contributed to this plan, and their assistance is gratefully acknowledged. Mr Charlie Nicholson (EPA) provided useful comments on the draft. Ms Yvonne Hobbs, Ms Pam Bremner and the clerical staff at the Wildlife Research Centre, Woodvale are to be thanked for their efficient typing and editing of the draft plan.

Officers of the Department of Mines, the Department of Resources Development and of the Western Australian Museum, representatives of the Pilbara offshore petroleum industry, and the Shire of Roebourne have provided valuable information and advice. The many people and organisations who prepared submissions on the draft management plan are especially acknowledged. Cover photo of Enderby Island is by Keith Morris.

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A GUIDE TO THIS PLAN

Overall the plan is divided into 2 major parts, The Dampier Archipelago Resource, containing sections on the Study Area, History and Land-Use, and Biological Resources; and a Plan for Management, referring to Management Objectives, Management for Conservation of Flora, Fauna and the Landscape, Management of Aboriginal and Historic Sites, Management for Public Use, and Plan Implementation and Revision.

In Part A, each section contains background information followed by various implications for management. For Part B, each section begins with a set of objectives, followed by a rationale, and concludes with various management strategies. Priorities have been allocated for all strategies (refer 8.0 Park Programmes).

PART A

THE DAMPIER ARCHIPELAGO RESOURCE

1.0 STUDY AREA

1.1 LOCATION

The Dampier Archipelago comprises 42 islands, islets and rocks lying within a 45 km radius of the town of Dampier on the north-west coast of Western Australia (Figure 1). The archipelago lies within the Shire of Roebourne between latitudes 20°20'S - 20°45'S and longitude 116°25'E - 117°05'E and at the eastern end of an extensive chain of coastal islands between Exmouth and Dampier. For management purposes, Eaglehawk Island is regarded as the western-most island of the archipelago, and Delambre Island the eastern-most.

1.2 LAND STATUS

1.2.1 Nature Reserves

Twenty-five of the islands in the Dampier Archipelago are incorporated into 4 nature reserves (Table 1, Figure 2), and **it is these islands only that are covered by this management plan.** The nature reserves are vested in the National Parks and Nature Conservation Authority (NPNCA) for the conservation of flora and fauna, and managed by the Department of Conservation and Land Management (CALM). All the nature reserves extend to low water mark. The plan recommends that **the purpose of these island nature reserves be changed to National Park**. The whole of the Dampier Archipelago is on the Register of the National Estate.

The nature reserves have varying reservation status, viz:

(a) Class A Nature Reserve 36915 comprising the whole of Rosemary(except for a Department of Land Administration Special Lease of 7 ha) and Enderby Islands, having a total area of 4436 ha. (NOTE: this figure is a more recent measurement than the 1980 total of 4352 ha derived from Table 1).

(b) Class B Nature Reserve 34944 comprising the whole of Dolphin Island and having an area of 3203 ha.

(c) Class C Nature Reserve 36913 comprising the whole of Egret, Eaglehawk, Goodwyn, Kendrew, Brigadier, Lady Nora, Conzinc, Angel, Gidley, Tozer, Wilcox, Keast, Hauy, Mawby, and Delambre Islands; Bare Rock, Nelson Rocks, Millers Rocks, Collier Rocks and Elphick Nob; various un-named islands between Gidley and Keast Islands; and a portion of Malus Island; with a total area of approximately 3020ha.

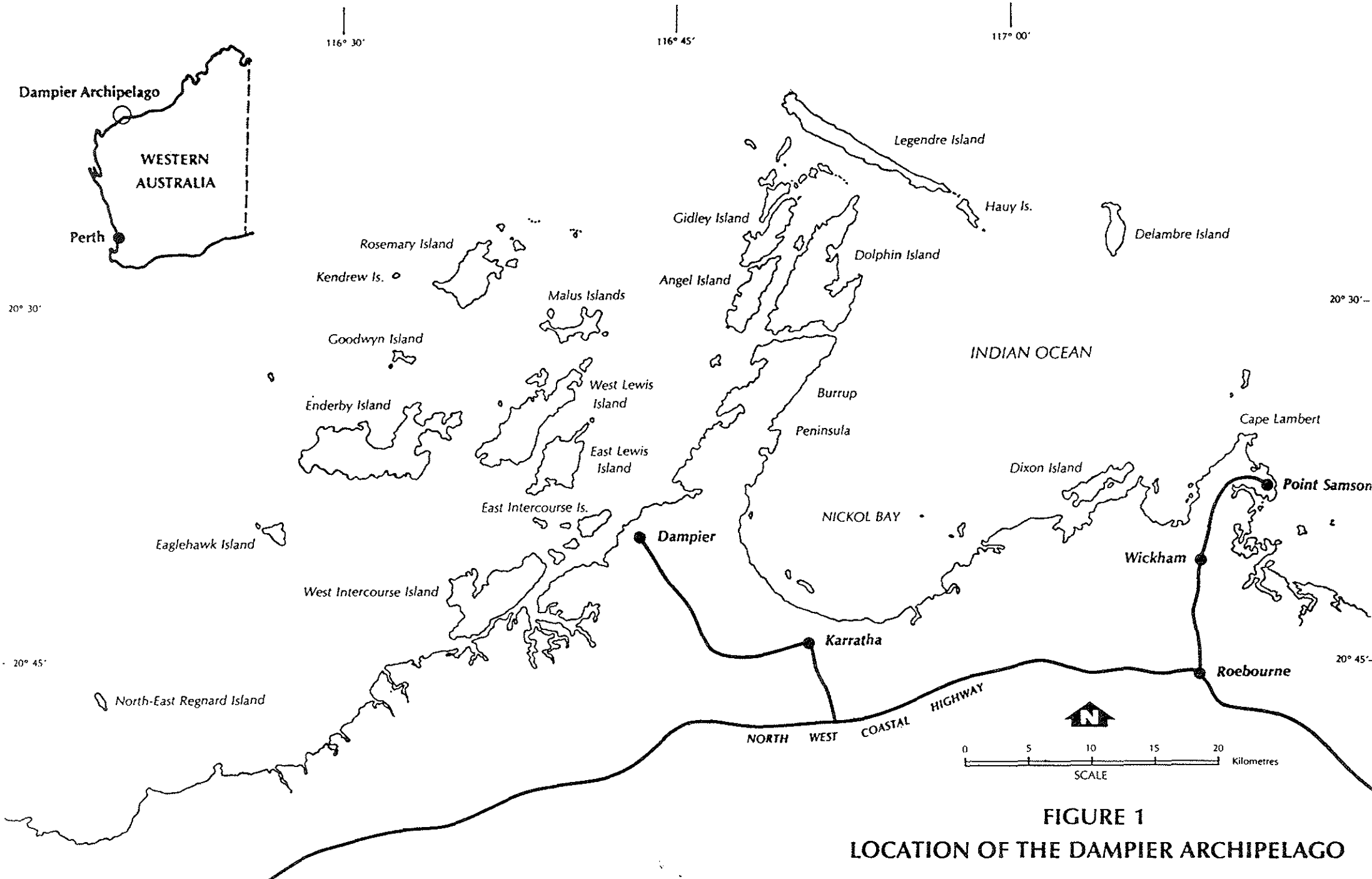

FIGURE 1
LOCATION OF THE DAMPIER ARCHIPELAGO

TABLE 1 **STATUS OF ISLANDS IN THE DAMPIER ARCHIPELAGO**
(see below for explanation of abbreviations)

RESERVE CLASS	ISLAND NAME	VESTED AUTHORITY	DATE OF VESTING	PURPOSE	AREA (HA)
B34944	Dolphin Island	NPNCA	12/10/77	Cons F & F	3203
C36907	East Lewis Island	NPNCA	Aug 1987	Cons & Rec	1018
C36909	West Lewis Island	NPNCA	Aug 1987	Cons & Rec	2082
C36910	Malus Island (part)	NPNCA	Aug 1987	Cons & Rec	76
C36913	Angel Island	"	24/10/80	Cons F &F	880
	Bare Rock	"	25/05/84	"	3
	Brigadier Island	"	25/05/84	"	6
	Collier Rocks	"	24/10/80	"	408
	Conzinc Island	"	25/05/84	"	11
	Delambre Island	"	24/10/80	"	320
	Eaglehawk Island	"	25/05/84	"	140
	Elphick Nob	"	25/05/84	"	22
	Egret Island	"	25/05/84	"	1
	Gidley Island	"	24/10/80	"	845
	Goodwyn Island	"	24/10/80	"	65
	Hauy Island	"	24/10/80	"	105
	Keast Island	"	24/10/80	"	51
	Kendrew Island	"	25/05/84	"	6
	Lady Nora Island	"	25/05/84	"	27
	Malus Island (part)	"	24/10/80	"	170
	Mawby Island	"	24/10/80	"	3
	Millers Rocks	"	25/05/84	"	1
	Nelson Rocks	"	25/05/84	"	1
	Tozer Island	"	25/05/84	"	1
	Wilcox Island	"	25/05/84	"	20
A36915	Enderby Island	NPNCA	24/10/80	Cons F & F	3290
	Rosemary Island	NPNCA	24/10/80	Cons F & F	1062
C39202	Cohen Island	NPNCA	29/09/85	Cons F & F	11
S. Lease 3116/3469	East Intercourse Is.	Not vested		Mining (H.I.)	300
	Tidepole Island	" "			10
S Lease 3116/4976	Mistaken Island	Not vested		Mining (D.S)	20
Crown Land	Dixon Island	Not vested			500
	East Mid Intercourse Is.	" "			2
	Haycock Island	" "			5
	Intercourse Island	" "			20
	Legendre Island	Min Ind Dev			1300
	Pemberton Island	Not vested			2
	Roly Rocks	" "			1
	Walcott Island	" "			10
	West Intercourse Is.	" "			2300
	West Mid Intercourse Is.	" "			2

EXPLANATION OF ABBREVIATIONS:

Reserve Class A - tenure can be changed only by agreement of both Houses of the W.A. Parliament.

B - tenure can be changed by the Governor of W.A. without approval by Parliament. However, the reasons for any changes must be reported to Parliament by the Ministers for Lands.

C - tenure can be changed by the Governor, without reference to Parliament. However, changes must be published in the Government Gazette.

NPNCA - National Parks and Nature Conservation Authority

Min Ind Dev - Minister for Industrial Development

Cons F & F - Conservation of Flora and Fauna

Cons & Rec - Conservation and Recreation

H.I. - Hamersley Iron Pty Ltd.

D. S. - Dampier Salt Pty Ltd.

S. Lease - Special Lease

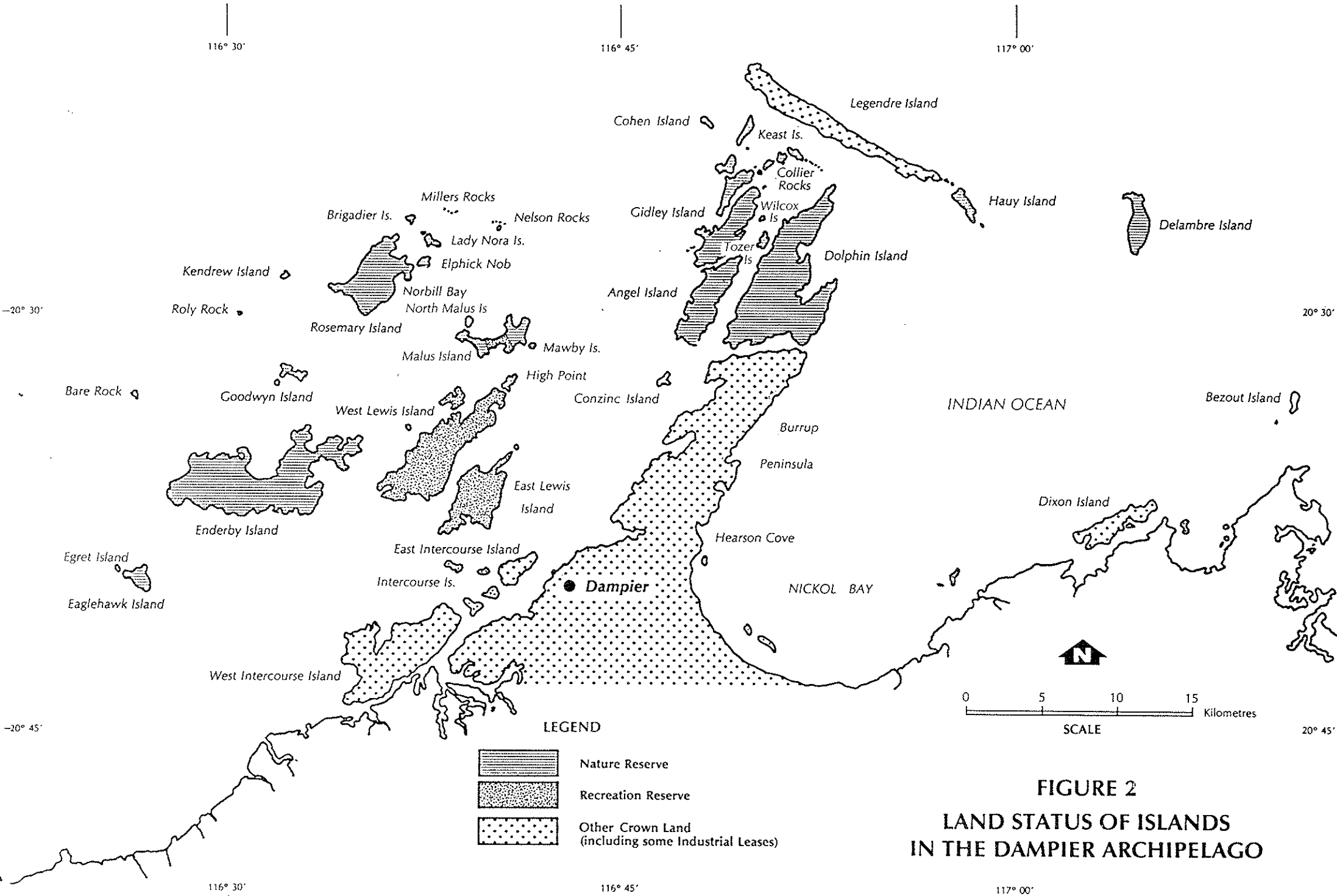

FIGURE 2
LAND STATUS OF ISLANDS IN THE DAMPIER ARCHIPELAGO

(d) Class C Nature Reserve 39202 comprising the whole of Cohen Island, an area of 11 ha.

1.2.2 **Recreation Reserves**

The central portion of Malus Island (C36910), and all of East and West Lewis Islands (C36907 and C36909 respectively) are reserves for conservation and recreation, vested in the NPNCA. These reserves are also managed by CALM, however they are not covered by this management plan (refer 1.2.5).

1.2.3 **Leases Under the Land Act 1933**

(a) North West Game Fishing Club:
Since 1963 the North West Game Fishing Club (NWGFC) has, under the Land Act 1933, leased a 7 ha site on Norbill Bay, Rosemary Island, for their club house and associated buildings. The NWGFC lease is on Crown land and is leased through the Department of Land Administration. This is not part of the nature reserve. The NWGFC lease continued after Rosemary Island became a nature reserve in 1980, and is renewable every ten years. The current lease commenced on 1 January 1984.

(b) Marine Navigation Beacons:
Three marine navigation beacons are positioned on land in the archipelago which is vested in the Commonwealth of Australia. One of these leases, on Legendre Island, consists of approximately 250 ha and adjoins a Ministerial Reserve. Another, on Courtenay Head, Malus Island, is 144 m^2 in area and leased by Hamersley Iron Pty Ltd. The third lease, on Rosemary Island, covers 767m^2. The latter two leases are surrounded by nature reserve.

1.2.4. **Other Crown Land**

The remainder of the islands in the Dampier Archipelago are Crown land, some of which are covered by Special Leases (Mining) held by Hamersley Iron Pty. Ltd., or Dampier Salt Pty. Ltd. (Table 1). The majority of Legendre Island is vested in the Minister for Industrial Development.

The Burrup Peninsula was formerly known as Dampier Island, as it was separated from the mainland by tidal creek systems and mudflats. With the development of Dampier in the 1960's and later the Dampier Salt fields, service causeways and levee banks were constructed across the creeks and mudflats, and their regular tidal inundation was prevented. Hence the Burrup Peninsula is now regarded as part of the mainland. Much of it is covered by special leases for mining and industrial purposes. The northern portion (about 3000 ha) is crown land covered by a Temporary Reserve vested in the Minister for Mines.

