

The Dampier Archipelago - Managing People in a Nature Reserve

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Abstract

The nature reserves in the Dampier Archipelago have significant conservation values which include providing nesting beaches for four species of marine turtle, nesting sites for 14 species of sea bird, feral animal free habitat for native fauna and undisturbed vegetation associations. The islands are also a popular recreational destination for the public of Dampier, Karratha, Wickham and Roebourne, and this use is likely to increase as the iron-ore and petroleum industries develop in the Pilbara. A management plan is being prepared to ensure the conservation values of the nature reserves are preserved. This will be achieved through the recognition of Conservation Zones, with restricted public access, and Recreation Zones where camping and day trips will be permitted. Public awareness of the islands values will be promoted through access to visitor tolerant sites such as Osprey nests and historic sites. Implementation of the management plan will require the full time attention of an Operations Officer.

INTRODUCTION

Since 1980, the Wildlife Research Centre, Department of Conservation and Land Management (formerly part of Department of Fisheries and Wildlife), has been actively involved in the management of people in nature reserves, through the production of management plans and the development of communication techniques that promote public awareness of conservation values.

The Dampier Archipelago has major conservation and recreation values and since October 1982 biological, physical, historical and cultural information of the area has been collected for a management plan. The draft management plan has now been prepared. This plan will be the primary means of managing the public in this important conservation area. This paper presents the conservation and recreation values of the Dampier Archipelago and discusses the management objectives and how those that relate to public use, will be achieved.

THE DAMPIER ARCHIPELAGO RESOURCE

The Dampier Archipelago is a group of approximately 40 islands within a 45 km radius of the port of Dampier (20°40' S, 116°42' E) off the Pilbara coast, Western Australia (Figure 1). The islands range in size from rocks and islets of less than 1 ha to large islands of over 3000 ha, and were formed approximately 8 000 years ago when rising sea levels

flooded coastal valleys leaving hills and ridges exposed (Merrilees 1979, Semeniuk *et al.* 1982).

Unlike most of the other nature reserves off the north west coast which are composed of Quaternary and Tertiary limestone, many of the islands of the Dampier Archipelago are composed of igneous rock of Precambrian age and have a rugged appearance similar to the adjacent Burrup Peninsula and mainland. A few islands in the north of the archipelago are composed of Quaternary limestone and have a flatter appearance. Beaches and sandplains of Holocene origin have formed between rocky headlands on many of the islands (Department of Mines 1979).

The Dampier Archipelago was known to Dutch navigators in 1628 as it appeared along with Barrow Island the the Monte Bello Islands (then unnamed on a chart drawn by the cartographer for the Dutch East India Company (de la Rue 1979).

In 1699 William Dampier visited the islands naming one Rosemary Island after a plant, *Olearia axillaris* he collected which reminded him of the herb rosemary. Some doubt exists whether the island he actually landed on is the island presently known as Rosemary Island (Tuckfield 1955, George 1971). Nicholas Baudin passed by the islands in 1801 and named several of the northern islands. A more detailed inspection of the archipelago was undertaken by Phillip King and botanist Allan Cunningham in 1919 (Lee 1925) and several plant specimens were

