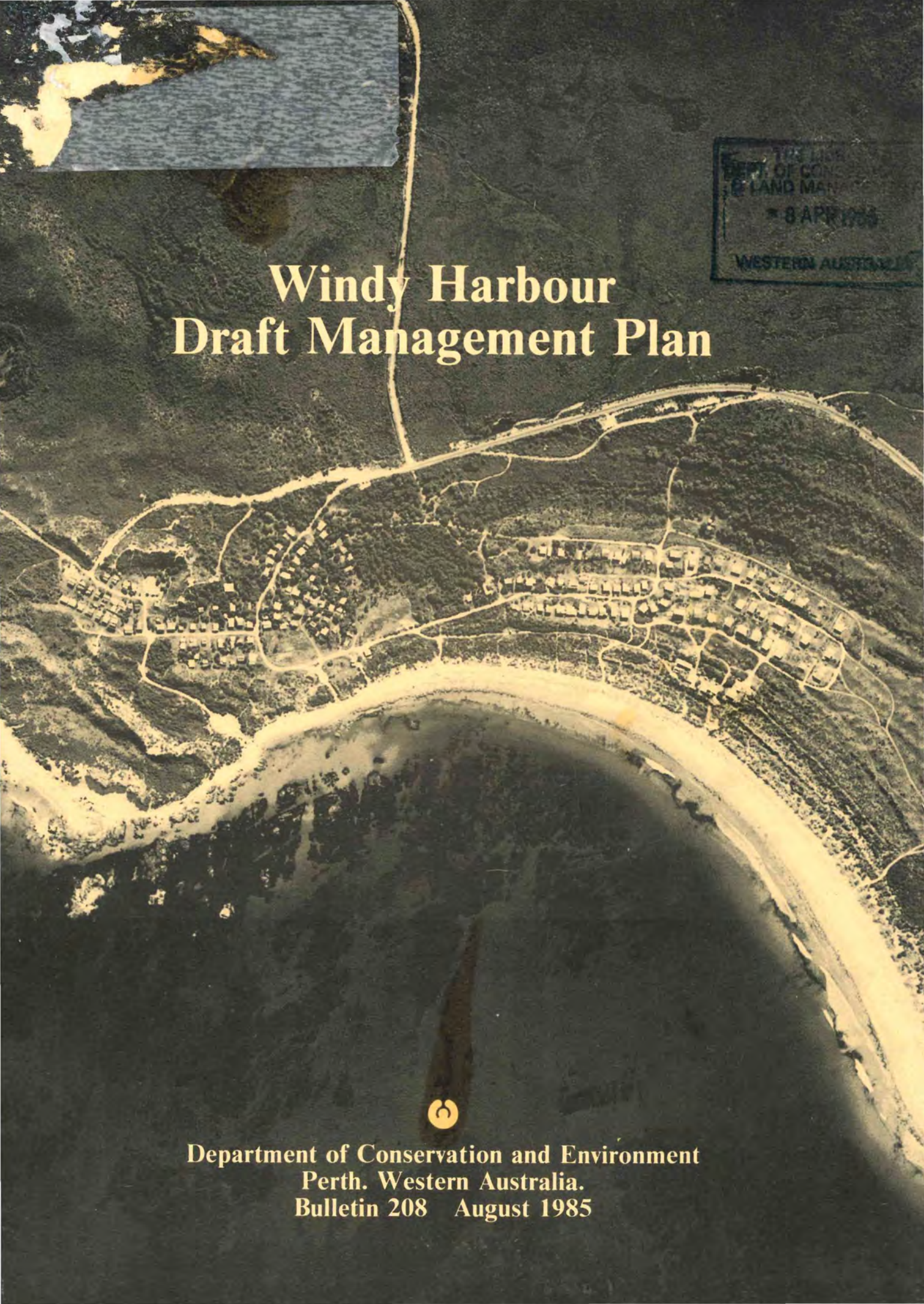

Windy Harbour
Draft Management Plan

Department of Conservation and Environment
Perth. Western Australia.
Bulletin 208 August 1985

WINDY HARBOUR

DRAFT MANAGEMENT PLAN

Department of Conservation and Environment

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ACKNOWLEDGEMENTS

REPORT PREPARATION	:	Annette Van Steveninck Bill McArthur, Consultant Geologist/Botanist
ASSISTANCE/CONTRIBUTIONS	:	Eve Bunbury Danuta Hulajko Ilona D'Souza George Gardner
ARTWORK	:	Tony Berman
DESIGN/LAYOUT	:	Brian Stewart

FRONT COVER : W.A. Lands Dept. Project 770049, 14.7.77, Aerial photograph of Windy Harbour

BACK COVER : Cathedral Rocks, Photograph by Stuart Chape

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1. INTRODUCTION

1.1 Location

This management plan considers Windy Harbour Reserve, which is Nelson location 12439. Windy Harbour is on the south coast of Western Australia east of Point d'Entrecasteaux and west of the Gardner River. Bearings for the south are 34° 50' latitude and for the east 116' 01 longitude. Windy Harbour is in Manjimup Shire and some 75 kilometres by road from Manjimup and 400 kilometres from Perth. See Figure 1 for location map.

The Windy Harbour Reserve contains 90.4305 hectares. The boundaries of this reserve were amended in 1984 in order to place the d'Entrecasteaux cliffs within the National Park which is named accordingly.

1.2 Land Tenure and Adjoining Lands

Windy Harbour is located on A Class Reserves 38881 which is vested with the Manjimup Shire Council for the purpose of recreation, camping, a caravan park and holiday cottages. Council has power to lease cottage sites on an annual renewal basis.