1.2.5. Scope of the Management Plan

This management plan will apply only to the islands in the Dampier Archipelago which are currently nature reserves. The plan does not cover the reserves vested for conservation and recreation (portion of Malus Island, and East and West Lewis Islands). It is expected that these will be incorporated in subsequent plans when land tenure issues have been resolved. During the life of this plan consideration will be given to incorporating marine reserves and the northern portion of the Burrup Peninsula into an integrated management plan for a marine park covering the archipelago.

1.3 CLIMATE

The climate of the Dampier Archipelago region can be described as semi-desert tropical (Bagnouls and Gaussen 1957), with two seasons; a hot summer extending from October to April, and a mild winter from May to September. The area usually experiences the effects of 2-3 cyclones per year. These cyclonic disturbances are accompanied by heavy rainfall, strong winds and higher tides. Since 1969, meteorological data have been available from Dampier Salt Pty. Ltd., approximately 5 km from the coast adjacent to the Dampier Archipelago. A summary of this data is shown in Table 2.

1.3.1 Temperature

Mean summer temperatures range from a minimum of 24°C to a maximum of 35°C. Mean winter temperatures range from a minimum of 17°C to a maximum of 29°C.

1.3.2 Rainfall

Rainfall is seasonal but unreliable. The mean annual rainfall is 276 mm from 31 rain days. There are two peaks of rainfall during the year. The first peak from January to March is due to tropical thunderstorms and cyclonic activity. The second peak from May to June is due to the passage of low pressure systems through the south of the state. The driest period is between September and November. Evaporation is approximately 2500 mm per year and exceeds rainfall by a factor of nine.

The islands possibly receive more rain than the adjacent mainland. Consistently higher rainfall was recorded by a rain gauge set on Enderby Island in the period 1983-87:

TABLE 2

A Summary of the Meteorological Data from Dampier Salt Pty. Ltd. (1969 - 1985).

(Meteorological Station Number 0050601, lat 20°43'S, long 116°45' elevation 8.0m)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
Mean Daily Maximum Temperature (°C)	35.4	36.2	36.1	33.5	29.5	26.5	26.1	27.3	30.2	32.0	34.1	35.8	
Mean Daily Minimum Temperature (°C)	26.2	26.5	25.7	22.2	18.0	14.9	13.7	15.0	17.0	19.6	22.2	25.3	
Mean Relative Humidity (%)													
0900	56	57	55	44	43	45	46	45	35	38	39	47	
1500	51	48	45	37	36	37	37	37	31	36	40	44	
Rainfall (mm)													
mean	31	53	60	21	36	32	19	10	1	1	1	11	276
median	17	52	43	2	18	5	6	1	1	0	0	1	303
No. raindays	4	4	5	2	3	3	4	2	0	1	1	2	31

	Dampier Salt	Enderby Island
1983	43.5 (mm)	67.5 (mm)
1984	261.9	293.5
1985	140.9	155.5
1986	248.4	268.0
1987	260.4	270.0

The Dampier Salt recordings for this period were all below average and reflect the variable nature of the rainfall.

1.3.3 Growing Period

Ombrothermic (rainfall/temperature) curves using the Dampier Salt meteorological data show that rainfall intersects the temperature curve only in March, suggesting that plant growth is most likely to occur at this time. This short growing period is typical of the semi-desert tropical bioclimatic zone (Bagnouls and Gaussen, 1957).

1.3.4 Humidity

Relative humidity is highest during the summer months, averaging 48% at 0900 hrs and 43% at 1500 hrs. Early morning dews can occur in both summer and winter.

1.3.5 Wind

Wind patterns are significantly different between winter and summer. Winter wind patterns generally consist of an easterly wind modified by a later night and early morning south-easterly land breeze. This changes in the afternoon to a north-westerly sea breeze. Wind speeds are at a maximum during the early morning, often exceeding 20 knots, and decrease during the afternoon and evening. The summer wind pattern consists of a prevailing westerly wind modified by a night and early morning south-easterly land breeze, and an afternoon north-westerly sea breeze. Wind speeds occasionally exceed 20 knots in the afternoon (Anon., 1979). Winds of up to 100 knots can be experienced during tropical cyclones.

1.3.6 Tides

Tides in the Dampier Archipelago are semi-diurnal with a maximum spring tidal range of 4.7 m and a minimum neap tidal range of 0.4 m. Storm surges may increase the tidal range by 2.0 m during cyclonic activity. Some islands (such as Goodwyn and Malus Islands) are regularly divided into 2 or more smaller islands by spring tidal activity.

1.4 LANDSCAPE

1.4.1. Landform

The Dampier Archipelago was formed 6000 - 8000 years ago when rising sea levels, caused by the melting of polar ice caps during the warmer interglacial period, flooded coastal valleys leaving hills and ridges exposed as islands (Merrilees 1979; Semeniuk *et al.*, 1982).

The islands range in size from rock islets of less than 1 ha. to Enderby Island, the largest, of 3290 ha. Dolphin is the highest island in the archipelago rising to 120 m above sea level.

Topographically, many of the islands resemble the adjacent mainland and Burrup Peninsula, and are steep and rugged, with coastal cliffs and large rock piles. These rock piles and cliffs are separated by valleys, beaches and coastal sandplains. Sparsely vegetated sand dunes rising to 3 m have formed at the landward margin of beaches and may also occur further inland on the sandplain. Drainage lines which run from the valleys across the sandplain to the ocean, cut through these dunes. Rock holes in the valleys fill with fresh water following rain, however no permanent fresh water source is known on the islands.

The small islets such as Millers and Nelson Rocks, and the islands to the north of the archipelago such as Hauy and Delambre, are low and flat, and the beaches are often backed by a low limestone cliff rather than a sand dune. These islands tend to be aligned around the seaward margin of the archipelago and represent remnants of the coastal dune system of an earlier period when the mainland shore was located further north than at present. At that time the igneous islands of today were rocky hills on a coastal plain.

1.4.2 Geology

The geology of the Dampier Archipelago Nature Reserves is described in Biggs (1976a), Biggs (1976b), Kriewaldt (1964), and Ryan (1966) and shown in Figure 3.

Unlike most island nature reserves off the north-west, which are composed of Cainozoic sediments younger than 64 million years old (Ma), many of the islands of the archipelago are composed of Precambrian volcanic and granitic rocks. The oldest rocks are Archaean granite and granite gneiss (older than 2800 Ma), which crop out on Dolphin, Tozer and Enderby Islands. These are unconformably overlain by the Mount Roe Basalt (about 2700 Ma) which consists of basaltic lavas and volcanogenic sediments. Intruded at the unconformity beneath the Mount Roe Basalt are granophyre and gabbro of the Gidley Granophyre. The youngest recognised igneous rocks in the area, are long and narrow dolerite dykes which cut all other Precambrian rocks. Beaches and

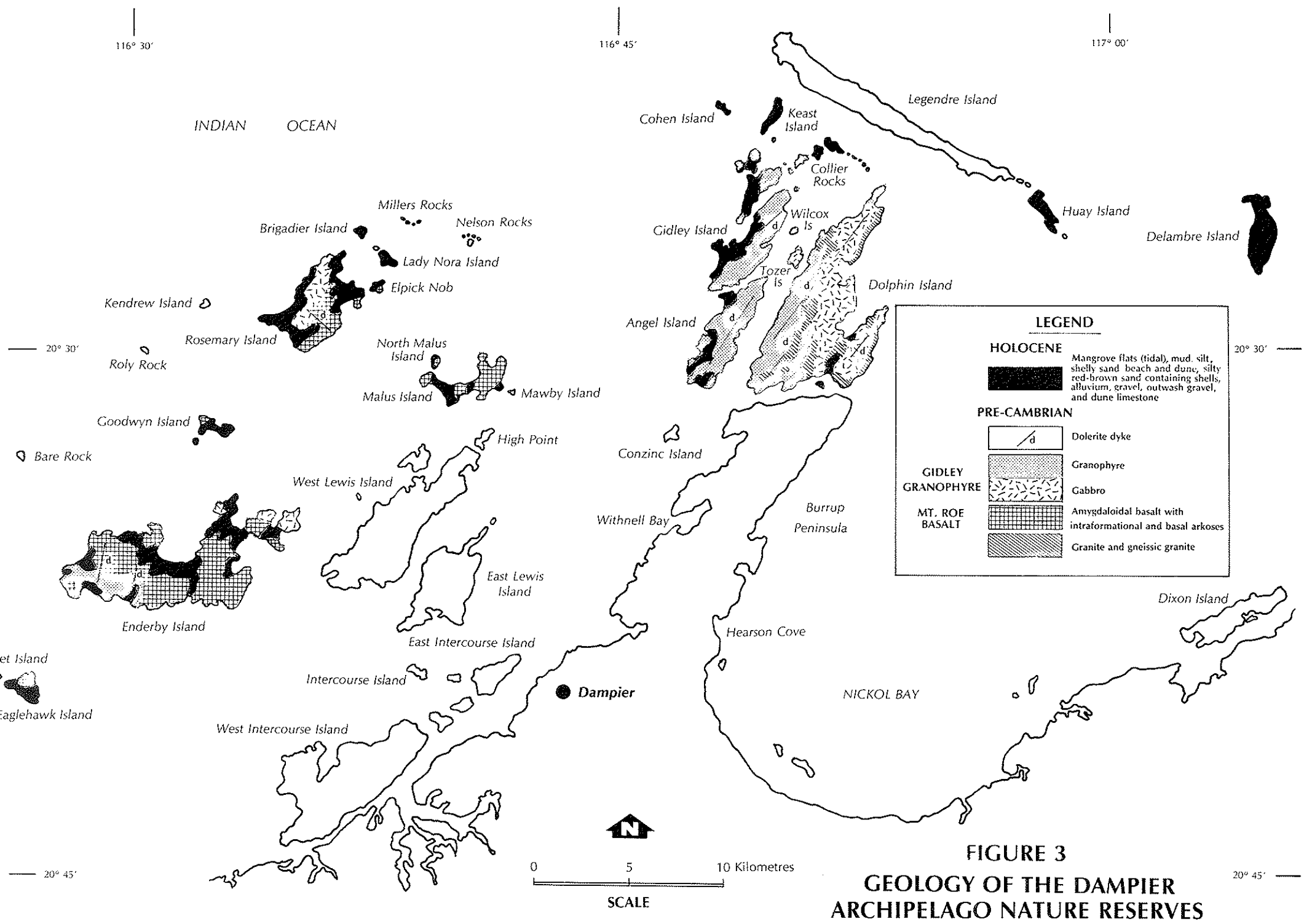

FIGURE 3
GEOLOGY OF THE DAMPIER ARCHIPELAGO NATURE RESERVES

sandplains of Holocene (less than 0.01 Ma) shelly sands have formed in the bays of the islands. Sandplains are more extensive on the western islands. Mud and silt replace the shelly sands in some bays. Older sand deposits occur further inland and some valleys contain weathered alluviums and red-brown silty sands.

The flatter islets and islands to the north of the archipelago are composed of Pleistocene dune limestone. Areas of fringing Holocene sands also occur on these limestone islands, however, most sandplain areas are pink-brown limestone derived sands.

1.5 IMPLICATIONS FOR MANAGEMENT

1. The existing status of islands in the Dampier Archipelago is confusing to the public and needs to be rationalised to ensure efficient management of the area.

2. Management planning, research and operational activities must consider the predominantly rugged and arid nature of the nature reserves. The beaches adjacent to sandplains are relatively easy points of access to many of the islands and hence will be a focus of any public activity. These areas will therefore require most attention with respect to management for public use. In particular, the sand dunes adjacent to the beaches are prone to erosion if disturbed.

3. The climate dictates that most public use of the nature reserves would occur during the winter months.

4. Many of the small islands and rocks do not have beaches and are relatively inaccessible to the public.

5. Many of the islands of the archipelago not covered by the plan including vacant Crown land should be considered for reservation in the future.

2.0 HISTORY AND LAND USE

2.1 ABORIGINAL OCCUPATION

The islands of the Dampier Archipelago show abundant evidence of previous occupation by Aboriginal people in the form of, for example, shell middens, stone "factory" sites, rock engravings, hunting hides and habitation sites. Recent evidence (Lorblanchet, unpublished

manuscript) suggests that Aboriginal people have utilised the area for probably 18 000 years, that is, well before rising seas isolated the coastal plains and hills as an archipelago approximately 8 000 years ago.

It is now believed that two groups utilized the islands (Rhoads and Gara, 1984). At the time of European settlement of the Roebourne district in the 1860s, the Yapurarra people were considered to be the traditional inhabitants of the Dampier Archipelago and Burrup Peninsula, and were referred to as the "island people" by the neighbouring Aboriginal groups. Some of the more western islands in the archipelago were also visited by the Martuyhinira people, a predominantly mainland group occupying land to the west of the Nickol Bay area.

It is estimated that the Yapurarra once numbered 100 - 120 individuals (Rhoads and Gara, 1984), but none now survive. These people used rafts to travel between the islands and made extensive use of the abundant marine life for food. Fresh water was available to them for part of the year from rock pools. Latz (pers. comm.) also suggests that shallow wells may have been dug in suitable areas on sandplains following rain. It is probably this group that Lieutenant Philip Parker King saw and communicated with during his visit to the Dampier Archipelago in 1818 (Lee, 1925). Their decline in the late nineteenth century followed the introduction of disease (such as smallpox), exploitation by whalers and pearlers, and violent confrontation with European settlers, for example the Flying Foam massacre in 1868 (Gara, 1983).

2.2 EARLY EUROPEAN EXPLORATION

The group of islands now known as the Dampier Archipelago were known to early Dutch navigators. It appears together with Barrow Island and the Montebello Islands on a chart drawn in 1628 for the Dutch East India Company (de la Rue, 1979).

The first recorded European visit to the Dampier Archipelago was made by the Englishman William Dampier in 1699. He landed on an island which he named Rosemary Island because of the presence of the plant *Olearia axillaris*, which reminded him of the English herb, Rosemary. However, it is now agreed that the island which bears this name today is not the one originally named by Dampier (King, 1817; Tuckfield, 1955; George, 1971). McIlroy (1979) suggests that Malus Island was the island visited by Dampier and the "Bluff Head" referred to was Courtenay Head on the north of Malus Island.

In 1772 St. Allouarn noted "Rosemary Island" while sailing from North West Cape to Timor, however no landing was made (Henn, 1934). In 1801 Nicholas Baudin in the "Geographe" named the group of islands Dampier's Archipelago, and apparently misinterpreted Dampier's naming Rosemary Island. Baudin named Malus Island and assigned the name Rosemary to an island 4 km

to the north-west of Malus Island. Legendre, Hauy and Delambre Islands were also named during this visit. Further east, Baudin named Depuch Island and the Forestier Archipelago. Lieutenant Philip Parker King made a more detailed excursion into the Dampier Archipelago during his voyage in the "Mermaid" along the north-west coast in 1818. During his 2 week visit Enderby, Gidley, the Lewis Islands and the Intercourse Islands were named, as was Nickol Bay to the east of the Dampier Archipelago.

In September 1851, Lieutenant F.B. Helpman visited the Archipelago in seach of guano deposits and made particular mention of "numerous fresh native foot marks on the beach..." and "... three graves lying side by side" on Enderby Island (McIlroy, 1979). These graves were believed to be of early whalers; however their exact location is not known, and they have not been found since.
The first party of Europeans to explore the inland Pilbara region landed at Hearson Cove, on the Burrup Peninsula, in 1861. This party under the leadership of F.T. Gregory, travelled from Fremantle in the "Dolphin" to determine the potential of the north west for agriculture. Dolphin Island was named after this ship, and several other features such as Pemberton, Walcott and Dixon Islands and Cape Lambert were named by Gregory after members of this expedition (Gregory and Gregory, 1884).

2.3 LAND-USE 1860-1960

Following Gregory's reports of good grazing land in the Pilbara in 1861, settlers journeyed from the south to establish the pastoral industry, and by 1866 the town of Roebourne had become established. Cossack was established as the port for Roebourne in 1872. Gregory also noted that pearl shell was abundant in the waters of the Dampier Archipelago and he took several valuable pearls with him when he returned to Fremantle. A pearling fleet soon became established at Cossack, and Flying Foam Passage, between Angel and Gidley Islands to the west and Dolphin Island to the east, became the major pearling area in the north-west between 1870 and 1900. In 1873, 500 people including Europeans, Malays, Chinese and Aboriginals were working in this area, and rock pools on Dolphin Island were used to supply fresh water for these operations. The remnants of a pearling camp can be found today in Black Hawke Bay on Gidley Island (MacIlroy, 1979). Flying Foam Passage was also used extensively during this period as a sheltered route for shipping between Cossack and Fremantle. Six graves on the west side of Dolphin Island are believed to be of pearlers.