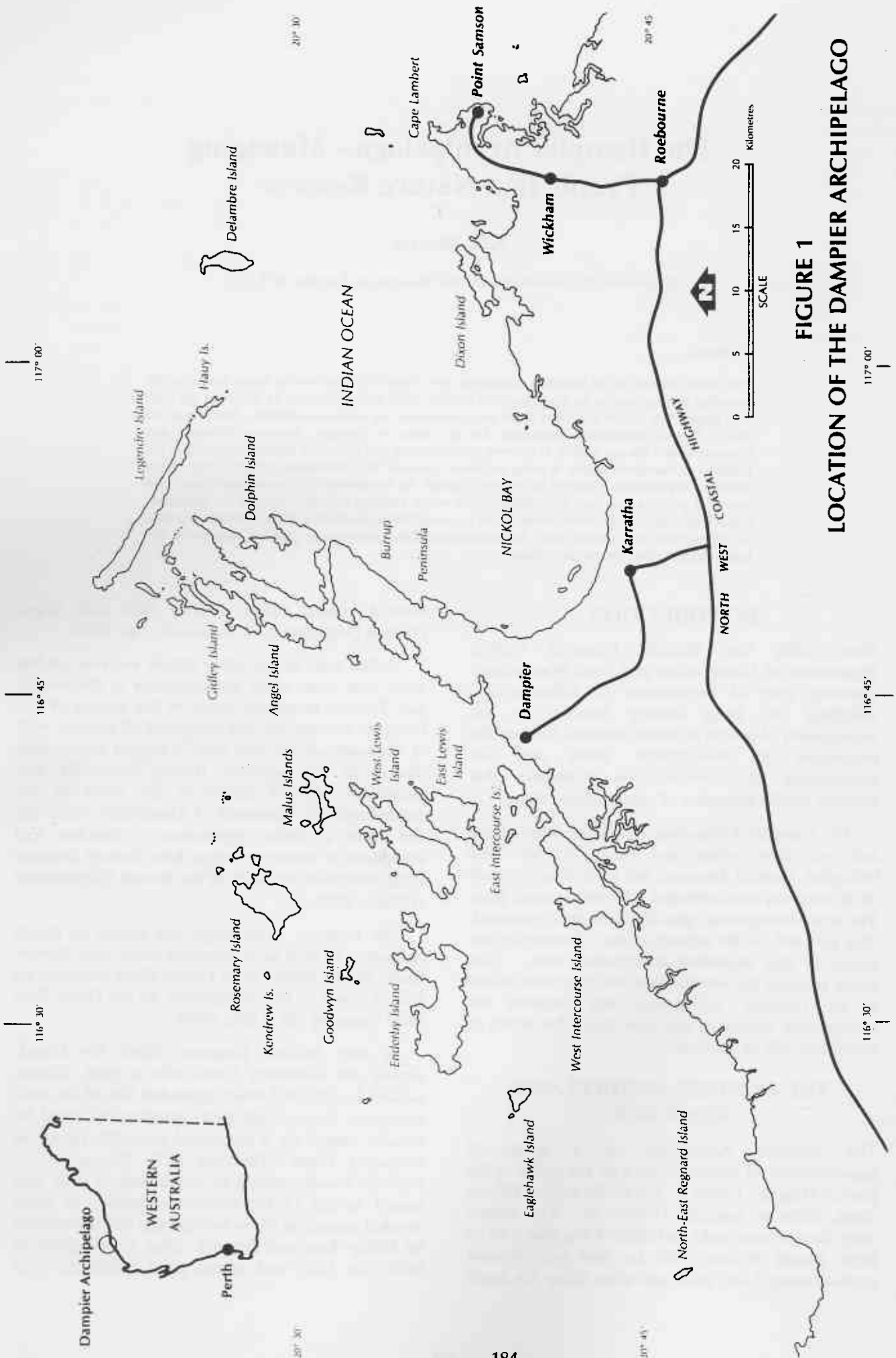


FIGURE 1
LOCATION OF THE DAMPIER ARCHIPELAGO

collected. King named the group of islands Dampier's Archipelago as well as many of the individual islands.

Following Gregory's reports of good grazing land in the Pilbara in 1861 (Gregory and Gregory 1884) settlers journeyed from the south to establish the pastoral industry. With the establishment of the towns of Roebourne (1866) and its port Cossack (1872) the islands became bases for fishing, pearling and whaling operations. The remains of these and other historic sites in the Dampier Archipelago have been surveyed (MacIlroy 1979).

At the time of European settlement an estimated 100-120 Aboriginal people of the Yapurarra tribe occupied the Burrup Peninsula and islands of the Dampier Archipelago (Rhoads and Gara 1984). However introduced diseases, exploitation and violent confrontation with the settlers reduced their numbers and they are now believed to be extinct. Many of the aboriginal sites on the Burrup Peninsula have been extensively surveyed (Rhoads and Gara 1984) however, those on the islands have not. Aboriginal sites on the islands include rock etchings, middens, fish traps and hunting hides.