The Windy Harbour Reserve is surrounded by the newly created Shannon Forest and d'Entrecasteaux National Parks. These significant conservation reserves total some 70,000 hectares and include extensive forests, wetlands, sand dunes, rugged and beautiful coastline and inlets. The Park's management objectives include the preservation of natural beauty as well as the provision of access and facilities for public recreation. It is intended to achieve these aims through zoning strategies. Consequently, the parks will increasingly become an important tourist attraction for the south coast region.

The Windy Harbour Reserve is an intensive people use zone focusing on the coast for recreation activities. Therefore management needs to consider people's requirements and the impact on the conservation value of the adjoining National Park.

1.3 Purpose of Management Plan

This plan provides recommendations for management of coastal land use within the Windy Harbour Reserve. Specifically it is intended to :

- Identify and manage areas that require protection such as the foredune system, high dune ridges and swampy land
- Assess the land capability for residential developoment
- Consider people's requirements for beach access, carparks, picnic sites, toilet facilities etc.
- Provide a caretaker to assist in management
- Indicate policies towards fire management and of road vehicles (ORV's)
- Encourage community participation in coastal management

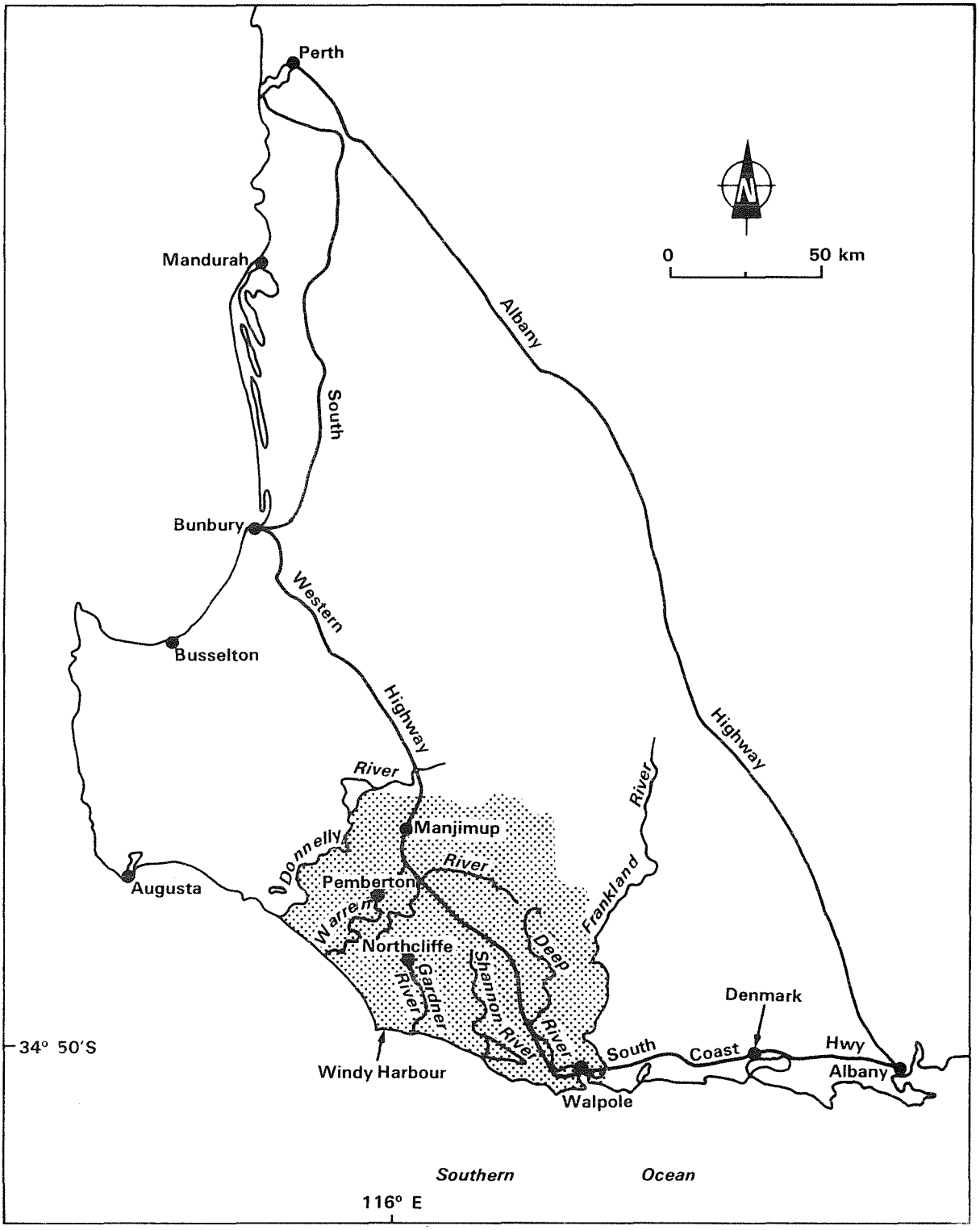

Figure 1. Location map for Windy Harbour, Manjimup Shire, W.A.