From 1870 to 1872, a whaling station was established on Malus Island to process Humpback whales taken by longboats operating around the Dampier Archipelago (MacIlroy, 1979). Remains of the try pots and ovens are still evident, on that part of Malus Island now classified as Recreation Reserve 36910.

The stone ruins of a pastoral settlement are found on the east side of West Lewis Island. The date of occupation and name of lessee are not known; however it is thought to have been abandoned prior to 1900. It has been estimated that the stockyards were large enough to hold several hundred sheep, however the actual number was probably less due to watering constraints (MacIlroy, 1979). Several pastoral leases were granted by the Department of Lands and Surveys over islands in the Dampier Archipelago between 1900 - 1930, however the earliest of these post-dates the abandonment of the settlement on West Lewis Island.

Between 1900 - 1960, islands in the Dampier Archipelago were used for shelter and as campsites by commercial fishermen (oysters and wet line fishermen) from Point Samson and Onslow. During this period turtles and their eggs were taken commercially around the Dampier Archipelago and until 1936 a turtle meat canning company operated at Cossack. The last turtles were taken commercially in 1963 when the licenced fishermen ceased hunting in the area because the large tidal variation made the shallow waters too dirty to catch efficiently. Very little recreational activity was undertaken by the public as the population of the region was small and the islands were relatively inaccessible at this stage.

Two war time wrecks can be found on Enderby Island. One of these is the remains of the 30 ton yacht "Sedjatra" which was wrecked on the north west side in 1942 while en route from Indonesia to Fremantle after the Japanese invasion of Singapore. The other is the dismantled parts of a PBY 5 Catalina flying boat located on the east side of Enderby Island. This flying boat belonged to the 10th Air Wing of the United States Navy which operated from Crawley Bay (Perth), Geraldton and Exmouth between 1942 and 1944. During this time they conducted reconnaissance and night bombing raids over Japanese held islands in the Timor region. One of these flying boats was forced to put down in the sea near Enderby Island due to mechanical problems, and during the night broke its moorings and was washed ashore.

2.4 LAND-USE 1960-PRESENT

2.4.1 Recreation and Research

a) Background and Population Estimates

The majority of people using the islands for recreation are residents in the Shire of Roebourne towns of Dampier, Karratha, Wickham and Roebourne, all of which are within a 50 km radius of the archipelago.

When the Commonwealth Government eased restrictions of iron ore exports in 1960, exploration and development of ore deposits in the Pilbara proceeded rapidly, and since 1965, the permanent population of the Shire of Roebourne has increased dramatically (Table 3). The increase began in

1965 when Hamersley Iron Pty. Ltd. constructed the town and port of Dampier to accommodate the company's 2500 employees involved in the export of iron ore. The adjacent Dampier Archipelago, at this stage vacant Crown land, immediately became a focus for recreational activities and shacks were erected on Enderby, Malus, East Lewis and West Lewis Islands. From 1965-1976, the population increased 10 fold as further development of ports and towns for the iron ore industry occurred, in particular Karratha and Wickham. With the development of the North West Shelf Gas project by Woodside Offshore Petroleum Pty. Ltd. and with Karratha becoming a significant regional centre, by 1981, the population of the Shire of Roebourne was 14 887, the most populated of the 4 Pilbara local government areas. This trend is continuing. The second stage of the North West Gas Shelf project commenced in 1985, and this in addition to the proposed developments of the Channar iron ore deposit by Hamersley Iron Pty. Ltd. will result in an estimated increase in population to 18 000 by 1991 (Elliott, 1986).

Boat ownership rates are extremely high in these towns (approximately one boat to every 10 people in Karratha) and recreational use of the islands will increase as the population increases. In addition to the local population, the archipelago is also visited during the cooler months by organised marine charters and cruising yachts from elsewhere in Australia and overseas.

TABLE 3 **SHIRE OF ROEBOURNE POPULATION 1965-1991**

YEAR	POPULATION	DATASOURCE
1965	1 000	Elliott 1986
1976	10 650	Aust. Bur. Stat. Census 1976
1981	14 887	Aust. Bur. Stat. Census 1981
1985	15 500	Elliott 1986
1991	18 000	Elliott 1986

b) Public Use Survey

Between 1982 - 1985 regular surveys of public use of the archipelago were undertaken during holiday and non-holiday periods (Table 4). The following points characterise public use of the islands:

i) Because of the climate and topography of the islands, camping and day trips are restricted almost exclusively to the beaches.

ii) Campers and daytrippers prefer to use beaches on their own, avoiding other users. Hence they generally use nature reserve beaches, rather than "shack" beaches on recreation reserves for their recreational activities.

iii) Most camping occurs during long weekends or holidays in the cooler months (April - September). However because of the rostered day off system operated by the larger companies in the region, which provides long weekends for employees outside public holidays, some camping occurs during ordinary weekends. The maximum number of camps observed on the nature reserves was 32 (Easter 1984 - Table 4). If it is assumed that 4 people occupy each camp this equates to approximately 120 people.

iv) The extent of day trip use of nature reserves was more difficult to estimate, however up to 17 boats (approximately 70 people) at a time were observed on the islands, but not associated with a camp. Up to 150 boats were observed around the islands at any one time. These were mainly involved in amateur fishing and diving activities and fishermen often clean fish on the islands before returning to Dampier.

v) Many of the public users were not aware of which islands were nature reserves and which were not. Dogs often accompanied campers and day trippers, and open fires were used by campers.

c) Shacks

Apart from the North West Game Fishing Club facilities on Rosemary Island (See 1.2.3), all shacks are now located on recreation reserves 36907 (East Lewis Island) 36909 (West Lewis Island) and 36910 (part of Malus Island). Thirty-three shacks (June 1986) exist on these reserves. Three dilapidated shacks remain on Delambre Island, and the concrete floor of a shack removed in 1984 remains on Goodwyn Island. Some temporary frames have been left by the public on some nature reserve beaches.

d) Research Station

The Department of Conservation and Land Management controls a research station on Enderby Island, and this is used as a base for research and management operations in the Dampier Archipelago.

e) Airstrip and Vehicle Tracks

As part of their use of Rosemary Island prior to it becoming a nature reserve, the North West Game Fishing Club constructed an airstrip and a well on the north side of the island. Vehicle tracks connect these and other parts of the island to their base in Norbill Bay. Use of the airstrip was stopped in 1983, and in May 1985 explosives were used to break up the compacted airstrip surface to facilitate vegetation regrowth. Another track connects the marine navigation beacon on Rosemary Island with Norbill Bay and is used by the Department of Transport and Communications for servicing purposes.

TABLE 4 ESTIMATES OF THE MAXIMUM PUBLIC USE OF NATURE RESERVES IN THE DAMPIER ARCHIPELAGO FROM OCTOBER 1982 - OCTOBER 1985.

Approximately four people are associated with each boat or camp (--- No Observation)

		LONG WEEKEND/ HOLIDAYS		NORMAL WEEKEND	
	Number of Public Holidays	Max. No. of boats	Max. No. of camps	Max. No. of boats	Max. No. of camps
JAN	2	106	15	76	0
FEB	0	0	0	5	0
MAR	1	68	8	---	0
APR	2	151	32	53	0
MAY	1	23	0	53	0
JUN	1	25	11	8	1
JUL	1	79	4	72	0
AUG	1	117	7	---	0
SEP	1	43	12	37	3
OCT	1	86	4	12	3
NOV	0	0	0	---	0
DEC	2	---	0	---	0

2.4.2 **Mining and Industrial Use**

a) Mining Tenements for Limesand and Limestone

In 1968, an iron ore pelletizing plant commenced operating in Dampier. Associated with this Hamersley Iron Pty. Ltd. lodged applications for mining tenements covering the beaches and sandplain on many of the islands in the Dampier Archipelago (Rosemary, Enderby, Malus, Delambre, Hauy, Legendre, Keast, East Lewis and Goodwyn Islands, and Collier Rocks). These applications were for the extraction of limesand, used in the production of iron ore pellets, and limestone for possible use in future iron and steel production. Legendre Island in particular was identified as a possible strategic source of limestone deposits. Prior to creation of the nature reserves in 1980, Cabinet approved the application for mineral leases on Enderby Island, but refused those on Rosemary Island. When the majority of other islands were reserved for Conservation of Flora and Fauna (C36913), Cabinet decided that all existing and future applications for mining tenements be granted on no more stringent conditions than are reasonably required to protect the environment, and provide for adequate rehabilitation after the completion of mining. The pellet plant ceased operating in 1980 and no extraction of limesand or limestone occurred on any of the islands, although some exploratory pits were dug on Enderby Island. All limesand for the pellet plant was obtained from deposits at Hearson Cove on the Burrup Peninsula.

b) Radio Positioning Base Stations

With the development of the North West Shelf Gas Project in 1980, there have been regular requests by Woodside Offshore Petroleum Pty. Ltd. to erect temporary manned and unmanned radio positioning base stations on nature reserves in the Dampier Archipelago. Selection and ongoing use of these sites is covered by the guidelines within the document on low impact industrial use of islands (refer Appendix 1). Recently, permanent navigation aids were installed on Angel and Gidley Islands by Woodside to indicate the position of the submarine gas trunkline.

2.5 AQUACULTURE

Two leases have been granted in Flying Foam Passage under the Pearling Act 1912 one of which is for the production of *Pteria penguin* pearl oysters. These operations are currently managed from floating platforms. There are a number of other applications for leases for aquaculture in the area of the Archipelago, including requests for shore bases. To date these applications have not been approved.

2.6 POSSIBLE FUTURE LAND-USES

Because of the limited availability of suitable beaches on the mainland, and the preference by the public for water based recreational activities, use of the nature reserves by the public will increase as the populations of nearby towns (in particular Karratha) increases.

Mining tenements covering several of the nature reserves are still held by Hamersley Iron Pty. Ltd., and the extraction of limesand and limestone from them is possible in the future. Requests by Woodside Offshore Petroleum Pty. Ltd. for temporary radio base positioning stations on the nature reserves are likely to continue.

Until December 1987, Rosemary, Enderby and Goodwyn Islands were covered by petroleum exploration permit WA 192-P. This permit lapsed, however this area has again been offered for petroleum exploration under the Petroleum (Submerged Lands) Act 1967. Exploratory surveys of the waters and lands within this area are possible in the future. There could be requests for production facilities in the area if exploration indicated the presence of petroleum reserves. Currently the Dampier Archipelago is not affected by any Petroleum Act 1967 leases.

Legendre Island is vested in the Minister for Industrial Development because of its potential as a deep water port site (Gillespie, 1975). Should this proposal proceed, Legendre Island would be linked to the Burrup Peninsula with a causeway across several of the island nature reserves, and continuing through the proposed reserve on the northern Burrup Peninsula along a route to be determined by reference to natural and cultural values of the islands and the peninsula.

2.7 HISTORY OF RESERVE STATUS

The value of the islands of the Dampier Archipelago to nature conservation and for future recreational use was realised in 1962 when the Australian Academy of Science recommended that:

a) the Dampier Archipelago be gazetted as an "A" Class reserve comprising a national park; and
b) a biological survey should be undertaken with recommendations made concerning areas for public recreation and areas for the preservation of flora and fauna.

No further action was taken at that time but as the Pilbara iron ore industry developed so did recreational pressures on the islands. A detailed biological survey was undertaken (Burbidge and Prince, 1972) and the Conservation Through Reserves Committee (CTRC) recommended to the Environmental Protection Authority (EPA) in 1974 that the majority of the islands be declared Class "A" reserve for the Conservation of Flora and Fauna. It was also recommended that Enderby Island be reserved for recreation and conservation, and that other islands be left unreserved for future port sites and associated industries and for a causeway to Legendre Island.

The residents of Dampier and Karratha felt that the CTRC recommendations did not adequately provide for recreation and through their Dampier Archipelago Reserves Committee submitted proposals for 5 "open recreation" areas on the islands. These areas would allow for the construction of shacks, as well as camping and day trips.

In the EPA report to Cabinet in 1975, the CTRC recommendations were modified and provided for more recreation reserves than initially suggested.

In October 1977 Dolphin Island was declared a B Class reserve for the Conservation of Flora and Fauna. The Dampier Archipelago Recreation Advisory Committee (DARAC) was appointed in 1978 to advise the Minister for Conservation and the Environment on the management of proposed recreation reserves in the archipelago. However in 1980, before DARAC reported to the Minister, the majority of the islands were declared nature reserves with portions of some reserved for recreation. By this stage several shacks had been erected on some of the islands and their distribution to a large extent determined the positioning of the recreation reserves. Camping for up to 5 nights, and day trips were permitted to continue on nature reserves, however no permanent structures were to be erected (West Australian Wildlife Authority, 1980). Legendre Island remained vacant Crown land for possible future development as a port site (Gillespie, 1975).

In 1984, the reserve status of the islands was reviewed and all of East and West Lewis Islands (formerly nature reserves) became recreation reserves. The recreation reserve containing shacks on Malus Island remained as such, however all other recreation reserves on Rosemary, Angel, and Delambre Islands were cancelled and incorporated into the adjacent nature reserve. This resulted in the reserve status as presently exists (refer 1.2).

2.8 IMPLICATIONS FOR MANAGEMENT

1. The full significance of the Aboriginal sites in the Dampier Archipelago is unknown and a detailed site survey is required. Nevertheless, there is no doubt that the rock art on the islands has enormous cultural value.

2. Aboriginal sites and objects are protected under the Aboriginal Heritage Act 1972. It will be necessary to obtain permission from the Western Australian Museum before management operations, which may involve Aboriginal sites, can be undertaken.

3. The Dampier Archipelago has featured in the early coastal exploration and development of the north-west of Western Australia and several historic sites are known from the islands. Relics from more recent events such as the Second World War also occur. These sites and relics are

worth preserving for their educational and heritage values. Much is known about these sites and this information should be used in the interpretive process for the nature reserves.

4. With the development of the iron ore industry since 1960, recreational use of the islands has increased dramatically. Some environmental degradation has occurred and regulation of public use will be necessary to protect the nature reserves' conservation values.

5. Further increased recreational use of the islands will occur. The use of nature reserves for camping is incompatible with management objectives for nature reserves and it would be appropriate for the purpose of the islands to be changed to national park immediately. Further, it would be appropriate that, at the expiry of this plan, the recreation reserves be incorporated into the national park. The issue of shack licences on the recreation reserves will be resolved within the life of the management plan.

6. Further industrial use of the islands is likely. In particular, liaison should be maintained with Woodside Offshore Petroleum Pty. Ltd. regarding the location of permanent and non-permanent navigation sites and radio positioning sites on the nature reserves. Use of the islands for the extraction of limesands and limestone, or facilities for the petroleum industry would be subject to Government policy on mining and exploration in nature reserves, and the Environmental Protection Act 1986.

7. Ships conveying petroleum products through the archipelago together with the presence of a submarine gas/condensate pipeline and onshore bulk fuel handling and storage facilities present a possible threat of contamination to the Dampier Archipelago.

   Seabirds and marine life, including the shoreline and intertidal biota of the nature reserves are at risk.

3.0 BIOLOGICAL RESOURCES

3.1 FLORA

3.1.1. Collecting History

The islands of the Dampier Archipelago have considerable significance in the history of botanical research in Western Australia.

The first recorded collection of plants from the archipelago was by William Dampier in 1699. He collected specimens of the Sturt Pea *Clianthus formosus* and the native Rosemary shrub *Olearia axillaris*, and noted other species such as *Ipomoea pes-caprae* (George, 1971).

The botanist Alan Cunningham collected several species from the Dampier Archipelago in 1818 when he accompanied Philip King on a journey of exploration along the north-west coast. Species collected include the native fig *Ficus platypoda, Cynanchum floribundum, Swainsona pterostylis* and an *Acacia* sp. possibly *A. bivenosa* (Lee, 1925). The type specimen of the native tomato *Solanum phlomoides* was collected from Enderby Island by Cunningham (Purdie *et al.*, 1982).