The first recorded collection of fauna from the Dampier Archipelago was by John Tunney in 1901, when he collected the rock wallaby *Petrogale rothschildi* from Enderby Island and the native rat *Rattus tunneyi* from West Lewis Island (correspondence of J.T. Tunney, W.A. Museum library). More recent collecting visits include a party from the W.A. Museum in 1961 and a joint W.A. Museum/W.A. Herbarium party in 1962. A detailed biological survey of many of the islands was undertaken in 1970 (Burbidge and Prince 1972). These trips, together with the biological survey undertaken between 1982-1985 have enabled the major conservation values of the nature reserves in the Dampier Archipelago, to be identified. These are:

1. Providing suitable nesting beaches for four species of marine turtle, the Green, Hawksbill, Flatback and Loggerhead turtle.

Some information on beach utilization by the turtle has been obtained since October 1982. The nesting season in this area extends from September to April, with a peak in activity during December and January (Figure 2), and this is related to suitable incubation temperatures on the beaches. Bustard and Greenham (1968) suggested that a range of 25C to 35C spanned the normal incubation temperature for the Green turtle, and that this probably applied to all marine turtles. Nesting activity in the Dampier

Archipelago also appears to be greater during neap tides than spring tides (Figure 2).

Not all islands in the Dampier Archipelago are used to the same extent by turtles for nesting (Table 1). Over 50 percent of turtle nesting activity occurs on Rosemary Island, even though this island only has 20 percent of the total beach available for nesting. Legendre and Delambre Islands are also important in terms of nesting activity. From a conservation viewpoint, the distribution of nesting species is also important, and ground surveys have shown that the Loggerhead and Flatback turtle prefer to nest on the limestone based islands to the north of the archipelago and closer to deep water. The Green turtle is the most common and nests on most beaches. The Hawksbill turtle is also widespread in the archipelago but in lower numbers than the Green turtle.

2. Providing breeding sites for at least 14 species of sea bird, including 4 species of tern (Caspian, Crested, Bridled and Fairy Tern), Wedgetailed Shearwater, Pelican, Osprey and White-breasted Sea Eagle. Most species breed in the winter and spring, however, throughout the year at least one species is breeding (Table 2). Some of these nesting species are more vulnerable to disturbance than others. For example, Fairy and Caspian Terns nest on beaches with well camouflaged eggs and young, and the burrows of Wedgetailed Shearwaters are readily collapsed if walked over. The small breeding colony of Pelicans on Keast Island is only the seventh to be recorded in Western Australia. Other species, such as the Osprey and White-breasted Sea Eagle are more visitor tolerant. Another 78 species of land bird are known, and some of these such as Signing Honeyeater, Corella, Richards Pipit, Bar-shouldered Dove and Welcome Swallow also breed on the islands.

3. Supporting the only feral animal free populations of the rock wallaby *Petrogale rothschildi*, a species restricted to the Pilbara region. This is one of the "critical weight range" mammals that has been adversely affected by the introduction of the fox. Another 8 species of native mammal have also been recorded on the islands. One of these the Sandy Inland Mouse *Pseudomys hermannsburgensis*, although common and widespread on the mainland is known from only two other islands (Kitchener and Vicker 1981).

4. Supporting undisturbed vegetation association which to some extent reflect the vegetation of the adjacent mainland prior to pastoral and mining activities. The sandplain areas in particular warrant

Fig. 2. Seasonal turtle activity on islands in the Dampier Archipelago during neap (————) and spring (-----) tides, October 1982-October 1985. (mid values and range shown)