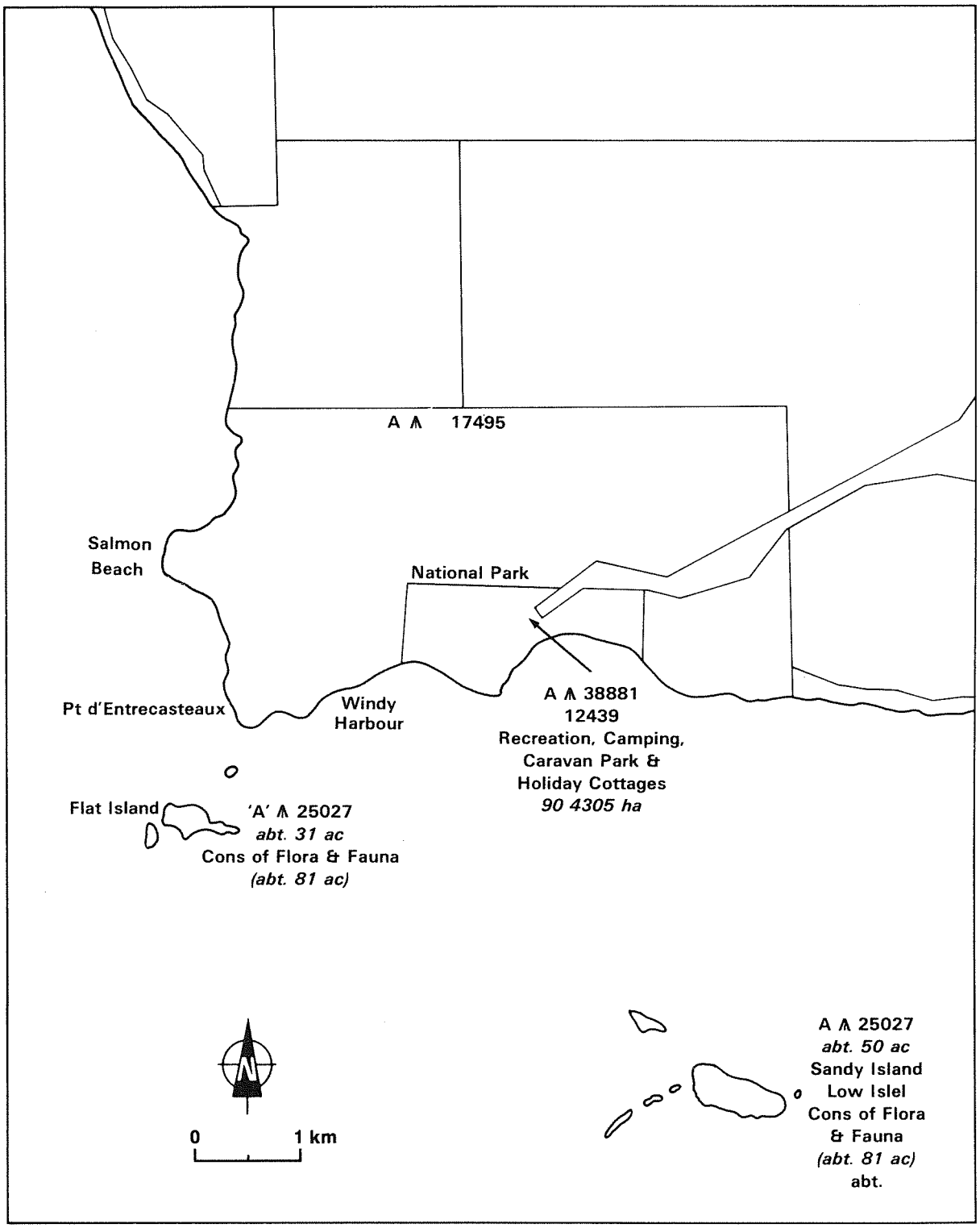

Figure 2. Land Tenure.

It outlines Manjimup Shire Council's commitment towards management of this reserve. This is a requirement of the 1981 amendments to the Land Act which states local government authorities need to prepare managmeent plans for lands under their control.

This plan will also consider the Manjimup Shire's coastline in general. This is intended to gain a district perspective in recreation opportunities, facilities and access along the coast. The establishment of the National Parks in this district places some restrictions on coastal land use and liaison between Council and the Department of Conservation and Land Management is recommended to increase local participation in planning for the Parks.

1.4 Development of Windy Harbour

Council has contracted Crimp and Associates to prepare a planning scheme for Windy Harbour settlement giving direction to development. (Crimp and Associates, 1982). In brief the scheme provides for the following :

- some 60 additional leases
- an additional lease site for professional fishermen
- development of the caravan park
- rationalization of foreshore tracks
- the provision of carparks and beach access
- by-laws to achieve management aims

This management plan considers the physical attributes of the Windy Harbour Reserve to arrive at a capability rating for the proposed residential development. See Section 2.4 and Figure 3. The recommendations contained in this report should guide future land use of the reserve.

Currently the rustic character and low accommodation cost attracts people to Windy Harbour. To date, electricity, sewerage or a PWD reticulated water supply are not provided as this will add to the cost of leases. Some of these facilities will be 'phased in' in the future and their impact needs to be considered in the planning scheme.

2. NATURAL RESOURCES

2.1 Climate

The information on climate was taken from meteorological data recorded over 30 years (1931 - 1960) and a one year record for Windy Harbour (see Table 1). The climate of Windy Harbour is Mediterranean with cool wet winters and a warm 4 month dry summer period. Rainfall increases towards the coast; Pemberton receives 1300mm per year while Windy Harbour receives 1400mm per year. The maximum rainfall occurs between April and September. The number of wet days in Pemberton and Northcliffe ranges between 194 and 182 days per year. The highest daily rainfall figures (see Table 1) indicates it is possible that from March to September 80 - 100mm of rain could fall in 24 hours.

The high rainfall causes a significant rise in the water table during the winter and spring months and this constitutes a constraint to development and access.

The temperature gradient increases away from the coast in summer but decreases in winter. During winter the mean temperature along the coast is about 12°C and in summer it is about 19°C. There is high rainfall effectiveness because of the low evaporation rates - 1100mm per year. The growing season commences from February 15th and it is 10 months in duration.