In 1861, Pemberton Walcott collected from the "Dampier Archipelago" (probably Burrup Peninsula and Dolphin Island) while he waited for F.T. Gregory to return from exploring the inland Pilbara region. Many native grasses were included in his collection (Gardner ,1952).
In 1961 a W.A. Museum expedition, and in 1962 a joint W.A. Museum and W.A. Herbarium expedition visited several of the islands. Both collected flora specimens but a more detailed collection was undertaken in 1970 as part of a biological survey of the Dampier Archipelago (Burbidge and Prince, 1972). More recently Blackwell et al. (1979) have compiled a report on the flora and vegetation of the Burrup Peninsula and southern part of Dolphin Island. In 1987, Long (1988) undertook a flora survey of selected islands in the Archipelago, on behalf of CALM.

3.1.2. **Flora Composition**

Two hundred and eighty eight species of native terrestrial plants from 60 families are known from the Dampier Archipelago. The Poaceae and Papilionaceae are well represented. Six species are listed as poorly collected and/or geographically restricted in the Pilbara by Van Leeuwen (1983); *Terminalia supranitifolia, Trianthema turgidifolia, Brachychiton acuminatum, Triumfetta leptacantha, Paspalidium tabulatum,* and *Scaevola cunninghamii.* Further surveys may find that some of these species such as *Terminalia supranitifolia* and *Brachychiton acuminatum* are more widespread. Long (1988) recorded undescribed species of *Heliotropium* and *Paspalidium*, and the occurrence of *Scaevola amblyanthera*, a species not previously recorded in W.A.

Dolphin Island (3202 ha) is the most floristically diverse with 157 species. Enderby Island, of similar size (3290 ha), but of slightly different geological formation, supports 117 species of plant, although further surveys will possibly increase this number. The sandplain and water-course areas in particular on Dolphin Island support a diverse flora.

Currently there are no data on the intertidal marine flora, although it is obvious that there are many species of algae and sea-grass inhabiting the intertidal zone of the nature reserves. The sea-grass is of particular significance in providing habitat and feeding grounds for dugongs and turtles.

3.1.3 Introduced Plants

At least seven species of introduced plant are known from isolated areas in the archipelago. Buffel Grass *Cenchrus ciliaris* is well established on the old airstrip on Rosemary Island; Kapok Bush *Aerva javanica* occurs on some sandplains, and the prickly pear *Opuntia stricta* did occur on Enderby Island but was eradicated by departmental officers in 1985.

Opuntia is well established on East and West Lewis Islands and has been subject to control attempts by the Agriculture Protection Board. Spraying with the herbicide 245-T in 1979 was unsuccessful, however biological control trials with *Cochineal* insects (1984-1986) were successful. In October 1986 Cochineal insects were distributed to all Prickly Pear infestations around East and West Lewis Islands. Palms (*Cocos nucifera*) and a Tamarisk tree have been planted on the North West Game Fishing Club lease on Rosemary Island. A Palm *Phoenix dactylifera* has been planted near the well site on Rosemary Island. *Salsola kali*, which is common on many islands is now regarded an an introduced species (Wilson, 1984).

3.2 VEGETATION

The Dampier Archipelago lies immediately adjacent to the Abydos Plain in the Fortescue Botanical Province (Beard, 1975). The vegetation is predominantly Eremaean (desert tropical) in character, however the Burrup Peninsula, and Dolphin, Angel, and Gidley Islands are botanically different from the Abydos Plain with a higher number of Northern Botanical Province (Kimberley) species (Blackwell *et al.*, 1979). The rockpile formation of the islands, together with the higher humidities and incidence of dews on the coast contribute to this difference. The vegetation of the islands has been infrequently burnt and has been largely unaffected by pastoral and mining activities and represents a climax situation in most instances.

Beard (1975) broadly mapped the Dampier Archipelago as grass steppe plains (spinifex *Triodia pungens*) with no trees or shrubs. However, Burbidge and Prince (1972) recognised six vegetation associations in the Archipelago varying with soils and topography, and these form the basis of the vegetation description used in this management plan. The vegetation and flora of the Burrup Peninsula and southern portion of Dolphin Island have been assessed in detail by Blackwell *et al.* (1979) as part of the Environmental Review and Management Program for the North West Shelf Gas Development Project (EPA, 1979).

The vegetation associations, commencing at the lowest point on the landscape are:

a) Littoral Association

Mangrove communities occur as narrow bands of vegetation in sheltered locations such as tidal creeks or bays where the substrate is muddy. These attain a height of 4 m and form dense thickets on the shore line. Gordon (1983) estimates that approximately 330 ha of mangal (mangrove habitat) occur around islands in the Dampier Archipelago, predominantly on Enderby, Gidley and Dolphin Islands. The White Mangrove, *Avicennia marina*, is the most common species, with another five species known. The only Pilbara mangrove species not recorded on the islands is *Osbornia octodonta.*

Salt water tolerant communities are often found at the mouths of drainage lines and on the landward side of the mangrove communities. These areas are frequently inundated by sea water during spring tides. Dominant species include Salt Water Couch *Sporobolus virginicus, Halosarcia halocnemoides* and *Enchylaena tomentosa.* On the small limestone islets such as Nelson Rocks, which are subject to frequent salt spray, *Thelkeldia diffusa* is a dominant species.

b) Sandplain Association

Recently formed (that is in the last 6000 years or so) sandplains of shelly sands occur adjacent to many of the beaches in the Dampier Archipelago, particularly on the basalt and granophyre based islands. The sandplain vegetation is probably the most diverse of any association on the islands.

The vegetation is sparse low shrubs to 2 m dominated by native wattles *Acacia bivenosa* and *A. coriacea* and *Myoporum acuminatum* over mid-dense hummock grasses *Spinifex longifolius* and *Triodia pungens.* Bloodwood Eucalypts *Eucalyptus terminalis* and Weeping Box *E. patellaris* to 4 m occur on sandplains at the west end of Enderby Island. These species also occur on rocky soils on Dolphin Island. Annual species such as the Sturt Pea *Clianthus formosus, Swainsona pterostylis* and *Trichodesma zeylanicum* appear following rain, particularly along drainage lines.

The creeper *Ipomoea pes-caprae* is common on the foredunes. On the pink-brown sandplains of the limestone islands, dominant species include *Triodia* spp., *Salsola kali, Ptilotus exaltatus, Sorghum plumosum* and *Sarcostemma australe.*

c) Run-on Areas and Flats Association

These are areas of heavier alluvial soils which become water logged or flooded after heavy rain. They support a variety of mid-dense grasses, and a few shrubs. Dominant species include the grasses *Sorghum plumosum, Setaria dielsii, Chrysopogon pallidus* and *Eulalia fulva*, the ground covers *Tribulus occidentalis* and*Mukia maderaspatana*, and shrubs *Sesbania cannabina* and *Cassia venusta.*

d) Drainage-lines Association

Drainage lines among the rocky slopes of the larger islands support a diverse array of flora particularly on Dolphin Island. The vegetation consists of sparse trees and/or shrubs to 4 m, predominantly *Eucalyptus microtheca, E. terminalis, E. patellaris*, and *Terminalia canescens,* over sparse shrubs to 2 m including *Sarcostemma australe, Cassia* spp. and *Sesbania cannabina.* Where water is retained in rock pools for long periods *Cyperus vaginatus* and *Scirpus litoralis* occur. Dense *Triodia angusta* tussocks grow in drier water courses.

e) Rocky Slope Association

This is the most common association in the archipelago and is probably Beard's "grass steppe".

The vegetation consists of very sparse shrubs (less than 2 m) of *Acacia pyrifolia, Grevillea pyramidalis* and *Hakea suberea*, over mid-dense hummock grass *Triodia wiseana*, on rocky soils. Other grasses such as *Themeda australis* and *Eriachne obtusa* also occur.

A very sparse vegetation cover is found on the higher rock piles and outcrops. On Dolphin, Angel and Gidley Islands, the vegetation consists of small pockets of fire-sensitive tree and shrub species such as *Brachychiton australe*, native figs *Ficus platypoda* and *F. virens,* Weeping Pittosporum, *P. phylliraeoides* and *Terminalia supranitifolia.* Grasses such as *Triodia wiseana* and *Themeda australis* occur where soil has accumulated. The rocky areas of Enderby and Rosemary Island are not as diverse.

The rocky outcrops on the limestone islands are less rugged, but they also support sparse shrubs to 2 m, predominantly *F. platypoda* and *P. phylliraeoides.*

3.3 FIRE HISTORY

Fires are likely to have occurred on the islands in the past through burning by Aboriginal people, and wild fires as a result of lightning strike.

The Yapurarra people who occupied the islands of the Dampier Archipelago prior to the 1860s would have used fire for a variety of management purposes including regeneration of food plants, clearing camp sites, and hunting. These fires were regular, but probably only covered small areas of land, producing a mosaic of vegetation seral stages. Superimposed on this, occasional lightning strikes may have produced more extensive fire patterns. Since the 1960s these less frequent, but more extensive fires have been the pattern, and this is reflected in the climax and in some instances, senescent vegetation seral stages, which dominate on the islands. Thus in the last 100 years or so, the "natural" fire regime has changed from one of small but frequent fires to one of large but less frequent fires.

Aerial photography taken in 1957 does not show any discernible fire scars on the islands in the Dampier Archipelago. In November 1979 a wildfire burnt the majority of Angel Island, having escaped from a signalling fire lit by stranded fishermen. In October 1982, another wildfire presumably started by a lightning strike burnt a large portion of Legendre Island. In January 1987, approximately 200 ha on the south east side of Dolphin Island was burnt. This fire was contained by the lack of vegetation on the rocky slopes. In August 1988, approximately 9 ha at the east end of Hauy Island was burnt as a result of an escaping camp fire, and in January, 1989 the majority of Collier Rocks was burnt. No other wildfires are known since the town of Dampier was established in 1965. There are however fire scars possibly 20 - 50 years old on the eucalypts at the western end of Enderby Island.

In 1980 a small area on the east end of Enderby Island was deliberately burnt by Department of Fisheries and Wildlife personnel as part of the research program into the requirements of Rothschilds Rock Wallaby, *Petrogale rothschildi.*

3.4 FAUNA

3.4.1 Collecting History

Notes on the fauna of the Dampier Archipelago, particularly sea-birds and turtles, were made by William Dampier in 1699. Alan Cunningham recorded some of the marine fauna during King's visit to the Dampier Archipelago in 1818 (Lee, 1925). In 1901 J.T. Tunney collected the first specimens of the native rodent *Rattus tunneyi* from the Lewis islands and Rothschilds Rock Wallaby *Petrogale rothschildi* from Enderby Island. F. Lawson Whitlock recorded several nesting sea-birds in the Dampier Archipelago in 1918 (Whitlock, 1918; Serventy and Whittel, 1976). Several vertebrate and invertebrate specimens were collected during W.A. Museum visits to the islands in 1961, 1962, 1971 and 1972 (Kendrick 1961; Kitchener and Vicker, 1981). The first detailed biological survey of the Dampier Archipelago was undertaken in 1970 (Burbidge and Prince, 1972), following a recommendation by the Australian Academy of Science in 1962 that the islands become Class A reserves. Further biological surveys have been undertaken by Connell (1983) and by CALM between 1982 - 1986 during the preparation of this management plan. A collection of aquatic invertebrates from a freshwater rock pool on Dolphin Island was made in March 1984, and a collection of terrestrial invertebrates, predominantly insects, was undertaken on Enderby and Rosemary Islands and Nelson Rocks in July 1985 by Mr P. McMillan.

There has been limited study of the marine fauna of the archipelago. A W.A. Museum field team made an extensive collection of invertebrates on the shores of Rosemary Island in 1961, and conducted an intensive study of a population of Crown of Thorns Starfish at Kendrew Island in 1972-74 (Wilson and Marsh, 1975). During the latter study a detailed survey was made of the

intertidal fauna at Kendrew Island, but the results have not been published. Further study on the marine flora and fauna was made by the Department of Conservation and Environment in 1981-84, including some habitat mapping of the shallow zones of the archipelago. Resulting from that project Simpson (1985) published an important paper on mass spawning by corals in the archipelago.

3.4.2 **Faunal Composition**

a) Mammals

Twelve species of native mammal, including 3 species of marsupial, 5 species of rodent and 4 species of bat have been recorded from the islands in the Dampier Archipelago (refer Appendix III). One of the bat species, the Little Red Flying Fox *Pteropus scapulatus* is known only from remains of one individual collected on a beach at Enderby Island. This species is probably a rare visitor to the islands although common on the mainland along the coast.

Three introduced mammal species are also known from the islands, and another, the sheep *Ovis aries* was kept on West Lewis Island between 1890 - 1900. The European Red Fox *Vulpes vulpes* and Feral Cat *Felis catus* occur on the islands adjacent to the Burrup Peninsula: Dolphin, Angel, Gidley, Keast, Legendre and Hauy Islands, and Collier Rocks. Over the last 50 years they have invaded these islands from the Burrup Peninsula which at low tide is connected to Dolphin Island. Control of foxes and cats on the Burrup Peninsula and adjacent islands has been undertaken since 1980 using meat baits impregnated with lethal doses of 1080 (sodium fluoroacetate). Tolerance trials undertaken by the Agriculture Protection Board indicate that at the doses used, this baiting is not lethal to the native fauna, which has a natural resistance to the effects of 1080 (King, 1989; King *et al.*, 1989). The House Mouse *Mus musculus* occurs on Dixon Island.

On the Burrup Peninsula, Tingay (1978) and Butler (1983) recorded 12 species of native and 4 species of introduced mammal. The presence of the introduced Black Rat *Rattus rattus* is of particular concern as this species has readily colonized other north-west islands, where it is the subject of eradication programs.

At least 8 species of marine mammal occur in the waters around the Dampier Archipelago: the Dugong *Dugong dugon*, Humpback Whale *Megaptera novaehollandiae*, Risso's Dolphin *Grampus griseus*, Bottlenosed Dolphin *Tursiops truncatus*, Indo-Pacific Hump-backed Dolphin *Sousa chinensis*, False Killer Whale *Pseudorca crassidens* and the Southern Bottle-nosed Whale *Hyperoodon planifrons*. Many of the shallow bays and areas between islands are used by the Dugong for feeding on sea grasses. Humpback whales and their young are often seen among the islands from July - September on their way to southern waters. Between 1870 - 1872 they were taken by whalers in the archipelago and processed for oil on Malus Island.

b) Birds

One hundred and two species of bird have been recorded in the Dampier Archipelago (refer Appendix V). One species, the Mangrove Kingfisher *Halcyon choloris* was gazetted under the Wildlife Conservation Act 1950 as fauna which is likely to become extinct or is rare (Government Gazette 2/12/88). More recent assessment however, has exposed a broader range than previously known, and the endangered status of the Mangrove Kingfisher is currently in the process of being revoked. The larger Enderby and Dolphin Islands, with their more diverse vegetation, support the most species, 71 and 69 species respectively. The close proximity of these islands to the mainland also contributes to their avian species diversity.

At least 25 species (10 land bird species and 15 sea and shore bird species) are known to breed on the islands. As many of the land birds are resident on the islands, the number of species breeding is probably higher than indicated. Many of the smaller islands and islets such as Goodwyn and Keast Islands, and Nelson Rocks are important as sea bird nesting sites. Some sea birds such as the Fairy and Bridled Tern are only present in the archipelago during their breeding season, while others such as the Osprey, White-breasted Sea Eagle and Silver Gull are present throughout the year. Migratory waders, which are protected under a joint agreement between the Australian, Japanese and Chinese Governments, use the archipelago's beaches and mud flats as feeding and resting sites during their long flights between Australia and their breeding grounds in northern Russia. Eighty-eight species of bird have been recorded on the Burrup Peninsula (Tingay and Tingay, 1978).

c) Reptiles

Forty-one species of terrestrial reptile are known from the Dampier Archipelago (refer Appendix VI). This is a more diverse terrestrial herpetofauna than either Barrow Island (35 species) or the Burrup Peninsula (32 species). Dolphin Island supports nearly half (20 species) of the total known for the Archipelago. The Pilbara Olive Python *Morelia olivacea barroni,* which shelters in rock piles and feeds in adjacent areas is gazetted as fauna which is in need of special protection (Government Gazette 2/12/88). The Mulga or King Brown Snake *Pseudechis australis* is the only dangerous reptile recorded. However, the Desert Death Adder *Acanthopis pyrrhus* has been recorded on the Burrup Peninsula (Butler, 1983) and possibly also occurs on islands in the archipelago, particularly Dolphin Island.