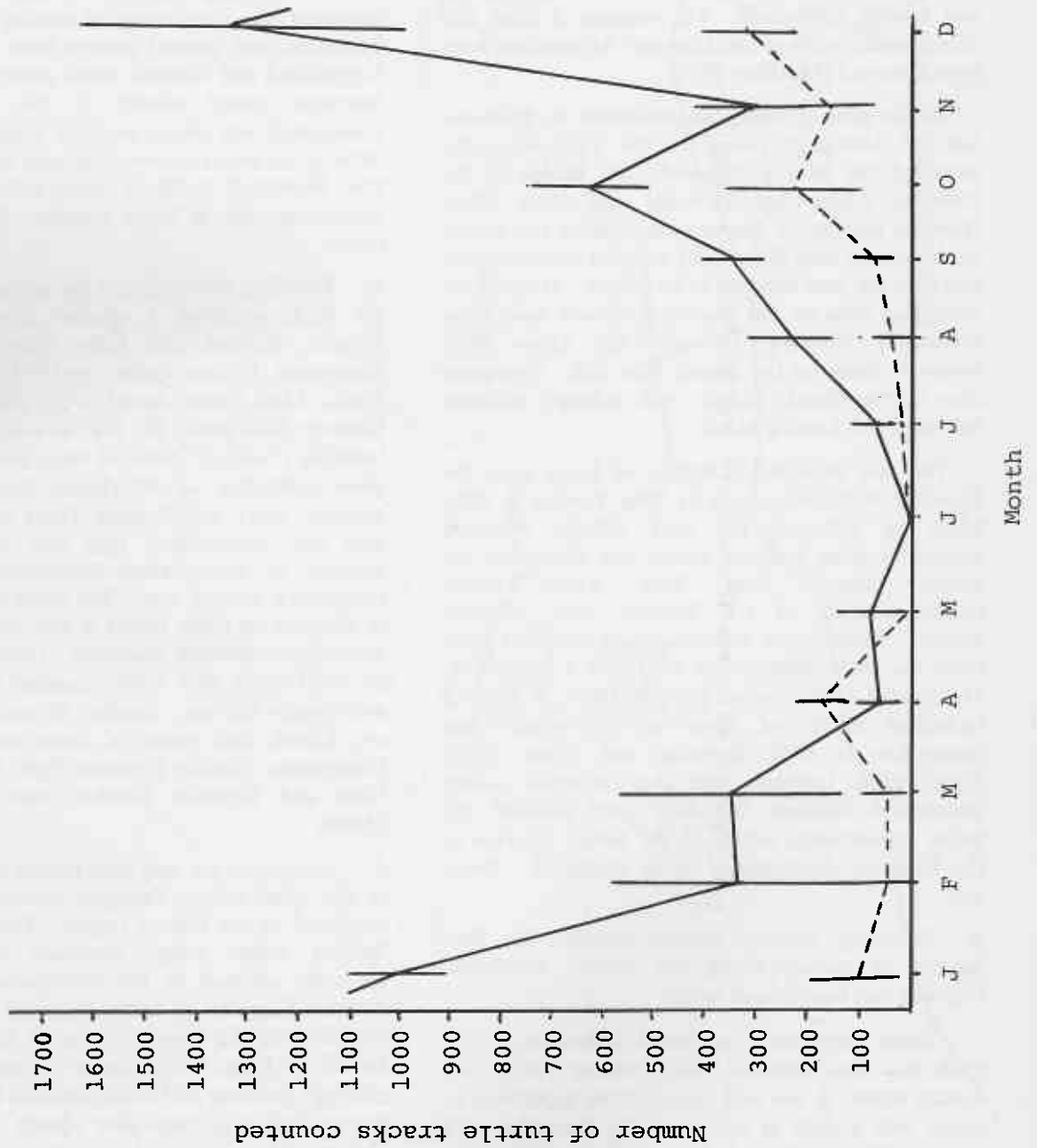


Table 1. Proportion of turtle activity on individual islands in the Dampier Archipelago

	Proportion of total turtle activity %	Beach available for nesting as a proportion of total archipelago beach distance %
Eaglehawk Island	2.5	3.4
Enderby Island	4.8	15.8
Goodwyn Island	0.7	3.4
Rosemary island	55.9	20.2
Malus Island	2.2	7.9
Angel Island	0.9	7.9
Gidley island	1.1	7.9
Collier Rocks	1.4	4.4
Keast Island	3.0	4.4
Legendre Island	14.6	9.0
Hauy Island	3.6	3.4
Delambre Island	8.9	5.6
Dolphin Island	0.6	6.7
		100% = 44.5 km