Cape Leeuwin is in a similar coastal situation as Windy Harbour and the wind data held by the Bureau of Meteorology is relevant. From January to March in the morning winds are east and south-easterly and turn south and south-westerly in the afternoon gaining in strength to 20 - 30km/hr. Winter storms are mainly from the south-west and west in the morning and the west and north-west in the afternoon.

Some 80% of winter storms are over 20km/hr and 15% of them have winds over 50km/hr.

The south-westerly wind is the most significant in management considerations. It is consistently strong and gusty and it is very effective in movement of sand. Therefore near-shore dunes with a south-west aspect should not be disturbed and paths or roads should not be aligned to the south-west.

The weather pattern influences people's use of Windy Harbour. The most popular season is November to April when the temperature during the day is over 20°C and the number of wet days drops below 10 per month.

2.2 Geology and Landforms

The Windy Harbour area has a basement of Precambrian granitic rocks which are mostly obscured by sand. They may be seen outcropping on the beach and they form "islands" emerging from the sandy Chudalup Plains to the north. The dominant feature at Windy Harbour is the limestone headland forming Point d'Entrecasteaux. The headland has an important influence on present coastal processes. It creates a 'sand-accumulating' environment possibly with the sand sources being the mouth of the Warren River to the north-west and the mouth of the Gardner River to the east. Sandy sediment is clearly visible in the colour air photographs (W.A. Lands Dept. Project 770049; 14.7.77). Sand has been coming ashore along this coast for (probably) 5000 years and it is continuing to accumulate. Within this environment, which includes the Windy Harbour settlement, both dunes and beach ridges have developed. Immediately to the east of Point d'Entrecasteaux is a small bay from which dunes have originated. There were apparently three phases of dune activity which are identified by their shape, relief, and soil profile development. Within the Windy Harbour settlement the phases are separated by narrow inter-dune corridors.

Further east the dunes give way to a series of beach ridges with inter-dune swales. The ridges are probably formed by the south-westerly swell striking the d'Entrecasteaux headland and being deflected northward and gradually moving sediment on shore. The ridges from 5 to 8 metres and the swales 2 to 3 metres above sea level are often barely above the winter water table.

TABLE 1 Meteorological data

MEAN RAINFALL (in mm)

STATION	Years Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
NORTHCLIFFE	30	26	23	49	105	189	243	266	210	152	116	63	43	1485
PEMBERTON	24	25	18	41	85	171	216	226	189	125	103	64	41	1303
WINDY HARBOUR	1	16	27	20	52	240	187	179	-	111	52	81	-	965
		STANDARD PERIOD 1931 - 1960 RAIN DAYS NORMAL / STANDARD PERIOD 1931 - 1960 RAINFALL NORMAL												
NORTHCLIFFE days	8	6	10	13	19	22	24	22	19	17	13	9	182	
NORTHCLIFFE mm	29	28	24	49	100	188	241	260	206	144	109	63	43	1455
PEMBERTON days	9	7	11	14	20	22	25	23	21	18	13	11	194	
PEMBERTON mm	29	29	21	47	96	198	245	263	205	152	115	63	46	1480
		HIGHEST DAILY RAINFALL												
NORTHCLIFFE	30	46	55	99	81	82	69	81	55	76	52	41	47	99
PEMBERTON	30	64	34	79	72	79	63	71	46	41	53	56	35	79
		MEAN TEMPERATURE (°C)												
PEMBERTON														
mean max.	11	25.8	25.6	23.9	20.5	17.2	15.4	14.4	15.3	16.4	17.6	20.7	22.5	19.6
mean min.	11	12.7	13.0	12.5	10.4	8.3	7.6	6.7	6.3	6.7	7.6	9.3	11.1	9.4

Inland from the dunes and beach ridges are the swampy Chudalup Plains which have occasional sandy hummocks and linear dunes in addition to the sporadic "islands" of granite rocks.

2.3 Vegetation

The landforms have distinctive soils which, in turn, determine vegetation communities. The swampy Chudalup Plains, with humus podzol soils, are dominated by sedges, reeds, and rushes; the surface is covered with water during the winter months. The hummocks on the Plain have Banksia attenuata and Banksia illicifolia woodland with a dense heath layer about 1 metre high.

The older dunes, with a weak podzol profile, have Agonis flexuosa - Hakea oleifolia woodland with a heath layer of Olearia axillaris, Jacksonia furcellata, Melaleuca acerosa, Hakea prostrata, Leycopogon insularis and several creepers. The younger dunes, with calcareous sandy soils, have coastal heath of Olearia axillaris, Acacia littorea, Spyridium globulosum and Scaevola nitida.

Vegetation on the beach ridges and swales depends on the depth of the water table. On the older ridges, under natural conditions, Agonis flexuosa and Hakea oleifolia form a woodland with a dense ground cover of Acacia littorea, Leucopogon insularis, Melaleuca acerosa and the creepers Muhlenbeckia adpressa, Hemiandra pungens and Hardenbergia comptoniana The younger dune ridges adjacent to the shoreline, have coastal heath of Acacia littorea, Olearia axillaris, Spyridium globulosum, Scaevola nitida, and Calocephalus brownii.

The wetter swales have Agonis juniperina tress with dense undergrowth of Lepidosperma gladiatum and Oxylobium lanceolatum. The better drained swales and other low-lying areas have a woodland of Banksia littoralis with ground cover of Lepidosperma gladiatum, Anigozanthos flavida, and the creepers Cassytha glabella and Muhlenbeckia adpressa. The youngest beach ridge, with loose calcareous sand, has typical colonising species such as Ammophila arenaria (marram), Spinifex hirsutus, Olearia axillaris and Arctotheca populifolia.