Four species of marine turtle, the Green *Chelonia mydas*, Hawksbill *Eretmochelys imbricata*, Flatback *Natator depressus* and Loggerhead Turtle *Caretta caretta*, use the beaches of the Dampier Archipelago for nesting during the summer months (refer Appendix VI). Up to 12 species of sea snake could occur in the waters off the Dampier Archipelago (Cogger 1979). These are potentially dangerous.

d) Amphibians

Two species of frog, the Desert Tree Frog *Litoria rubella* and Main's Frog *Cyclorana maini* have been recorded from fresh water rock holes on Dolphin Island (refer Appendix VI). These are also found on the Burrup Peninsula and are widespread in the Pilbara.

e) Freshwater and Terrestrial Invertebrate Fauna

The limited surveys undertaken suggest that the Dampier Archipelago supports a diverse invertebrate fauna. At least 16 species of aquatic invertebrate occur in the fresh water rock pools of Dolphin Island, and at least 152 species of predominantly terrestrial invertebrates (Arthropoda) occur on Enderby Island. Of particular interest are the attractive Jewel Beetles (Family Buprestidae) which are protected in Western Australia under the Wildlife Conservation Act 1950. Of the nine species recorded on Enderby Island, four are yet to be described. In arid areas, Jewel Beetles act as pollinators for many of the native plant species. On Enderby Island they are associated predominantly with flowering *Acacia* spp.

Three species of land snail (family Camaenidae) have been collected from various islands: *Thersites convicta, Bellrhagada plicata* and *Kimboraga* sp. Land snails are important for the breakdown of vegetation litter and returning of nutrients to the soil. They rely on dense vegetation cover, especially spinifex *Triodia* for survival through the dry periods of the year.

f) Marine Invertebrate Fauna

The intertidal zone of the Dampier Archipelago is characterised by wide sandflats and mudflats, rocky shores, coral reefs and mangals, all of which support an extremely abundant and diverse invertebrate fauna. Although there is no published account, the common species are well known.

Included in the marine intertidal fauna there are a number of molluscs which are avidly collected by amateur and commercial conchologists. Some of these species, the volutes for example, have direct development. That is, the young hatch direct from attachment egg masses and there is no planktonic dispersal stage, so that they are vulnerable to local extinction from over collecting.

Since the nature reserves extend to low water mark, the intertidal fauna is protected in the same way as the terrestrial fauna of the islands.

3.5 NATURE CONSERVATION VALUES

3.5.1 Diverse Biotic Assemblages

The majority of the larger islands in the Dampier Archipelago are different geologically from other Pilbara offshore islands, being composed of Proterozoic basalts and granophyres, and

Archaean granites, rather than Quaternary and Tertiary limestones. They are similar to, and biologically representative of the range country of the Pilbara mainland but have not, however, been subject to the same disturbance since European settlement, particularly from mining and pastoral activities. Hence, they still support a high diversity of flora and fauna which contributes significantly to the biota of the Pilbara region. Approximately 32 percent of the flowering plant species and 30 percent of the vertebrate fauna species known from the Pilbara region, occurs on the islands.

3.5.2 **Undisturbed Vegetation/Habitat**

The undisturbed vegetation associations are known to be important for the continued survival of much of the fauna. The sandplain and mangrove associations are particularly important and vulnerable to disturbance. Mammals such as Rothschilds Rock-wallaby, Little Northern Native-cat and Common Rock-rat forage on sandplains adjacent to their rock pile refuges. Tunneys Rat and the Sandy Inland Mouse are totally restricted to sandplain habitat. Many of the larger shrubs and trees occur on sandplains and these are important as nesting sites for many of the resident land bird species. Mangrove communities are also a vital natural resource in terms of plant primary production, feeding and breeding areas for a wide array of marine, terrestrial and aerial fauna, and as important stabilizing agents for beach areas subject to erosion.

3.5.3 **Infrequent Fires**

The biotic assemblages on the islands have been subject to some fire disturbance in the past (refer 3.3). However, they have been spared the frequent extensive fires that have characterised the mainland since European occupation, and which have been implicated in the decline of certain native mammal species over the last 50 years (Burbidge, 1985). Blackwell et al. (1979) comment :

> *The most difference between Dolphin Island and the Burrup Peninsula is the density and development of vegetation. In the absence of fire on Dolphin Island, the plant communities have developed to the climax stage with deep, almost continuous ground cover of* Triodia *hummocks and relatively clear boundaries between communities. On the Burrup Peninsula however, wide ranging fires during the last decade have exposed substrate and obscured boundaries between communities.* And: *On the peninsula the rarest species and plant communities were in unburnt areas.*

3.5.4 **Absence of Introduced Species**

Because of their relative isolation many of the islands in the archipelago have not been invaded by introduced plants and animals and hence support populations which are close to their most

"natural" state. Some introduced species do occur on the islands, however they are restricted in distribution and can be controlled effectively. The introduced fox and cat have been implicated in the decline of many medium sized marsupials such as rock wallabies. Enderby and Rosemary Islands support the only feral animal free populations of Rothschilds Rock Wallaby, a species which is restricted to the Pilbara region. The breeding of sea-birds and marine turtles is also enhanced by the absence of introduced predators.

3.5.5 **Breeding and Refuge Sites for Marine Species**

The islands provide important undisturbed nesting and refuge sites for several marine species. Sixteen species of sea-bird and 10 shore-bird species nest on the islands. Most species breed during the winter months, however throughout the year there is at least one species nesting at any one time (Table 5). The nesting record of the Australian Pelican on Keast Island is only the eighth location for the State (Serventy and Whittel, 1976). The Wedge-tailed Shearwater reaches close to the northern limit of its breeding range in the Dampier Archipelago, and the Bridled Tern is close to its northern breeding limit (Serventy and Whittel, 1976). The Fairy Tern has declined in the south-east of Australia, largely due to its habit of nesting on mainland beaches during the summer months. In W.A. this decline is not as noticeable, but protected island nesting sites such as the Dampier Archipelago may become important for this species in the future. Many other sea-birds (for example, Pied and Sooty Oyster-catchers, and Caspian Tern) also nest on exposed beaches or amongst vegetation close to beaches such as *Spinifex longifolius*. Several species of migratory waderbirds use the beaches and mudflats in the Dampier Archipelago as resting and feeding areas during their long flights between southern Australian feeding areas and northern hemisphere breeding sites. Waders and their habitat are protected by a joint agreement between the Governments of Australia, Japan and China.

Four species of marine turtle nest on beaches in the Dampier Archipelago during the summer months, and these are being tagged as part of a long term turtle tagging program which will provide information on the movements of turtles, both within and outside Australian waters and on their reproductive behaviour. All are protected in Australian waters. One of these, the Flatback Turtle, is believed to be endemic to Australian waters however the others, especially the Green Turtle, are thought to be migratory and are taken in south-east Asian waters for food and shell. Nesting sites are also prone to disturbance in these areas. Mangrove lined creeks on the islands are important habitat as feeding and refuge areas for juvenile turtles.

TABLE 5 BREEDING OF SEA AND SHORE BIRDS IN THE DAMPIER ARCHIPELAGO

	MONTH											
	J	F	M	A	M	J	J	A	S	O	N	D
Wedgetailed Shearwater	'----------									----------		
Australian Pelican	'----------											---'
Eastern Reef Heron								'----------				
Mangrove Heron								'----------				
Osprey					'----------							
Brahminy Kite								'----------				
White-breasted Sea Eagle								'----------				
Beach Stone-curlew								'----------				
Pied Oystercatcher								'----------				
Sooty Oystercatcher								'----------				
Red-capped Plover								'---------				
Silver Gull	'-------											
Caspian Tern							'----------					
Bridled Tern	'-------										----------	
Fairy Tern								'----------				
Crested Tern				'----------								

3.5.6 **Species of Special Interest**

The Dampier Archipelago supports two species of vertebrate fauna, the Mangrove Kingfisher and Pilbara Olive Python, that are gazetted as fauna which is likely to become extinct or is rare, or otherwise in need of special protection. Several species of protected Jewel beetles (Family Buprestidae) occur on the islands. Several of the plant species found on the islands are considered to be geographically restricted, presently undescribed, or in need of taxonomic revision, and at least one species, *Scaevola amblyanthera*, was previously thought not to occur in W.A.

The islands also support several species with an unusual geographical distribution. While the flora is Eremaean in general character, it contains a group of species more typical of the Kimberley region. These are found almost exclusively in the more humid, moist and fire free rock pocket, and creek bed areas of Dolphin, Angel and Gidley Islands, but do occur in similar locations on the Burrup Peninsula. Several of the faunal elements are also considered to be Kimberley species. The Little Northern Native-cat and Common Rock-rat have extensive distributions across the north of Australia, but penetrate the Pilbara, including the Dampier Archipelago. Tunney's Rat occurs on many of the islands in the Dampier Archipelago, however it is not found on the Pilbara mainland although occurring in the neighbouring Kimberley and Shark Bay regions. Some birds such as the Jabiru and Brown Booby approach the southern extremity of their distribution in the vicinity of the Dampier Archipelago.

3.6 IMPLICATIONS FOR MANAGEMENT

1. The maintenance of the islands' conservation values should be the primary objective of management.

2. The sandplain and beach areas of the islands will require particular management attention as they are the most likely areas to be subject to degradation through public use (e.g. erosion, escaped camp fires, collection of firewood) and are potential areas for the mining of limesand. The sandplain areas support a diverse array of flora and fauna. Beaches are important as sea-bird and marine turtle nesting sites.

3. Knowledge of appropriate fire management practices is lacking. Research should be directed towards this as soon as possible.

4. The location of plant species considered to be geographically restricted, presently undescribed, or in need of taxonomic revision needs to be known by CALM's regional personnel, to ensure that management operations do not unintentionally affect these species.

5. Continued monitoring of sea-bird and marine turtle nesting sites is essential if the success of management strategies advocated in this plan is to be determined. Most sea-bird breeding occurs during the winter months when most use is made of the islands by the public for recreation.

6. Management strategies should include a continuation and refinement of the control programs for foxes and feral cats on the northern portion of the Burrup Peninsula and adjacent islands. Weed control should be implemented where necessary.

7. Unlicensed shell collecting in the nature reserves' intertidal zones is, by definition, illegal. Because of the breeding strategy of many target species, especially the volutes, shell collecting can cause local extinction. It is necessary to ban shell-collecting in these areas except that which is conducted for scientific or educational purposes under permit. This ban applies to both living and dead shells.

PART B

PLAN FOR MANAGEMENT

4.0 MANAGEMENT OBJECTIVES

4.1 GENERAL OBJECTIVES

This management plan recommends that the purpose of the nature reserves in the Dampier Archipelago be changed to National Park. Given the conservation, historic, archaeological and recreational values of the reserves, this purpose is considered to be the most appropriate.

Objectives for the management of nature reserves in Western Australia are laid out in Section 56(1)(d) of the Conservation and Land Management Act 1984, hereinafter referred to as the CALM Act:

> *... to maintain and restore the natural environment, and to protect, care for, and promote the study of, indigenous flora and fauna.*

No provision is made in these objectives for recreation on nature reserves. However such provision is made in the objectives for management of national parks in W.A., and this status would be more appropriate to the islands which are presently nature reserves in the Dampier Archipelago.

Objectives for management of national parks in W.A. are laid out in Section 56(1)(c) of the CALM Act :

> *... to fulfill so much of the demand for recreation by members of the public as is consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest.*

The 25 islands vested in the National Parks and Nature Conservation Authority as nature reserves and referred to within this plan as the Dampier Archipelago Nature Reserves, are recommended to become a single management unit to be referred to as the **Dampier Archipelago National Park.**

The creation of the national park is the prerogative of Parliament, which the Authority hopes will agree to the change proposed. Those actions proposed in this plan which require the status of National Park will need to await such time as changes in purpose are made.

4.2 SPECIFIC MANAGEMENT OBJECTIVES

Giving due consideration to the above, the following are the management objectives for the islands of the Dampier Archipelago subject to this plan:

a) To conserve the flora and fauna, in particular to maintain the full complement of native species present, their habitats, and the natural ecological processes which sustain their communities;
b) To conserve the physical landscape;
c) To protect archaeological and historic values; and
d) To provide for the proper recreational and educational use of the islands, consistent with a), b) and c) above.

5.0 MANAGEMENT FOR CONSERVATION OF FLORA, FAUNA AND LANDSCAPE

To conserve the flora, fauna and physical landscape of the islands subject to this plan, active management is required in the following areas:

a) Fire protection;
b) Control of introduced plants;
c) Control of introduced animals;
d) Control of access for mining and industrial purposes;
e) Habitat degradation and rehabilitation; and
f) Research and monitoring.

5.1 FIRE PROTECTION

OBJECTIVES

1. To protect and enhance the wildlife conservation values of the Park.

2. To protect the lives of visitors, staff and firefighters.

3. To protect community values on the islands, including Departmental facilities and equipment.

4. To use fire cautiously in the management of vegetation and wildlife habitat.

5. To reduce the incidence of wildfire resulting from human activity.

RATIONALE

The usefulness of fire as a management tool on semi-arid tropical islands is poorly understood. Little is known of the relationship between fire and the maintenance of habitat diversity in these situations. Some use of fire by Aboriginal people for hunting, signalling, and habitat modification probably occurred as it did on the mainland.

The islands have been subject to infrequent wildfires from either lightning strikes or escaped campfires and with increased public use of the islands these events are likely to continue. Frequent fires can have a detrimental effect on the environment through the degradation of native vegetation, and subsequent erosion, and the promotion of introduced plant species. The physical features of the islands will influence the extent of wildfire spread. On the larger islands, the poorly vegetated rocky slopes and mangrove lined creeks and mudflats will probably restrict fire to the sandplain areas. Smaller, sandy islands will be totally burnt.

Most, if not all recreational use occurs on the island beaches. Also there are few facilities present on the islands. As a consequence, the requirement to protect life and property by establishing fuel reduced areas is restricted to the limited circumstances of protecting Departmental facilities.

The use of fire will be directed primarily towards experimental manipulation of habitat for wildlife conservation.

STRATEGIES

1. Until further research is conducted on the relationship of fire to the maintenance of habitat diversity on semi-arid northwest islands, a no planned burn policy for the islands will be implemented.

2. The Departments ability to suppress a wildfire on the nature reserves is limited. Attempts should be made if possible, particularly where small islands are involved. CALM personnel and equipment will also be available to assist in the control of wildfires on recreation reserves.

3. A contingency plan for action in the event of a wildfire will be prepared. Control of a wildfire on the islands will be the responsibility of the senior CALM officer present.

4. Burn-back techniques are an appropriate form of fire control on the islands. The extensive use of sea water is undesirable as salt water significantly inhibits vegetation regeneration in arid environments.

5. There is no immediate requirement for firebreak construction on any of the islands, with the exception of a cleared area around the Enderby Island Research Station for the protection of buildings and equipment. If a need is seen for firebreak construction in the future, flora surveys of the area will be undertaken prior to construction to ensure that no species which are rare or in need of special protection are affected.

6. The public will be permitted to use only gas cooking equipment. Open camp fires on the nature reserves will be prohibited.

7. The staff in the Dampier Port Authority control tower on the Burrup Peninsula have a commanding view of the Dampier Archipelago and have been requested to inform CALM in Karratha of any fire occurring on the islands.

5.2 CONTROL OF INTRODUCED PLANTS

OBJECTIVES

1. To preserve the natural flora assemblages on the islands.

2. To prevent the introduction of exotic plants to the islands.

3. To control and, where appropriate, eradicate plants not native to the islands, wherever these occur.

RATIONALE

Several species of introduced plant already occur on the islands. These, in particular the grasses, are capable of spreading rapidly and competitively excluding native species once the soil has been disturbed. With the increasing use of the islands for recreational and industrial purposes the spread of existing species and the introduction of other species is possible unless precautionary steps are implemented.

STRATEGIES

1. A survey of all the islands subject to this plan will be undertaken to determine the extent and distribution of introduced plant species.

2. Departmental personnel will ensure that introduced plant species are not spread onto, or around, reserves during the course of research projects or management operations. Similarly, industrial use of the reserves will be subject to environmental hygiene conditions which prevent the spread of exotic species onto the islands (Appendix 1).

3. Eradication of introduced species such as Tamarisk, Kapok Bush and *Opuntia* will be attempted. Buffel Grass, spread throughout a number of the islands, for example in the vicinity of the old airstrip on Rosemary Island, would be controlled only in areas of human disturbance and where small outbreaks occur.

4. In co-operation with the Agriculture Protection Board, the Prickly Pear infestations on East and West Lewis Islands will be monitored to determine the effectiveness of the recent biological control attempts. Until the Prickly Pear has been eradicated, the islands close to East and West Lewis Islands will be monitored for fresh outbreaks. To achieve total eradication it might be necessary to invoke other control measures.