Table 2. Seasonal distribution of sea bird breeding in the Dampier Archipelago

Osprey												
White-breasted Sea Eagle												
Brahminy Kite												
Caspian Tern												
Crested Tern												
Bridled Tern												
Fairy Tern												
Silver Gull												
Sooty Oyster-catcher												
Pied Oyster-catcher												
Reef Heron												
Mangrove Heron												
Pelican												
Wedge-tailed Shearwater												
	J	F	M	A	M	J	J	A	S	O	N	D
	Month											

special protection as they support the most diverse flora and fauna, and have been shown to be critical to the continued survival of *Petrogale rothschildi* on Enderby and Rosemary Islands (Kinnear *et al.* 1984). They are also adjacent to beaches some of which are used by the public.

In addition to their conservation values, the nature reserves of the Dampier Archipelago have other values which must be considered with respect to managing people in the area. These include aesthetic values, historic values, and aboriginal sites. These can be broadly categorized as recreational values as awareness of them by the public can contribute to their overall enjoyment of the islands. Public awareness of the native flora and fauna can also be seen as contributing to their enjoyment of the islands.

With the development of the iron ore industry in the Pilbara and associated increase in population in the 1960s, it was recommended that the Dampier Archipelago be managed in a way that recognized both the recreation and conservation values of the islands (Australian Academy of Science 1962, Conservation Through Reserves Committee 1974, Environmental Protection Authority 1975). In 1977 State Cabinet agreed that a system of nature and recreation reserves be established and in October Dolphin Island was gazetted a nature reserve. Many of the other islands followed in 1980, with recreation areas set aside for day trips, camping and shack development. Twenty six of the islands are now nature reserves managed by the Department of Conservation and Land Management (CALM).

PUBLIC UTILIZATION OF THE DAMPIER ARCHIPELAGO

Between 1900-1965 the islands in the Dampier Archipelago were used by fishermen mainly from Point Samson and Onslow for shelter and campsites. Very little recreational activity was undertaken as the islands were relatively inaccessible at this stage. In 1963 the North West Game Fishing Club obtained a special lease of 7.3 ha from the Lands Department to cater for a shack and facilities which had been erected in Norbill Bay, Rosemary Island. An airstrip was also constructed and a well sunk and these were connected to the lease area by a track.

When the Commonwealth government eased restrictions on iron ore exports in 1960, exploration and development of iron ore deposits in the Pilbara proceeded rapidly and by 1965 Hamersley Iron Pty Ltd began constructing the town and port of Dampier to house 2 500 employees involved in the companies' export of iron ore. The Dampier Archipelago, at this

stage vacant Crown land, immediately became a focus for recreational activities and this use increased from 1970 with the construction of Karratha and Wickham to cater for another 8 000 people. By 1981 the combined population of Karratha, Dampier, Wickham and Roebourne was 14 800. By 1992 this is predicted to increase to 18 000 (Department of Industrial Development 1983). These towns are all within a 50 km radius of the Dampier Archipelago (Figure 1).

When the majority of the islands were gazetted as nature reserves in 1980, areas of recreation reserve were set aside to cater primarily for camping and shack development. This situation was revised in 1984 when all East and West Lewis Islands became recreation reserve and that part of Malus Island containing shacks remained recreation reserve. All the other recreation reserves on Rosemary, Angel and Delambre Islands were incorporated into the adjacent nature reserve. Overnight camping and day trips were permitted to continue on nature reserve beaches, however, all shack development was restricted to the recreation reserves and is managed by the Department of Conservation and Environment.