The coastal vegetation is well adapted to its harsh physical environment but it is easily damaged by people, for example, by tracks and fire. Vegetation traps and holds wind blown sand in dunes so that without it the wind may erode dunes to produce blowouts. If foredunes are destroyed the coast is also more vulnerable to erosion by the sea, consequently the foreshore is often described as a 'fragile' or 'sensitive' environment because self regulating mechanisms can easily be interrupted and weather conditions may have damaging repercussions. The protection of foreshore vegetation is an integral part of beach management and soil stabilisation.

As the vegetation is a significant resource of the reserve investigation for possible dieback (Phytophthora) symptoms should be undertaken. Dieback hygiene procedures need to be considered following any earthworks.

2.4 Land Capability

Capability is defined as the capacity of a landscape to sustain a particular land use development without incurring unacceptable land degradation. It is

determined by considering the proposed land use (in this case residental development as noted in Section 1.4) in relation to the physical attributes of the land. Climatic parameters such as wind patterns and rainfall intensity are also considered. In arriving at a Capability Rating the constraints and hazards for each landform are listed and the rating is given as an index as follows:

1. Capable of proposed use without constraints or hazards
2. Capable with low limitations and with low risk and adverse effects
3. Special management and technology required for success; moderate risk of adverse effects
4. Highly specialised management and technology required for success; extensive conservation measures required to avoid adverse effects; maintenance required for on-going management
5. Severe physical limitations to development. Extremely high risk of degradation. Cost of modifications, conservation measures, and maintenance would be generally prohibitive.

The Windy Harbour settlement area has been mapped into landform-soil units which are shown on Figure 3 and described below :

Chudalup Plains. This is a landscape of low elevation and very low relief. There are many permanent swamps and, during winter, much of the surface has free water. The main soils are peats and humus podzols. There are occasional linear dunes and hummocks.

Capability Rating 5 - The major constraint is the high water table which would cause problems for access and for effluent disposal.

The Oldest Dune Phase consists of rounded hills, the highest almost 30 metres, forming a ridge to the north of the present townsite.

Capability Rating - 2 to 4 - The eastern end (Rating 2) has low relief and gentle slopes and has no major constraints on development. The western end (Rating 4) has higher relief and elevation and steep slopes. There is a high risk of wind erosion following disturbance for development.

The Interdune Corridor (furthest inland) has very low relief and, at the western end, has a permanent swamp.

Capability Rating 3 and 5 - the eastern end (Rating 3) with elevation generally from 7 to 10 metres, is gently undulating. The water table probably rises to the surface in the lower topographic sites. The main problems would be with effluent disposal. The western end (Rating 5) has permanent swamp and development should be excluded.

The Intermediate Dune Phase consists of high, steep, irregular hills which reach 22.5 metres in height.

Capability Rating 2, 3, and 5

The eastern end (Rating 2) has low relief and gentle slopes and present no real problems.
The southern part (Rating 3) has moderate relief, gentle slopes, and reaches about 15 metres. Erosion hazard would be the main problem.
The main ridge (Rating 5) is too high and steep to be considered for development.

The Interdune Corridor (nearest coastline) has very low relief and low elevation; it ranges from 2 metres to about 8 metres above sea level and in many places it is very wet during the winter months. Although this area includes many of the original buildings it is felt that the constraints in development are considerable.

Capability Rating 2 - 3 with effluent disposal due to high water table being the main hazard, some parts are only 2 metres above sea level.

The Youngest Dune Phase consists of high steep irregular ridges, reaching about 17 metres.

Capability Rating 5. High risk of instability following disturbance. Some areas are already unstable, especially on crests and, being near the shore and exposed to the full force of the south-west wind, these dunes are very vulnerable.

The Older Beach Ridges consist of a series of low linear features, seldom more than 6 metres above sea level, separated by swales which are generally less than 4 metres above sea level.

Capability Rating depends on the depth to the water table:

Ridges (Rating 2) present no major problems

Swales (Rating 4) would have problems with effluent disposal and vehicle access.

The Younger Beach Ridges consist of low ridges, generally about 6 metres high separated by a broad swale at 2 to 3 metres. The material is calcareous and soil development is minimal.

Capability Rating 5. Development should be excluded from this zone because of the high risk of wind erosion. It should remain as a buffer between the beach and settlement and every effort should be made to maintain the vegetative cover.

Sections 2.2 - 2.4 of this Report were compiled by W. McArthur, Consultant Geologist/Botanist. Figure 3 collates the information on land capability and it provides a valuable guide for residential development at Windy Harbour. The information on landforms/soils/vegetation and climate should also be considered in provision of facilities such as carparks, paths, picnic sites, etc.

2.5 Fauna

Very little is know about the vertebrate fauna on Windy Harbour Reserve. Muir (1981) has compiled a list of species known to occupy, or expected to occur, the d'Entrecasteaux National Park. See Appendix 1.

The number of bird species and individuals is probably related to the floristic diversity of the surrounding district. The careful use of fire is essential to ensure the maximum structural diversity of vegetation.

2.6 Marine Resources

Permanently based professional fishermen fish from Windy Harbour for salmon and herring from February to March and April to May respectively. Amateur fishermen use rods and reels from the shore and from small boats.

Fish are caught throughout the year with catches of whiting, herring, skipjack, sweep and various rock cod common.

It is probable that this coast is used as a rest area for seals and dolphins.

Seaweed often builds up along the beach in winter. This may be used as a mulch for gardens and for sand stabilisation.

2.7 Water Resources

The water resources are attributed to the reliable rainfall. Residents generally obtain drinking water from rainwater tanks. Ground water is readily obtained by bores. The high water table requires careful management to prevent septic systems or rubbish tips contaminating this resource. Hence this poses a limit on development in swampy, low lying areas.