5. Leaseholders on recreation reserves will be allowed to grow endemic island species around their shacks. Planting of exotic species will not be allowed, to prevent their spread to adjacent nature reserves.

6. The existing conditions for occupancy of the Special Lease in Norbill Bay by the North West Game Fishing Club do not include reference to the planting of exotic plant species. Palms and a Tamarisk tree have been planted on the lease. Further plantings of exotic species should be discouraged and requests for shade trees referred to CALM.

5.3 CONTROL OF INTRODUCED ANIMALS

OBJECTIVES

1. To preserve the natural faunal assemblages on the islands.

2. To prevent the introduction of exotic animals.

3. To control and, where appropriate, eradicate animals not native to the islands, wherever these occur.

RATIONALE

Introduced animal species are known to have a detrimental effect on native fauna. The fox and feral cat have occupied the islands to the north of the Burrup Peninsula for at least 50 years and have been implicated in the decline of the rock wallaby *Petrogale rothschildi*. Other small mammal species, birds, reptiles and turtle nesting have probably also been affected by these predators. It is possible that the other introduced species on the Burrup Peninsula, the Black Rat *Rattus rattus* and House Mouse *Mus musculus*, will move north to colonise the islands, and compete with the native rodent species.

STRATEGIES

1. Regular control of fox and cat populations will be undertaken on the northern portion of the Burrup Peninsula and adjacent islands using meat baits impregnated with lethal doses of sodium monofluoroacetate (1080). Complete eradication of these species is not possible because of the connections at low tide between the Burrup Peninsula and Dolphin Island, however populations will be maintained at acceptably low levels. Control work on the Burrup Peninsula will be undertaken in liaison with Woodside Offshore Petroleum Pty. Ltd.

2. The spread, if any, of the introduced rodents *Rattus rattus* and *Mus musculus* on the Burrup Peninsula will be monitored. Woodside Offshore Petroleum will be requested to include this in their regular fauna monitoring programs. Dolphin Island will also be monitored regularly by CALM for *Rattus* and *Mus*.

3. To prevent the further introduction of exotic fauna onto the islands subject to this plan, no pets or any other animal will be permitted to be taken onto any such islands in the archipelago.

5.4 CONTROL OF ACCESS FOR MINING AND INDUSTRIAL PURPOSES

OBJECTIVE

1. To ensure that mining and industrial activities do not reduce the conservation values of the islands.

RATIONALE

The developments which have led to the Dampier Archipelago becoming a focus for recreational activities have also led to its use and potential use for mining and industrial purposes. It is possible that in the future Hamersley Iron Pty. Ltd. will seek to exercise their option to mine limesand and limestone from leases on the islands for the processing of iron ore. It is also possible that the islands may be subject to requests as locations for oil or gas production facilities.

Woodside Offshore Petroleum Pty. Ltd. have made regular requests, since 1981, for the erection of temporary radio positioning base stations and navigation aids (guidelines for low impact industrial use of the islands are presented in Appendix 1). These have always been approved subject to site inspection and conditions relating to the Wildlife Conservation Regulations. Recently permanent navigation aids have been erected on Angel and Gidley Islands. Marine navigation beacons on Rosemary and Malus Island are regularly serviced by Department of Transport and Communications.

Legendre Island is a Ministerial Reserve for Industrial Development and it is possible that further port facilities may be developed on this island in the future. This would necessitate a road connection between the Burrup Peninsula and Legendre Island, across some of the nature reserves, and passing through the proposed reserve on the northern Burrup Peninsula along a route to be determined by reference to natural and cultural values of the islands and the peninsula.

STRATEGIES

1. Any proposal for exploration, mining or industrial activity on the islands subject to this plan, will be referred to the EPA, and an appropriate level of assessment sought.

2. The erection of small scale temporary facilities such as radio positioning base stations and navigation aids will be subject to regulations under the CALM Act and preceded by a joint site inspection by officers from CALM and the company involved. This inspection will include a survey for rare, endangered or geographically restricted flora, and an assessment of Aboriginal sites, if any, in the immediate vicinity of the proposed facility (refer Appendix 1).

3. Approval for access for any mining or industrial purposes will require that no plants or animals are introduced to the islands through equipment and stores.

4. Liaison be maintained between the appropriate Federal and State departments, industry and Port Authorities to ensure that adequate conditions are set and followed to minimise detrimental environmental effects of accidental spill of petroleum products.

5.5 AQUACULTURE

OBJECTIVE

1. To ensure that land bases required in conjunction with aquacultural activities do not reduce the conservation values of the islands.

RATIONALE

Two pearling leases are currently present within the waters of the Dampier Archipelago. In addition, one further application to farm *Pteria penguin* (Wing Shell) in the Dampier Archipelago has been made to the Fisheries Department.

It is likely that in the future further applications will be made to the Fisheries Department to establish aquacultural industries in the Dampier Archipelago.

Some aquacultural activities require land bases for the purpose of propagation, processing and security. It is therefore possible that applications will be made to CALM by proponents wishing to establish land bases on island reserves.

STRATEGIES

1. Use of islands for land bases associated with aquaculture will not be encouraged. Where possible, adjacent mainland areas should be developed in preference to the islands.

2. Draw the attention of the EPA to development proposals requiring formal assessment procedures.

3. If aquaculture land bases do proceed on the island reserves, this should be by way of concessions/leases from the Executive Director. Lands should not be excised from reserves.

4. A condition of the granting of a lease/concession will be that the proponent develops a management plan to the satisfaction of CALM.

5.6 HABITAT DEGRADATION AND REHABILITATION

OBJECTIVES

1. To prevent any further habitat degradation through public use.

2. To encourage the regrowth of natural vegetation in disturbed areas.

3. To remove rubbish and recreational structures from the islands subject to this plan.

RATIONALE

Habitat degradation diminishes the conservation values of the islands in several ways. It can alter the vegetation structure and hence affect the faunal composition. The removal of natural vegetation and disturbance of the soil also encourages the spread of exotic plant species and promotes erosion. Some environmental degradation has already occurred, particularly on Rosemary Island, and management programs need to ensure that this is restricted and that rehabilitation ensures the natural regrowth of vegetation.

STRATEGIES

1. Vegetation regrowth on the old airstrip on Rosemary Island will be monitored. If the Buffel Grass in the vicinity of the airstrip is eradicated selected indigenous species including *Triodia* spp. and *Myoporum acuminatum* will be planted to assist in the rehabilitation of the area.

2. With the exception of the service access track to the marine navigation beacon, and the NWGFC track to the airstrip (but not beyond it) all vehicle tracks on the present Rosemary Island nature reserve will be closed and vehicular use of them prohibited. No further tracks are to be constructed.

3. Except for the use of the tractor on Rosemary Island by NWGFC members on approved tracks, no vehicles will be permitted on the islands subject to this plan.

4. Areas that have been cleared of vegetation for camping sites will have public access restricted until regeneration of vegetation has occurred. No further clearing of vegetation for camping sites or collection of firewood will be permitted.

5. The derelict remains of shacks and camping shelters that occur on some of the islands subject to this plan will be removed. No permanent structures are to be erected on the islands, except at the departmental research facility on Enderby Island.

6. Rubbish from either recreational or other use of the islands, must not be left on the islands. Every effort will be made to encourage the public to remove their rubbish and the Shire of Roebourne and Hampton Harbour Boat and Sailing Club requested to erect and maintain large rubbish bins at boat launching ramps in Dampier, Karratha and Wickham. The

NWGFC will be requested to remove rubbish, which has accumulated over the years, from the reserve adjacent to their lease in Norbill Bay.

7. Areas zoned for public use in this management plan will be regularly monitored for habitat degradation, and rehabilitation operations conducted where necessary. Special attention will be paid to sand dunes adjacent to popular recreation beaches.

5.7 MARINE POLLUTION

OBJECTIVE

1. To minimise pollution of marine waters by fuel or chemicals.

RATIONALE

The marine and fringing terrestrial and island environments of the Dampier Archipelago are susceptible to contamination by petroleum products and other toxic substances discharged or leaking from pipelines, ships and onshore bulk handling and storage facilities. The transport through the archipelago or use of any toxic or hazardous chemical, and the discharge of wastes from adjacent land or waters, requires appropriate management.

STRATEGY

1. That in the event of an oil spill occurring, CALM will provide environmental advice to the responsible authorities defined under the terms of *The National Plan to Combat Pollution of the Sea by Oil*:

   Inland Waters
   The State Marine Authority (Department of Marine and Harbours) and Local Government (Shire of Roebourne).

   Within Ports and Harbours
   The Port Authority (Dampier or Port Walcott)

   Beaches and Foreshores
   The Local Authority and State Marine Authority

   Territorial Waters
   The State and Commonwealth through the Operational Committee

High Seas
The Commonwealth

5.8 RESEARCH AND MONITORING

OBJECTIVES

1. To utilise the islands as a resource for research into coastal tropical semi-arid ecosystems (both marine and terrestrial).

2. To obtain information relevant to the current and future management of the islands and of surrounding waters.

RATIONALE

Research provides information on species requirements which is essential for their effective management, while monitoring studies enable the success or otherwise of management programs to be assessed. Some research and monitoring studies have been initiated on the nature reserves, for example biological survey, requirements of the rock-wallaby and utilisation of turtle nesting beaches. However, the successful management of the islands depends on these studies being continued and expanded. Other studies, such as those into the most appropriate fire regime for the islands, have yet to be initiated. Research into marine, archaeological and historic values should also be regarded as an integral part of the management of the islands.

STRATEGIES

1. All research programs on the islands, whether undertaken by CALM personnel or others, are to be covered by appropriate permits issued by the Department. Any fauna removed from the islands under permit for research purposes will not be returned.

2. Research into the most appropriate fire regime to maintain the existing flora and fauna of the islands will be encouraged. Special attention should be given to the effects of different burning regimes on vegetation and vegetation succession.

3. Research into marine life including aquacultural prospects, will be encouraged in order to promote better informed and more integrated management of the archipelago.

4. The status of the rock wallaby and other small mammal populations will be monitored, and study made of the population biology of these species with special attention on the effects of different fire regimes.

5. Surveys will be conducted on the distribution of rare and poorly collected flora, and on the distribution of exotic plant species in the archipelago. The spread of exotic plant and animal species will be monitored.

6. Scientific collection of those flora species presently undescribed or in need of taxonomic revision should be encouraged.

7. Control techniques for exotic plants and animals will be developed ensuring minimal effect on non-target species. Close liaison with the Research Branch of the Agriculture Protection Board will be maintained with regard to the control of foxes and feral cats in the Dampier Archipelago. Monitoring the effect of baiting programs will be continued.

8. Utilization of the islands by marine turtles and seabirds for breeding will be continually monitored, particularly with respect to disturbance resulting from public and industrial use of the islands. Long term tagging studies of marine turtles in the archipelago will continue.

9. Rehabilitation operations undertaken on the islands will be monitored at regular intervals.

10. Recreational use of the islands and the environmental effects of that use will be monitored.

11. Research relating to Aboriginal and historic sites on the nature reserves by the relevant Government departments and institutions will be encouraged.

12. A biological survey will be conducted of islands in the Dampier Archipelago not currently reserved for conservation of flora and fauna, with a view to vesting for that purpose.

6.0 MANAGEMENT OF ABORIGINAL AND HISTORIC SITES

OBJECTIVES

1. To locate and protect all Aboriginal sites and objects on the islands subject to this plan and to comply with the Aboriginal Heritage Act 1972.

2. To locate and protect all historic sites on the islands.

RATIONALE

Many significant Aboriginal and historic sites are known on the nature reserves. CALM is obliged to conform with the Aboriginal Heritage Act 1972 which protects Aboriginal sites and objects. Very little published information is available on Aboriginal sites in the archipelago, however many sites are known to the local community and to CALM personnel. Several of the historic sites have significant cultural value and are listed on the National Estate Register.

STRATEGIES

1. The W.A. Museum will be encouraged to undertake surveys of Aboriginal sites and objects on the islands.

2. Aboriginal sites already known will be reported to the W.A. Museum Registrar of Aboriginal Sites.

3. To ensure that departmental management practices do not damage Aboriginal and historical sites and objects, departmental staff should receive training on the requirements and their obligation under the Aboriginal Heritage Act.

4. The W.A. Museum, and Roebourne Aboriginal groups will be consulted about the care and use of, and access to, Aboriginal sites and objects.

5. Information on historic sites and, where appropriate, information concerning the Aboriginal occupation of the islands will be featured in the interpretive processes for the management of the islands.

6. Visitation to Aboriginal and historic sites will be monitored and, if necessary, controlled.

7.0 MANAGEMENT FOR PUBLIC USE

Management for public use of the nature reserves will be based on zonings for particular use, the development of guidelines for public use and for commercial concessions, and an emphasis on interpretive measures. Environmental education is considered an essential part of management.

7.1 MANAGEMENT ZONINGS

OBJECTIVE

1. To provide for a pattern of public use that does not diminish the values of the islands.

RATIONALE

Islands presently nature reserves have been used by the public for the past 20 years or so for camping, day trips, and construction of shacks, and this practice in some areas has contributed to degradation of the environment. No public shacks now exist on the nature reserves. However as camping and daytrip activities increase, so does the potential for increased environmental degradation and disturbance to the vegetation and fauna (particularly nesting sea-birds and turtles).

Portions of the islands subject to this plan are suitable for camping and daytrips, and provision is made for these activities. However the erection of permanent structures is excluded because of their tendency to concentrate public use and increase environmental degradation. The visual impact of permanent structures on beaches is also not consistent with the objectives for conservation reserves.

It is likely that there will be commercial interest in the development of accommodation facilities on the nature reserves within the life of this plan (10 years). However the development of such facilities is incompatible with management objectives outlined within this plan. Rather, the construction of infrastructure for tourism will be encouraged on the nearby mainland. Commercial concessions may be granted to enable daytrip or camping visits to the islands.

STRATEGIES

The islands will be zoned for various degrees of public access.

These zones are:

A. Special Conservation Zone (No public access at any time).
B. Conservation Zone with some passive recreation (Daylight access only).
C. Recreation Zone (Daytrips and camping permitted).

The zonings relevant to each island nature reserve are shown in Table 6 and Figure 4.

A. **Special Conservation Zone** - No public access at any time.

These will be Prohibited Areas throughout the year under Section 62(1) of the CALM Act, and have been designated primarily to protect sea-bird nesting sites.

Some of the inland areas of islands have been designated as such to protect the burrow nesting Wedge-tailed Shearwater colonies. Their nesting burrows are readily collapsed if walked on and hence damage to the burrows and breeding success can occur even during the non-breeding period. Many of the smaller islands and rocks in the archipelago are also covered by this zoning as they are nesting sites for non-burrowing sea-birds. Several tern species nest on the shorelines just above high water mark and are readily disturbed by public intrusion. Walking near or through these sites results in increased predation of eggs and young by Silver Gulls when the adult terns are flushed from their nests. Nests usually consist only of a scrape in the sand and the camouflaged eggs and chicks are often difficult to detect, and may be squashed. Because some of the tern species shift nesting location from year to year this zoning may have to be implemented temporarily in other areas as the need arises.

This zoning may also be invoked where rehabilitation operations are being undertaken, where significant colonies of seabirds exist, and where, on advice from the W.A. Museum, Aboriginal sites of significance are known to exist. Access by permit to islands or parts of islands designated Special Conservation Zone will be possible for legitimate industrial purposes associated with the safe operation of commercial marine activities in the waters of the Dampier Archipelago, for example the temporary installation of radio positioning stations. This access must be requested by the company concerned and will be supervised by CALM personnel (refer Appendix 1).

B. **Conservation Zone** - Daylight access only

These areas will be Limited Access Areas under Section 62(1) of the CALM Act and have been designated:

1) to protect important turtle nesting beaches and to prevent disturbances to nesting turtles; and

2) to prevent possible vegetation degradation to the inland areas of the islands through camping activities.

Hence this zoning allows for daylight recreational access to the important turtle nesting beaches and the inland areas of most of the islands.