Since 1982, data on public utilization of nature reserves has been obtained mainly through regular aerial surveys and liaison with the public on site. The following points characterise the present public use:

1. The beaches and other scenic qualities of the islands are seen by the public as the major values of the islands.
2. Because of the climate and topography of the islands, camping and day trips are restricted almost exclusively to the beaches.
3. With the exception of Norbill Bay on Rosemary Island and Delambre Island campers and day trippers prefer to use beaches on their own and avoid other forms of occupation. They tend to stay away from shack beaches and invariably use nature reserves beaches "to get away from it all".
4. Most camping occurs during long weekends or holidays in the cooler months (April-September) however because mainly of the "rostered day off" system operated by Hamersley Iron and Woodside outside of public holidays, some camping also occurs over standard weekends. The maximum number of camps counted to date on nature reserves is 32, which equates to approximately 120 people (Table 3).
5. Camping is short term and rarely exceeds the permitted 5 nights.

Table 3. Estimates of the maximum public use of islands in the Dampier Archipelago from October 1982 - October 1985.
[(-) = no observation]

Month	Number of Public Holidays	Long weekend/holidays		Standard weekend	
		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

6. The extent of day trips to nature reserves is more difficult to estimate, however up to 17 boats at a time have been observed moored at beaches but not associated with a camp. This equates to approximately 70 people. Up to 150 boats have been counted around the islands at any one time.

Even with the present, relatively low level of recreational use of the nature reserves, management problems are apparent for example disturbance of turtle nesting and seabird nesting colonies, excessive use of foredune areas, potential for wildfire on sandplains, litter, and presence of dogs. With restrictions placed on the number of shacks that can be erected on the recreation reserves, it is likely that camping and day trip activities on nature reserves will increase significantly in the next ten years as the population increases.

PLAN FOR MANAGEMENT

After evaluating the conservation and recreation values of the nature reserves of the Dampier Archipelago, and taking into account the Department of Conservation and Land Management's responsibilities under the Conservation and Land Management Act (1984), the following management objectives were developed:

1. To maintain and restore the natural environment and protect it from any disturbance that would reduce its value to nature conservation.
2. To promote public appreciation and enjoyment of the natural, historical and archaeological values of the islands, consistent with the first objective.
3. To eradicate or control exotic plants and animals.

4. To promote scientific study of the islands ecosystem.

With respect to management for recreational use it is predominantly the first two of these objectives that must be addressed, and the key to achieving these objectives is through effective communication with the public.

a. To maintain and restore the natural environment and protect it from any disturbance that would reduce its value to nature conservation

To achieve this objective the nature reserves will be divided into Conservation Zones and Recreation Zones.

The Conservation Zones will be areas of restricted public access and will include four categories:

- a. no access at any time - this zone will apply to most of the Wedge-tailed Shearwater breeding sites in the nature reserves. Some sites are conducive to public viewing.
- b. no access during the breeding season - this will apply to seabird nesting sites and as many species, especially terns are not loyal to nesting sites, this zoning will need to be flexible and implemented as the need arises.
- c. daylight access only from September to April - this will apply only to the important turtle nesting beaches and is to prevent disturbance to adult and hatchling turtles caused by lights and crowds of people. Some controlled night access during September-April will be possible. Other turtle nesting beaches occur outside this zoning.
- d. daylight access only all year round - this applies to all inland areas other than (a), and to some beaches where, because of insufficient space for camping, vegetation cover may be affected by this activity.

Recreation Zones will be beach areas where unrestricted day access and camping for up to 5 nights will be permitted. Effectively this applies to most beaches on the nature reserves, except those occupied by sea birds or turtles during their nesting season. In both the Conservation Zones and Recreation Zones, Wildlife Conservation Regulations (Wildlife Conservation Act 1980) will apply, and nature reserve signs of modular pine log construction will inform the users, using symbols, that the island is a nature reserve and that no dogs, open fires, or camping (in the Conservation Zones) are permitted.