2.8 Mineral Extraction

The limestone quarry located north-west of the Windy Harbour Reserve represents an important source of high quality limestone which is used for local purposes. Provided that extraction is undertaken in an environmentally acceptable manner agreement may be reached with The National Parks Authority to continue this operation.

3.

3.1 Aboriginal Occupation by Eve Bunbury

(i) Introduction

Aboriginal people are thought to have lived in Australia for the last 40,000 years. During this time they have coped with changes in both climate and sea levels (the present sea level was reach 6000 years ago), and consequently changes to faunal and floral communities upon which they were dependent for food.

In response to the changing environment, Aboriginal people evolved a subsistence life style based on 'hunting and gathering', involving systematic seasonal exploitation of the wide variety of food resources available to them. They moved from place to place within defined tribal areas as dictated by the availability of food.

Patterns of Aboriginal land and resource use, and associated trade networks, are reflected in ethnographic accounts (i.e. recorded historical accounts) and archaeological sites.

(ii) Ethnographic Account

Traditional Aboriginal culture disappeared from the south coast of W.A. in the mid 19th century. At that time, the Pibelmen and Minang tribes were known to occupy the land adjacent to Windy Harbour (Tindale, 1974). Little ethnographic information is recorded for this area. However, it is known that Aboriginal people exploited a wide range of food resources, including :

marine and freshwater fauna, i.e. crayfish, cobbler, marron, tortoises, frogs and marine shell species; terrestrial plants, i.e. sedges, herbs, rushes, and the seeds, fruits and nuts of various plants, e.g. Zamia Palm kernals, Blackboy crowns, and Eucalypt nectar; and terrestrial animals, i.e. birds and their eggs, reptiles, and small mammals.

No archaeological data discovered to date reflects specific seasons of occupation. However, early historical reports, as well as seasonal availability of food suggest that the Coastal Plain was occupied during the summer and autumn months when many plants were in season. Regular burning of the coastal vegetation is thought to have been a significant controlling device employed by the Aboriginal people. This destroyed the old vegetation which restricted tribal movement, and encouraged new growth suitable for the people to eat as well as attracting grazing animals which could be hunted. Fire was also used to direct animal movement through the scrub, so they could be hunted easily. During the cold, windy, winter months, people retreated to the more sheltered inland areas.

(iii) Archaeological Sites

Thick understorey vegetation and groundcover characteristic of this area prevents intensive, systematic archaeological survey. However, several sites have been located, predominantly on dune ridges or sandy hummocks overlooking marshes, or adjacent to freshwater streams.

Archaeological sites located in the area can be broadly classified into the following groups :-

1. Open Habitation Sites - these are seasonally occupied sites located near temporary or permanent water sources. In the Windy Harbour area these occur adjacent to freshwater streams as they join the sea. Small amounts of artefacts are associated with these sites and local stone is used for their manufacture, i.e. quartz, quartzite, silcrete, and chert (used to make tools), and granite (used for grinding implements). The artefacts illustrate a diverse range of tools made on flakes and blades, notably 'geometric microliths' (i.e. small stone artefacts with a geometric shape). These tools are associated with domestic tasks such as food preparation and wood working.

2. Middens - these can be defined as 'accumulations of humanly transported mollusc shells of selected food species in situ', associated with other archaeological material including stone artefacts, beach pebbles, charcoal, and vertebrate faunal remains. (Dortch et al, 1984:83).

   Middens are found at Point d'Entrecasteaux, on heath covered calcareous dunes, 50 - 200 metres from the present shoreline. These are located adjacent to rocky points overlooking platforms of resistant granite rock, forming a reef where there is an abundant source of marine molluscs. Shells found in the middens include species of Nerita atramentosa (winkles) and Patella laticostata (limpets).

   These sites are significant in terms of West Australian prehistory as they indicate that marine molluscs were included as a food resource in traditional Aboriginal economy. Only a few middens have been located on the south-west coast of W.A. to date, and it was previously

throught that mollusc species were not part of the traditional Aboriginal diet (as indicated by ethnographic sources).

3. Fish Traps - both wood and stone fish traps have been found in this area :

   (i) A wooden fish trap has been located in a freshwater creek near Point d'Entrecasteaux. Several wooden stakes, which appear to have been cut with a metal tool, are embedded in the creek bed at right angles to the waterflow. This has formed a type of weir, with a central opening. It seems likely that fish were driven into the traps by people creating a disturbance downstream and as the fish passed through the trap they were speared by people standing on wooden platforms adjacent to the weir (which are no longer standing). Fish such as cobbler and marron could be caught in this way, and yields may have been sufficiently high to support relatively large numbers of people for prolonged periods of time.

   (ii) At least eight identifiable stone fish traps have been located in Broke Inlet, the most intact of which is 18 metres in diameter. Some of the traps are totally submerged in water and others are completely dry. These traps appear to be tidal, i.e. semi-circular traps radiating out from the beach, which would trap fish during outgoing tides. However, there are no tides at Broke Inlet, (and have not been for at least fifty years) as a sand bar has formed across the entrance to the sea. This bar is broken annually in winter through the combined effect of flood water and winter storms off the coast but reseals soon afterwards. The traps are therefore considered to have been constructed during times when the inlet was open to the sea.

4. Burials - coastal dunes were used for Aboriginal burials throughout the West Australian coast. Human skeletal material has been exposed in this area due to dune blowouts.

   No conclusive dates have been established for the age of these sites. However, with the exception of the wooden fish trap (which was obviously constructed post-European contact due to the use of metal tools), the sites are considered to be of Holocene age (i.e. the last 10,000 years). Middens at Point d'Entrecasteaux are thought to be of comparable age to middens located at Conspicuous Cliff, approximately 70 kilometres to the south-east, which have a radio carbon date of 580 years BP (Before Present).