TABLE 6 DAMPIER ARCHIPELAGO NATURE RESERVES: ZONING FOR PUBLIC USE

ISLAND	Beaches - Zoning	Remainder of Island - Zoning
Angel	*C	B
Bare Rock	A	A
Brigadier	A	A
Cohen	A	A
Collier Rocks	C	B
Conzinc	Eastern beaches B	
	Remainder A	A
Delambre	Southern tip C	
	Remainder B	B
Dolphin	South-Eastern beaches B	
	Remainder C	B
Eaglehawk	South-Eastern beach C	
	Remainder B	B
Elphick Nob	A	A
Egret	A	A
Enderby	East and West beaches B	
	Remainder C	B
Gidley	C	B
Goodwyn	South beach C	
	Remainder A	A
Hauy	East beach C	
	Remainder A	A
Keast	A	A
Kendrew	A	A
Malus (part)	Marney Bay C	
	Remainder B	B
Mawby	A	A
Millers Rocks	A	A
Nelson Rocks	A	A
Rosemary	Norbill Bay C	
	Chookie Bay C	
	Remainder B	B
Tozer	B	B
Wilcox	B	B

* *Zones A, B and C as defined on p46.*

116°30'

116°45'

117°00'

ENLARGEMENT A

GOODWYN ISLAND

ENLARGEMENT B

CONZINC ISLAND

Millers Rocks

Nelson Rocks

Brigadier Island

Lady Nora Island

Elphick Nob

Kendrew Island

Norbill Bay

Rosemary Island

20°30'

Roly Rock

North Malus Island

Malus Island

Mawby Island

Goodwyn Island

SEE ENLARGEMENT A

Bare Rock

High Point

West Lewis Island

Mermaid Sound

East Lewis Island

Enderby Island

Egret Island

Eaglehawk Island

East Intercourse Island

Intercourse Island

West Intercourse Island

20°45'

Dampier

Cohen Island

Keast Island

Legendre Island

Collier Rocks

Gidley Island

Wilcox Island

Hauy Island

SEE ENLARGEMENT C

Delambre Island

Tozer Is

Dolphin Island

Angel Island

Flying Foam Passage

Searipple Passage

Conzinc Island

SEE ENLARGEMENT B

Burrup Peninsula

Withnell Bay

INDIAN OCEAN

Hearson Cove

NICKOL BAY

Dixon Island

20°30'

ENLARGEMENT C

HAUY ISLAND

20°45'

0 5 10 Kilometres

SCALE

N

LEGEND

Special Conservation Zone— No access at any time

Conservation Zone— Day access only

Recreation Zone— Day trip and camping areas

Conservation and Recreation Reserve

Proposed Reserve

FIGURE 4

MANAGEMENT ZONINGS FOR THE NATURE RESERVES IN THE DAMPIER ARCHIPELAGO

Access for industrial purposes will be as above for the Special Conservation Zone.

C. **Recreational Zone** - Daytrips and Camping Permitted

These areas will be Recreational Areas for Specified Activities under Section 62(1) of the CALM Act and have been designated to allow public enjoyment of the islands without diminishing their conservation values. Camping for up to five (5) nights to 100m inland of the high water mark will be permitted on:

- all the beach areas of Angel and Gidley Islands, and Collier Rocks
- all the beach areas, except the south-eastern beaches, of Dolphin Island
- all the beach areas, except the two western most beaches, and the eastern most beaches, of Enderby Island
- Norbill Bay and Chookie Bay, Rosemary Island
- Marney Bay, Malus Island
- the south facing beach of Goodwyn Island
- the south east facing beach of Eaglehawk Island
- the eastern beach of Hauy Island
- the south tip of Delambre Island (up to a distance of 100 m north on either the east or west side of the island).

Unrestricted day access will be permitted to all recreation areas mentioned above. **All day trip and camping activities will be subject to the guidelines for public use** (refer 7.2).

7.2 GUIDELINES FOR PUBLIC USE

OBJECTIVES

1. To ensure public use does not diminish the conservation values of the islands.

2. To inform the public of the guidelines governing their use of the islands.

RATIONALE

The nature reserves were established primarily for their conservation values and Wildlife Conservation Regulations exist to protect these values, while providing for access to the reserves by the public. Similar protection will be afforded under the CALM Act and National Parks Regulations should the islands become a national park, with resultant improvements in public access and recreational opportunities. The public also need to be aware of the protection afforded

Heritage Places (WA) Act, presently before Parliament. As some of the historic sites are listed on the National Estate Register, they are protected from some activities under the provisions of the Australian Heritage Commission Act 1976.

STRATEGIES

1. Provisions of the Wildlife Conservation Act 1950 and the CALM Act will apply to the reserves, viz:

   a) Day visits and camping for up to 5 nights will be permitted in the appropriate areas (refer 7.1);

   b) No permanent structures are to be erected by the public;

   c) Flora and fauna of the reserves, including intertidal marine species may not be killed, disturbed, or removed from the reserves except for scientific or educational purposes, authorised by permit. (Note that shell collecting in the intertidal zone is thus prohibited. This applies to all shells, whether living or not.);

   d) Rocks and soil may not be removed or disturbed for campsites, or any other purpose except by permit;

   e) Dogs, cats or any other animal are not to be taken onto the reserves;

   f) Plants are not to be taken to, or planted on the reserves;

   g) All offal, refuse, rubbish and litter is to be removed and returned to the mainland, not burnt or buried on the reserve;

   h) No vehicular transport is to be used on the reserves, except with the written approval of the Executive Director;

   i) Cooking with gas equipment only is permitted. Open fires and the use of reserve vegetation for fires is prohibited; and

   j) Firearms are prohibited on the reserves.

2. The protection afforded to Aboriginal and historic sites under the provisions of the Aboriginal Heritage Act 1972 and the proposed Heritage Places (WA) Act respectively, will be made clear to the public.

3. The NWGFC which operates on Rosemary Island during the winter months, will be requested to continue their surveillance of public use of Norbill Bay.

4. Regular patrols of the islands by the District Wildlife Officer and other CALM personnel with the appropriate authority will be maintained to ensure that the public use guidelines are not breached.

5. Public use of the reserves will continue to be monitored.

7.3 INTERPRETATION

OBJECTIVES

1. To provide the public with information relevant to management of the islands subject to this plan.

2. To increase public awareness and appreciation of the values of the islands.

RATIONALE

Management of the islands will be enhanced if the public users are informed of management strategies such as those relating to island status, zoning and public use guidelines. Increasing public awareness of the conservation values will assist management.

STRATEGIES

Several methods of informing the public will be adopted.

1. Departmental Reserve Signs

Reserve signs of modular pine log construction and conforming to the CALM sign standards will be erected on beaches most often visited by the public. These will give the island name and use symbols to demonstrate restrictions on open fires and pets on the reserves. "No camping" symbols will be used in the appropriate areas. Positive symbols such as those depicting walking, photography and fishing will also be displayed. Signs indicating the use zoning of the beach or island will be erected.

2. Information Boards

Once this management plan has been accepted in its final form, information boards will be erected at the boat ramps in Dampier, Karratha and Wickham. These will show a plan of the Dampier Archipelago with island reserve status and the management zonings of this plan. Information boards will also be situated at the boundaries of management zonings to indicate to the public why the zoning was created and restrictions imposed (for example at turtle and sea-bird nesting locations). Historic and Aboriginal site information boards will be erected where appropriate following consultation with the Western Australian Museum.

3. Management Brochures

Separate brochures will be produced in the early stages of the term of the management plan. These include:

- a brochure summarising the management zonings of the islands and guidelines for public use
- a brochure summarising the natural, historic and archaeological values of the reserves
- a brochure containing guidelines for observing fauna such as nesting turtles and sea-birds, together with notes on the biology of these species
- brochures containing check lists of the flora and fauna of the reserves.

These brochures will be displayed in the CALM and Department of Marine and Harbours offices in Karratha and distributed to tourist and marine charter operators in the region. Shack owners on the recreation reserves will be provided with copies.

4. Newspaper Articles and Public Relations

Articles on points of interest relating to the islands and information on management operations undertaken will be offered regularly to local newspapers and mining company magazines.

Every opportunity will be taken by CALM personnel to speak to the public on the management of the islands, for example, through seminars and other forums.

5. Environmental Education

Some fauna is accessible and can be used to promote nature conservation without detrimental effects. Sites such as active Osprey nests can be approached at certain times and photographed unsupervised with no harm to the nesting birds. If demand exists, it could be possible to arrange supervised visits to turtle nesting beaches and Wedge-tailed Shearwater rookeries. Controlled access to other seabird nesting sites is possible.

The Department's research station on Enderby Island will be used for organised nature studies by interested groups such as the Nickol Bay Naturalist Club and school biology classes.

Information regarding historic and, where appropriate, Aboriginal sites will be included in environmental education programs.

7.4 COMMERCIAL CONCESSIONS

OBJECTIVE

1. To allow use of parts of the Dampier Archipelago nature reserves by a limited number of commercial operators, while ensuring that the reserves environment and other users are not adversely affected.

RATIONALE

As the population of the Pilbara continues to grow and visitor interest in the archipelago increases, proposals from commercial operators for various concessions will arise. These might include guided tours by properly trained personnel, boating trips with designated landings, and short-term small group camping.

Activities proposed would need to be compatible with the natural and cultural values of the islands, and restrictions on visitor numbers might need to be applied.

STRATEGIES

1. Concessions which are consistent with the purpose of reservation and preservation of the archipelago may be approved if proposals fulfil the guidelines of the CALM recreation policy and are acceptable to the NPNCA and Minister.

2. Liaise with local government to ensure provision of facilities in nearby towns for tour members.

3. Ensure that tour operators contact CALM staff before visiting the archipelago and encourage them to obtain interpretive information.

4. Provide training for tour operators to ensure that concession holders meet certain minimum standards of operation and conform with regulations.

8.0 PARK PROGRAMMES

Actions to be taken as a result of this plan have been grouped and summarised in the following tables.

Priorities have been assigned as follows:

HIGH	Essential to stated objectives.
MEDIUM	Essential to long-term objectives of the plan but may be deferred pending the availability of resources.
LOW	Desirable but will only be undertaken when other demands on resources have been met.

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
5.1 Fire Protection		
Implement no planned burn policy for the islands, except where limited burning is undertaken for research purposes.	H	39(1)
Develop a contingency plan for action in the event of a wildfire on the islands.	H	39(3)
Staff training in fire management.	H	39(1)
Provide fire protection to the Enderby Island Research Station.	H	40(5)
5.2 Control of Introduced Plants		
Survey islands to determine extent and distribution of introduced plant species.	H	41(1)
Staff training in environmental hygiene conditions.	H	41(2)
Eradication/control of introduced species.	H	41(3, 4)
Develop catalogue of acceptable shade trees for islands.	M	41(6)
5.3 Control of Introduced Animals		
Control of feral fox and cat populations on the Burrup Peninsual and adjacent islands in liaison with Woodside Petroleum and APB.	H	42(1)
Monitoring the status of all exotic animals on the islands of the Dampier Archipelago.	H	42(2)

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
5.4 Control of Access for Mining and Industrial Purposes		
Refer proposals for exploration, mining or industrial activity to the EPA.	H	43(1)
Implement strategy on Low Impact Industrial Use of Islands.	H	43(2)
5.5 Aquaculture		
Refer relevant development proposals to the EPA for formal assessment.	L	44(2)
5.6 Habitat Degradation and Rehabilitation		
Close public access to degraded areas until regeneration of vegetation has occurred.	H	45(4)
Remove derelict remains of temporary shelters on islands subject to this plan.	M	45(5)
Liaise with Shire and Fishing clubs to have large rubbish bins provided at boat launching ramps.	H	45(6)
5.7 Marine Pollution		
To provide appropriate environmental advice to the relevant authorities in the event of pollution of marine waters.	M	46(1)
5.8 Research and Monitoring		
Issue permits for research programs undertaken on island covered by this plan.	H	47(1)
To encourage research into appropriate fire regimes for the maintenance of biological diversity. Special attention should be given to the effects of different burning regimes on vegetation and vegetation succession.	H	47(2)

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
5.8 Research and Monitoring (cont)		
Research into the marine environment of the archipelago including biota of the intertidal zone.	H	47(3)
Research into the population biology of small mammals with special attention on the effects of different fire regimes.	M	48(4)
Monitor the status of the rock wallaby and other small mammal populations with special reference to the effects of various fire regimes.	H	48(4)
Survey the distribution of rare and poorly collected flora and the distribution of exotic plants.	H	48(5)
Collect flora species presently undescribed or in need of taxonomic revision.	M	48(6)
Liaise with APB to develop control techniques for exotic plants and animals that will minimise effect on non-target species.	H	48(7)
Monitor the use of islands by marine turtles and seabirds for breeding.	H	48(8)
Conduct tagging studies on marine turtles in the archipelago.	H	48(8)
Monitor rehabilitation operations on the islands.	H	48(9)

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
5.7 Research and Monitoring (cont)		
Monitor recreational use and the environmental effects of that use.	H	48(10)
Encourage research relating to Aboriginal and historic sites on the islands.	M	48(11)
Conduct a biological survey of islands in the Dampier Archipelago not currently reserved for the conservation of flora and fauna.	H	48(12)
6.0 Management of Aboriginal and Historic Sites		
Transport will be made available to WA Museum staff to enable survey work on islands in the Dampier Archipelago.	M	49(1)
Aboriginal Site recording forms will be compiled by CALM staff and forwarded to the WA Museum.	M	49(2)
Staff training on the requirements and objectives under the Aboriginal Heritage Act 1972	H	49(3)
Consult with WA Museum and Roebourne groups about care and use of, and access to, Aboriginal sites and objects.	H	49(4)
Collect information on historic sites and Aboriginal sites.	M	49(5)
7.0 Management Zonings		
Implement park zoning plan.	H	51(A)

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
7.0 Management Zonings (cont)		
Erect notices, if required, to temporarily close sections of reserves to members of the public so as to protect seabird nesting areas and rehabilitating sites.	H	51(A)
Erect notices on the advice of the WA Museum to protect Aboriginal sites of significance.	M	51(A)
7.2 Guidelines for Public Use		
District Wildlife Officer and other CALM personnel with the appropriate authority to patrol the islands subject to this plan to ensure public use guidelines are not breached.	H	57(4)
7.3 Interpretation		
Erect Departmental signs on beaches with high visitation.	H	57(1)
Erect information boards at boat ramps showing island status and management zonings.	H	58(2)
Erect information boards at the boundaries of management zonings.	H	58(2)
Produce management brochures summarizing:		
- management zonings and guidelines for public use	H	58(3)
- natural, historic and archaeological values of the islands	M	58(3)
- guidelines for observing fauna with notes on their biology.	M	58(3)

PROPOSED ACTION	PRIORITY	REFERENCES (Page Strategy No.)
7.3 Interpretation (cont)		
Development of an interpretive program incorporating interpretation and visitor information.	H	58(5)
7.4 Commercial Concessions		
Liaise with local government to ensure that nearby towns provide appropriate visitor facilities.	M	59(2)
Derive a procedure whereby tour operators contact CALM staff prior to visiting the archipelago.	M	59(3)
Encourage tour operators to obtain interpretive information.	M	59(3)
Provide training for tour operators to ensure that concession holders meet appropriate standards of operation and conform with regulations.	M	59(4)

9.0 PLAN IMPLEMENTATION AND REVISION

Once adopted this management plan will be implemented by CALM within the framework of available public resources. It is proposed that the status of plan implementation be reviewed annually by CALM regional and branch personnel. Where it is considered that management practice is not in accordance with the plan, steps will be taken to amend management practice or, alternatively, revise the plan.

The management plan will remain in force for a period of 10 years expiring in 2000. Amendments may be made to the plan within this period. In the event of the plan being revoked before expiry, a new plan will be substituted in accordance with the provisions of the CALM Act.

It is possible that an advisory committee could be established to assist with management of the nature reserves and other proposals for conservation reserves with broadly based membership providing an avenue for general community input into management, and for input from appropriate authorities. The committee would be established in accordance with CALM Policy Statement No. 4 *Departmental Advisory Committees*, and advisory to the Executive Director (CALM) through the Regional Manager (Pilbara). Members will be appointed by the Minister. Meetings will generally be convened in response to a request from the CALM Regional Manager.

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APPENDIX 1

CONDITIONS OF USE FOR SURVEY STATIONS IN THE DAMPIER ARCHIPELAGO - WOODSIDE

1. (a) Most of the sites have been in operation for some time and the facilities well established. CALM agrees these sites remain as positioned, and Woodside undertakes to conform to the "Conditions of Use".

   (b) Prior to the establishment of new sites on CALM lands, joint CALM/Woodside Offshore Petroleum site inspection would be required. These would take into account:
   a) rare, endangered or geographically restricted flora and an assessment of Aboriginal Sites, if any, in the immediate vicinity of the proposed facility;
   b) the need for the proposed site to be suitable to meet the technical and safety requirements of Woodside;
   c) seabird nesting sites; and
   d) safety requirements (including helicopter landing sites).