The above zonings will be delineated by appropriately worded signs that identify the zone and provide reasons for the restriction. If necessary post and rail fencing will be used to mark off areas. Information post and rail fencing will be used to mark off areas. Information boards showing a map of the Dampier Archipelago will be erected at the two boat ramps in Dampier and one in Wickham to inform the public of the status of the islands and the zonings that apply. A brochure containing this information will also be prepared and distributed from the Karratha office of Department of Conservation and Land Management. It may also be possible to arrange distribution of this brochure through the Department of Marine and Harbours, through whom private boats must be licensed.

The other part of the objective, to restore the natural environment, will be achieved through rehabilitation works to the areas so far affected by public use of the nature reserves. The airstrip surface on Rosemary Island has been broken up to allow revegetation, and tracks not approved by CALM for use by the North West Game fishing Club on Rosemary Island will be fenced off. The foredune areas of popular camping sites such as Norbill Bay, Rosemary Island, and Delambre Island will possibly require fencing with pine logs and access to the inland areas restricted to a few points. Areas that have previously been used for camping and have subsequently been affected, through a loss of vegetation, by this activity, will have future access restricted to daylight only through Conservation Zone (d). Other rehabilitation works will be undertaken as the need arises.

b. To promote public appreciation and enjoyment of the natural, historic and archaeological values of the islands, consistent with the first objective

Several, natural, historic and archaeological features have been identified as visitor tolerant on the nature reserves and these will be used to promote public appreciation and enjoyment of the islands.

- (a) Natural features include Osprey nests, turtle nesting and Wedge-railed Shearwater breeding sites.

Osprey nests even when containing eggs or young can be readily approached and photographed without any long term disturbance.

Visits by the public to turtle beaches designated under Conservation Priority Area Zone (c) could only be undertaken if supervised by

CALM staff and restricted to six persons per visit. The public would be educated as to how to observe nesting turtles without disturbing them.

Wedge-tailed Shearwater breeding sites could be observed from suitably positioned lookouts on the edges of the sites. Night time excursions to these areas would be supervised by CALM staff.

- (b) the many historic sites on the nature reserves could be viewed by the public without supervision from CALM staff.
- (c) many of the archaeological sites are close to beach areas and readily accessible by the public. Aboriginal sites are subject to special protection under the aboriginal Heritage Act (1972-1980) and the W.A. Museum would be involved in any management of these sites.

Information boards would be erected at all these sites, and brochures with details on the sites would be available from the CALM office in Karratha. The location of these visitor tolerant sites would also be included on the information boards located at the boat launching ramps at Dampier and Wickham.

Other means of promoting public appreciation and enjoyment of the nature reserves include articles in the local newspaper on points of interest, talks to interested groups such as naturalist clubs and schools, and personal liaison with the public on the islands.

Obviously, the important aspect of a management plan is its implementation and the management of the nature reserves in the Dampier Archipelago will require the full-time attention of an Operations Officer based in Karratha. However, before it is implemented, the management plan will have to be "sold" to the public and their support obtained. Some of the island users are transient and don't have a long term interest in their surroundings. They believe that because of the islands rugged topography and hot, dry climate, they have no value. Many of the longer term residents used the islands without control prior to them becoming nature reserves in 1980, and even since then, no access restrictions have been placed on the islands. All users need to be reminded that the islands have long term conservation and recreation values which need careful management now, and the management plan is the means of achieving this.

Once the draft management plan has been subject to public review, amended and accepted in its final form, the Operations Officer will be responsible for such activities as erection of nature reserve signs and information boards, monitoring public use of the islands, assessing sea-bird nesting sites so that appropriate protective zonings can be implemented,

supervising access to turtle beaches and Wedge-tailed Shearwater breeding sites, and disseminating information to the public. Close liaison with the Wildlife Officer is also essential to ensure that Wildlife Conservation Regulations and the guidelines set out in the management plan are adhered to.

The Operations Officer will also be responsible for implementing management procedures to achieve the other two objectives mentioned above that is to eradicate existing plants and animals, and to promote scientific study of the island's ecosystem.

Finally it should be emphasized that the management plan will be under continuous review during its currency and CALM will undertake any action necessary to achieve the stated objectives of management for the nature reserves of the Dampier Archipelago.

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