(iv) Conclusion

This archaeological evidence is extremely valuable in understanding traditional Aboriginal land and resource use in the south-west of Australia, as well as in terms of Australian Prehistory in its widest context. While numerous sites have been recorded in the area, many more are presumed to be present, but are as yet unlocated due to thick vegetation cover.

The recording and protection of Aboriginal Sites in Western Australia is the responisbility of the Department of Aboriginal Sites, W.A. Museum, under the Aboriginal Heritage Act 1972 - 1980. Any developments in the Windy

Harbour area are likely to have some impact on Aboriginal sites. Where development is planned, the Department of Aboriginal Sites as well as local Aboriginal communities need to be consulted.

3.2 European History

Point d'Entrecasteaux bears the name of the French Admiral who landed at the site in the 1870's. The landfall is commemorated by a plaque at the lighthouse which is an interesting feature for tourists. The harbour is one of the few sheltered anchorages between Augusta and Albany and it would have been used by the early sealers and whalers.

Squatters were the first settlers during World War II period. Currently two professional fishermen and a ranger are permanent residents. One hundred and seventy-five holiday cottages have been built since the 1940's and people's activities are orientated towards the coast. During peak holiday times there are some 2000 visitors and land use pressure will continue to increase.

3.3 Coastal Access

The Manjimup Shire coastline appeals to people largely because it is free from high density urbanised recreation which dominates the west coast tourist resorts south of Perth. The Shire's main townsites except Walpole, traditionally have inland locations to service farming and forestry activities. The district is not favoured with coastal facilities and the holiday accommodation at Windy Harbour represents a valuable opportunity for local people.

The current land tenure arrangements accentuate the coast's remoteness and lack of vehicle access. There are grazing leases, some private land with titles to high water mark and the extensive Shannon Forest and d'Entrecasteaux National Parks. In practice people do gain access by 4WD vehicles to popular fishing spots and some squatters shacks have been built. Access to much of the coast still relies on local knowledge.

Planning for the National Parks is currently underway and access will be upgraded to specific sites together with the provision of 'low key' facilities such as serviced campsites.

As National Parks cover over 90 per cent of the Shire's coast the Department of Conservation and Land Management should consult Shire representatives in planning for Park recreation use. An effective management committee is recommended.

See Table 2 for a list of sites with vehicle access and facilities. The main visitor activities are also listed.

Table 2

Beach Access, Facilities and Recreation Activities
in Manjimup Shire - Donnelly to Frankland River

Location	Access	Facilities/Activities
Donnelly River	By boat	Illegal shacks, local amateur fishermen main use of site.
Warren Beach	4WD access using Callcup Hill and the beach	Popular fishing beach, some shacks at river mouth. Yeagarup Dunes/ Warren River area popular camping/bushwalking
Malimup Springs	4WD may become impassable in wet	Private property/camping on arrangement with owner. Freshwater springs, important archaelogical area, owner's home/facilities established near Salmon Beach
Doggerup Beach	4WD - access through Malimup has been closed by local landowner	Popular 'local' fishing spot
Salmon Beach	4WD access from National Park - track along cliffs closed, use of inland route	'Local' fishing beach. Carpark on cliff used by hang-gliders
Cathedral Rocks	Limestone road suitable for conventional vehicles	
Windy Harbour	Sealed road, all weather access	Leasehold settlement - currently orientated towards local use. Camping/caravans, toilets, shower, water. Boat ramp, sheltered anchorage designated swimming area and fishing
Gardner River	4WD access south of Northcliffe or along the beach from Windy Harbour	Popular campsite at 'Frog Flat' near river mouth and dune blowout. Squatter's shack. Water. Shire recreation reserves receive little use
Coodamarrup Beach	4WD access through private property	'Local' fishing beach

Location	Access	Facilities/Activities
Lake Maringup	4WD access largely over-grown and problem crossing Gardner River. Alternative access through private property. Remote location.	
Fish Creek	4WD access through land leased for grazing	Popular local fishing spot. Some private facilities - shack, beach access, boat launching
Broke Inlet	Limestone/gravel road all weather suitable for conventional vehicles	Squatters shacks, small boat launching, informal camping, possibility of holiday chalets, attractive holiday site, canoeing, winsurfing etc., on inlet
Cliffy Head	4WD	Some fishing
Banksia Camp	4WD	'Local' fishing spot
Mandalay Beach	Conventional vehicles access maintained by National Parks Authority	Fishing spot, strolling. No camping
Long Point	4WD	Fishing, scenic coastline
Mouth of the Deep River	Conventional vehicles	Pleasant area, Tinglewood Lodge tourist accommodation further upriver
Nuyts Wilderness	Walking area	Over 1000 recorded visitors per annum, i.e.highly significant recreation area
Coalmine Beach	Sealed road/all weather	National Park, camping/ caravan park, kiosk, small boat launching,picnic sites, scenic drive, water sports on Inlet, popular fishing spots
Frankland River	Highway or by boat via Nornalup Inlet	Some fishing, canoeing

4. MANAGEMENT POLICIES

Council's policies for Windy Harbour are outlined below:

4.1 Insofar as possible, conserve the natural environment.

4.2 Reduce the fire risk to the settlement and to the adjoining National Park.

4.3 Protect 'fragile' vegetation especially on the foredunes, steep slopes and swampy locations. Undertake management and revegetation when necessary and devise a means of monitoring the effectiveness of management measures.

4.4 Plan for the growth in demand for holiday accommodation at Windy Harbour, consider land capability in releasing new lease sites and offer a wider range of accommodation, for example rental units and a youth camp.

4.5 Preserve the 'rustic' character of the settlement and plan development to blend with the environment as far as possible.