2. (a) A minimum of 2 weeks notice to be given to CALM, whenever possible, prior to the activation of an existing site.

   (b) Notice should include whether the site will be manned, an indication of how long the site will be in use and of the frequency of helicopter visits.

   (c) Subsequent visits by Woodside Offshore Petroleum personnel to an activated site during the period of activation would not require notification.

   (d) If the CALM Regional Manager believes the primary and/or secondary sites are located in areas known or thought likely to be adjacent to active sea-bird rookeries and nest sites, CALM and Woodside will review (including possible site inspection) to decide upon the most appropriate action and to ensure any disturbances are minimised. This may include moving the positioning facilities between the primary and secondary sites if technically possible or relocating the rookeries and nest sites.

   If given notice well in excess of two weeks, CALM could include some pre-activation inspections in normal island inspections.

3. Conditions of Use

(a) No pets shall be taken to the island.

(b) Visual checks will be made on all equipment prior to transportation to ensure that it is free of exotic plant propagules and animals.

(c) Disturbance to flora shall be kept to a minimum.

(d) Particular care shall be taken to avoid walking over Wedge-tailed Shearwater burrows and in other areas where sea-birds are nesting.

(e) All reasonable precautions shall be taken to minimise disturbance to any animal, its habitat, nesting or spawning ground.

(f) No firearms shall be taken to the island.

(g) No rubbish shall be left on the island.

(h) Compliance with Aboriginal Heritage Act 1972.

(i) Commensurate with flying and safety requirements applicable at the time, helicopter approaches shall be from the sector which will minimise disturbance to seabird rookeries and nest sites.

4. Existing supplementary stations will be treated as existing primary sites, and new supplementary stations will be treated as under the Initial Site Selection conditions.

NOTE: These conditions have been prepared with specific reference to Woodside Offshore Petroleum, but will be applicable to all such survey stations.

APPENDIX II DAMPIER ARCHIPELAGO - ISLAND NAME CODES

An	=	Angel Island
Ba	=	Bare Rock
Br	=	Brigadier Island
Co	=	Cohen Island
Cl	=	Collier Rocks
Cn	=	Conzinc Island
De	=	Delambre Island
Di	=	Dixon Island
Do	=	Dolphin Island
Ea	=	Eaglehawk Island
EI	=	East Intercourse Island
EL	=	East Lewis Island
Ep	=	Elphick Nob
Eg	=	Egret Island
En	=	Enderby Island
Gi	=	Gidley Island
Go	=	Goodwyn Island
Ha	=	Hauy Island
Hi	=	High Point
Ke	=	Keast Island
Kn	=	Kendrew Island
LN	=	Lady Nora Island
Le	=	Legendre Island
Ma	=	Malus Island
Mw	=	Mawby Island
Mi	=	Millers Rocks
Ne	=	Nelson Rocks
NM	=	North Malus Island
Ro	=	Roly Rocks
Rs	=	Rosemary Island
Te	=	Tern Island
Ti	=	Tidepole Island
To	=	Tozer Island
WI	=	West Intercourse
WL	=	West Lewis Island

APPENDIX III DISTRIBUTION OF THE TERRESTRIAL MAMMALS IN THE DAMPIER ARCHIPELAGO

	Island Name Code																		
	An	Co	Di	Do	EI	EL	En	Gi	Ha	Ke	Kn	Le	Ma	NM	Rs	To	Ti	WI	WL
Marsupialia																			
Dasyuridae																			
Dasyurus hallucatus	.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Macropodidae																			
Macropus robustus	.	.	x	x	x	x	.	.	.	.	.	.	.	.	.	x	.	x	x
Petrogale rothschildi	.	.	.	x	.	.	x	.	.	.	.	.	.	.	x	.	.	.	x
Eutheria																			
Pteropodidae																			
Pteropus scapulatus	.	.	.	.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.
Emballonuridae																			
Taphozous georgianus	.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vespertilionidae																			
Eptesicus finlaysoni	.	.	.	.	.	.	x	.	.	.	.	.	.	x	.	.	.	.	.
Nyctophilus geoffroyi	.	.	.	.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.
Muridae																			
Pseudomys hermannsburgensis	.	.	x	.	.	.	.	.	.	.	.	.	.	.	x	.	.	.	.
Rattus tunneyi	.	.	.	x	.	x	x	.	x	x	.	x	x	.	.	.	.	.	x
Zyzomys argurus	x	.	.	x	.	.	x	.	.	.	x	x	.	.	x	.	.	.	.
Hydromys chrysogaster	.	x	.	.	.	.	.	.	.	.	.	.	.	.	x	.	.	.	.
Mus musculus	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
unidentified murid	.	.	.	.	x	.	.	x	.	.	.	.	.	.	.	.	x	x	.
Canidae																			
Vulpes vulpes	x	x	.	x	x	.	.	x	x	x	.	x	.	.	.	.	.	.	.
Felidae																			
Felis catus	x	.	.	x	x	.	.	.	.	.	.	.	.	.	ext	.	.	.	.
Bovidae																			
Ovis aries	.	.	.	.	.	ext		.	.	.	.	.	.	.	.	.	.	.	ext

ext = now extinct.

APPENDIX IV MARINE MAMMALS OF THE DAMPIER ARCHIPELAGO

Ziphiidae	
Hyperoodon planifrons	Southern Bottle-nosed Whale
Delphinidae	
Grampus griseus	Risso's Dolphin
Tursiops truncatus	Bottle-nose Dolphin
Sousa chinensis	Indo-Pacific Hump-backed Dolphin
Pseudorca crassidens	False Killer Whale
Balaenopteridae	
Megaptera novaengliae	Humpback Whale
Dugongidae	
Dugong dugon	Dugong

DISTRIBUTION OF BIRDS IN THE DAMPIER ARCHIPELAGO

APPENDIX V

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
PROCELLARIIDAE Wedge-tailed Shearwater				o	o	o	o				o				o	o			o	o	o	o				o			
OCEANITIDAE Wilsons Storm-petrel												waters of the Dampier Archipelago																	
PELECANIDAE Australian Pelican	#					#	#	#					#	#	#			o	#			#	#	#				#	
SULIDAE Brown Booby												waters of the Dampier Archipelago																	
PHALACROCORACIDAE Pied Cormorant Little Pied Cormorant	#					#		# #	#		#		#		#	# #	#	#	#	#	#			#	#	#			
FREGATIDAE Lesser Frigatebird												waters of the Dampier Archipelago																	
ARDEIDAE White-faced Heron Great Egret Eastern Reef Heron Mangrove Heron Rufous Night Heron	#			o	#	o		# # o	o	#	# # #		# o o #	#	#	#		#	#	#	#	# o		#	#	#	#	o	# #
CICONIIDAE Black-necked Stork								#																					
ANATIDAE Plumed Whistling Duck	#												#														#		

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
ACCIPITRIDAE																													
Black-shouldered Kite													#			#					#						#		#
Brahminy Kite		#			#	#		#		#		#	#		#						#	o					#		o
Collared Sparrowhawk								#																					
Brown Goshawk													#																#
White-breasted Sea Eagle	o		o			#	#	o	o	o	o		o	#	o		#	o	o	#	o	#			#		#	#	o
Spotted Harrier	#												#								#								#
Osprey	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o		o	o	o
Whistling Kite								#					#							#	#						#		#
FALCONIDAE																													
Brown Falcon								#					#							#							#		#
Australian Kestrel	#		o	#			#	#	#		#		#		o			#	o	#	#	#					#		#
PHASIANIDAE																													
Brown Quail	o									o	#		#								o						o		o
TURNICIDAE																													
Little Button-quail													#														#		
HAEMATOPODIDAE																													
Pied Oystercatcher	#			#		#	#	#					o		#	#		o		#	#	#				#	#		#
Sooty Oystercatcher	#			o		#		#	#			#	o		#	#				#	#	#					#	#	#
CHARADRIIDAE																													
Grey Plover								#	#																				
Large Sand Plover								#												#		#							
Red-capped Plover	#							#	#				#		#					#		#					#		o
Mongolian Sand Plover								#					#			#				#							#		
Oriental Plover													#							#									
SCOLOPACIDAE																													
Ruddy Turnstone	#			#		#	#	#	#	#	#		#			#		#	#	#				#			#		#
Eastern Curlew								#																					

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
SCOLOPACIDAE																													
Whimbrel	#		#										#	#						#	#				#				#
Grey-tailed Tattler				#		#		#					#		#						#	#							#
Greenshank													#														#		#
Common Sandpiper								#					#																#
Red Knot Godwit									#																				
Sharp-tailed Sandpiper									#				#																
Red-necked Stint								#																			#		
Curlew Sandpiper								#					#																
Bar-tailed Godwit	#							#	#																				
BURHINIDAE																													
Bush Stone Curlew													#								#	#					#		#
Beach Stone Curlew	#			#		#	#	#					o		#	#							#				o		o
LARIDAE																													
Silver Gull	#	#	#	#	#	#	#	#	#	#	o	#	#	#	o	#	#	#	##	#	#	#	#	#	#	#	o	#	#
Caspian Tern			#	o		o	#	#				o	o		#			o	#	o		#			#	#	o	o	#
Whiskered Tern													#														#		
Gull-billed Tern								#					#																
Roseate Tern				#			#											#	#					#	#	#	#		
Bridled Tern				#	#		#				o				o			#	o	#				#	#	#			
Fairy Tern	#			o	#		#	#	#			o	#		#				#	#		#				#	o	o	#
Crested Tern	#	#	#	#	#	#	#	#	#	#	#	o	#	#	#	#	#	#	#	#	#	#	#	#	o	#	o	#	#
Lesser Crested Tern	#						#	#		#			#			#	#		#							#	#		
Common Tern							#		#				#		#			#											#
Common Noddy								waters of the Dampier Archipelago																					
COLUMBIDAE																													
Peaceful Dove								#					#														#		
Diamond Dove								#					#														#		#
Bar-shouldered Dove	#				#		#	#		#			o		#						o	#	#				#		#
Crested Pigeon								#																					

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
PSITTACIDAE																													
Galah	#							#					#																
Corella	#		#				#	#	#	o			#		#		#		#	#	#	o					#		#
Budgerigar																					#						#		
CUCULIDAE																													
Pallid Cuckoo								#																					#
Horsefield Bronze Cuckoo													#																
STRIGIDAE																													
Boobook Owl								#																					
Barn Owl	#																												#
PODARGIDAE																													
Tawny Frogmouth								#					#																
CAPRIMULGIDAE																													
Spotted Nightjar													#																
APODIDAE																													
Fork-tailed Swift							#						#																
ALCEDINIDAE																													
Mangrove Kingfisher								#					#																
Sacred Kingfisher	#							#					#			#				#	#	#							#
HIRUNDINIDAE																													
Welcome Swallow	#		#			o	#	#			#		#			#		#	#	#	#					#		#
Tree Martin	#							#								#													
MOTACILLIDAE																													
Richard's Pipit	#					#		#	o	#			#	#	#	#			#	#	#	#					#		#

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
CAMPEPHAGIDAE																													
Black-faced Cuckooshrike	#							#		#			#								#	#					#		#
White-winged Triller																					#								
PACHYCEPHALIDAE																													
Mangrove Robin								#					#								#								#
Mangrove Golden Whistler								#					#																#
White-breasted Whistler													#								#								#
Grey Shrike Thrush													#																
MONARCHIDAE																													
Mangrove Grey Fantail								#					#								#						#		#
Willy Wagtail	#							#		#			#	#		#		#			#								#
SYLVIIDAE																													
Spinifex-bird								#																					
Brown Songlark																											#		#
ACANTHIZIDAE																													
Dusky Flyeater								#					#								#								#
MELIPHAGIDAE																													
Yellow-throated Miner	#							#					#																
Singing Honeyeater	#				#			#		#			o	#		#				#	#	#					#		#
Grey-headed Honeyeater								#																					
Brown Honeyeater	#							#		#			#													#			#
PARDALOTIDAE																													
Striated Pardalote													#																
ZOSTEROPIDAE																													
Yellow White-eye								#					#								#						#		#

# = sighting record
o= breeding record

ISLAND NAME CODE

SPECIES	An	Ba	Br	Co	Cl	Cn	De	Do	Ea	El	Ep	Eg	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	Ma	Mw	Mi	Ne	Ro	Rs	Te	WL
PLOCEIDAE																													
Painted Finch	#							#																			#		#
Zebra Finch								#					#																#
GRALLINIDAE																													
Magpie-lark								#																					
ARTAMIDAE																													
Black-faced Woodswallow								#																					
Masked Woodswallow								#																					
Little Woodswallow								#						#															
White-breasted Woodswallow								#					#								#	#					#		#
CRACTICIDAE																													
Pied Butcherbird	#		#		#			#		#	#		#	#	#				#	o		#					o		#
CORVIDAE																													
Australian Crow					#			#		#			o		#				.		#						o		#

APPENDIX VI

DISTRIBUTION OF AMPHIBIANS AND REPTILES IN THE DAMPIER ARCHIPELAGO

SPECIES	ISLAND NAME CODE																			
	An	**Co**	**De**	**Do**	**Ea**	**Ep**	**En**	**Gi**	**Go**	**Ha**	**Hi**	**Ke**	**Kn**	**LN**	**Le**	**NM**	**Ma**	**Mw**	**Rs**	**WL**
HYLIDAE																				
Cyclorana maini	X			X																
Litoria rubella				X																
CHELONIIDAE																				
Caretta caretta			X																	
C. mydas	X	X	X	X	X		X		X	X		X		X	X		X		X	X
Eretmochelys imbricata	X		X	X	X	X	X		X								X		X	
Natator depressus			X				X			X		X			X					
GEKKONIDAE																				
Crenadactylus ocellatus horni				X																
Diplodactylus conspicillatus															X					
D. elderi				X											X					
D. stenodactylus															X					
Gehyra pilbara	X									X					X					
G. punctata	X			X	X	X	X				X					X	X	X	X	X
G. variegata				X	X					X					X				X	X
Heteronotia binoei		X		X		X	X	X	X	X	X	X	X	X	X				X	
Oedura marmorata				X		X														
PYGOPODIDAE																				
Delma borea																			X	
Lialis burtonis							X													
AGAMIDAE																				
Ctenophorus c. caudicinctus	X			X			X								X		X		X	X
C. i. isolepis															X					
Gemmatophora g. gilberti				X					X			X	X	X	X	X				

	An	Co	De	Do	Ea	Ep	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	NM	Ma	Mw	Rs	WL
VARANIDAE																				
Varanus acanthurus										X					X					X
V. gouldii	X	X	X		X			X												
V. panoptes rubidus				X						X										
V. t. tristis		X		X																
SCINCIDAE																				
Carlia tricantha							X													
Cryptoblepharus plagiocephalus	X			X															X	
Ctenotus pantherinus ocellifer							X													
C. saxatilis	X	X		X	X	X	X			X	X	X	X	X	X	X		X	X	X
C. serventyi					X		X												X	
Egernia pilbarensis						X	X												X	
Lerista bipes		X			X	X	X	X		X		X		X		X			X	
L. muelleri					X		X					X			X				X	
Menetia surda				X																
Morethia ruficauda exquisita				X	X		X	X		X					X				X	
Omolepida branchialis				X																
Sphenomorphus i. isolepis	X	X		X	X	X				X	X	X	X	X	X	X		X	X	X
TYPHLOPIDAE																				
Rhamphotyphlops diversus ammodytes						X									X					
ACROCHORDIDAE																				
Aipysurus laevis			waters of the Dampier Archipelago																	
Astrotia stokesii			waters of the Dampier Archipelago																	
BOIDAE																				
Aspidites melanocephalus							X										X			X
Morelia olivacea barroni				X																X
M. perthensis																	X		X	X
M. s. stimsoni																			X	

	An	Co	De	Do	Ea	Ep	En	Gi	Go	Ha	Hi	Ke	Kn	LN	Le	NM	Ma	Mw	Rs	WL
ELAPIDAE																				
Demansia rufescens				X																
Ephalophis greyi				waters of the Dampier Archipelago																
Pseudechis australis					X															
HOMALOPSIDAE																				
Fordonia leucobalia				waters of the Dampier Archipelago																
Hydrelaps darwiniensis				"	"	"	"	"												
HYDROPHIIDAE																				
Hydrophis major				waters of the Dampier Archipelago																