4.6 Recognise the needs of the commercial fishermen and ensure that their interests are not put in jeopardy.

4.7 Obtain advice on management concerns from the Windy Harbour Board. Appoint a fulltime caretaker to undertake management recommendations, police regulations and liaise with visitors, the Board and Council.

4.8 Discuss management policies for the surrounding National Parks with the Department of Conservation and Land Management and agree upon mutual concerns, such as fire management

4.9 Support public education programmes toward environmental protection. Initially, signs and a brochure on the reserve are recommended.

4.10 Seek finance from appropriate Government sources and development management priorities for the effective use of funds.

5 POLICY IMPLEMENTATION

5.1 The Environment

Manjimup Shire Council intends to undertake the following management strategies:

5.1.1 Restrict the clearing of natural vegetation and favour the use of native plant species in landscaping programmes. See Section 2.3. In particular in the caravan park/camping area trees will be used to form separate bays, and segregate facilities.

5.1.2 Take precautions against dieback when undertaking any earth moving activities.

5.1.3 Prevent people making more tracks to the beach. Required paths will be upgraded to encourage people to use them.

5.1.4 Close any existing unnecessary tracks. This includes the vehicle track parallel to the eastern foreshore, pedestrian tracks leading onto dune ridges above the Lion's Clubhouse, western-most cottages and western headland.

5.1.5 Re-vegetate bare sand areas. Project priorities will be assessed by a site's stage of erosion, degree of exposure to winds, people pressure and the possible damage to capital investment. (See Section 6 on Coastal Management Projects).

5.1.6 Recognise the high risk of fire within the settlement due to the closeness of buildings and surrounding trees and the consequent risk to the adjoining National Park. Undertake general fire precautions such as the mowing of all tall grass near cottages, prohibitions on storage on lots, fire extinguishers in cottages and organisation of a local fire fighting group with suitable equipment.

5.1.7 Develop a fire prevention programme liaising with the Department of Conservation and Land Management. A fire break system is favoured on the land boundary of the reserve to assist in getting to any fires. The objectives for safety of the settlement and conservation of the National Park are recognised and will need to be monitored frequently.

5.1.8 Burning foreshore vegetation on a regular basis is not favoured. The reasons are noted below:

- the soil binding function of vegetation is damaged and the likelihood of dune blowouts is increased
- management of 'burnt out' dunes is more difficult and indiscriminant tracks from people and vehicles cause more erosion problems
- burning off tends to favour exotic plants which in the long term are less adapted to the coastal enviornment and tend to die off.
- there has been insufficient study on the period required for regeneration of coastal vegetation. Newbey (pers.com.) suggests that 12 to 15 years are necessary to adequately restore an area.

5.1.9 Open fires are not permitted within the settlement. Wood will be provided at barbeque sites to prevent people using nearby trees. The feasibility of a low maintenance gas barbeque will be considered.

5.1.10 As pets are permitted within the reserve they may become a nuisance in the public areas. This will be monitored to place restrictions as required. For example, dogs may need to be on a leash or restricted from popular places such as the main beach during the peak season.

5.2 The Settlement

5.2.1 This management plan provides a detailed assessment of land capability for residential development. See Section 2.4 and Figure 3. This will provide the basis for determining the best areas in which to expand the settlement and in recognising management concerns for specific land units.

5.2.2 The planning scheme provides a means of assessing the future needs of the settlement and it considers matter such as rental accommodation, fishermen's lease sites and Building By-laws with Council's policy objectives in mind.

5.3 Administration

5.3.1 Council has employed a caretaker/ranger to ensure effective management of the reserve. His duties include :

- Patrol and Public Education:
  The caretaker is required to prohibit or report activities that oppose the management objectives. He is a public relations officer between Council and visitors to the area. He should also be involved in providing advice for management plans.

- Garbage and Litter Control:
  During holiday periods, garbage and toilet cleaning operations need to be undertaken on a regular basis. At other times, these duties will be undertaken as required.

- The caretaker will undertake a variety of minor development and maintenance works during non-holiday periods. They will include small soil stabilisation and beach management projects, landscaping, and the erection and maintenance of signs and fences.

5.3.2 The Windy Harbour Management Board will provide a forum to represent leaseholder's interests in planning and management of the reserve and liaise with Council in this respect.

5.3.3 The Manjimup Shire Council will consult with the Department of Conservation and Land Management to develop a suitable fire prevention programme for the reserve. (See 5.1.6 and 5.1.7). Council will also request more effective participation in a management committee for the National Parks which currently consumes over 90% of the Shire's coastal district.

5.3.4 Public education is an integral part of any effective management strate' Signs will be used to indicate beach paths and request people to pro' dune vegetation or to indicate dune under repair, please keep off, etc .ı some areas fencing will act as an additional constraint to access. Bro es explaining why these management measures are undertaken will be a' ıble from the caretaker. It is intended to increase people's awarene' , the fragile nature of the coast and how they may assist in its p .ction. International sign format will be used to indicate constraints or .reation activities, etc.

5.3.5 The Manjimup Shire Council will seek funds from Governm sources to undertake necessary projects at Windy Harbour. To date .e assistance for coastal management has been obtained from the epartment of Conservation and Environment.

6. MANAGEMENT UNITS

For convenience purposes the coast is divided into three sections - Eastern, Central and Western. Recommendations for each area are noted below :

6.1 The Eastern Foreshore

6.1.1 Discourage any further burning of the foreshore vegetation. Monitor regrowth of burnt areas by periodic photographs and site inspections.

6.1.2 Rationalize beach access in front of the fishermen's lots by upgrading one or two paths and request people protect dune vegetation by using the paths.

6.1.3 Retain the eastern vehicle access onto the beach.

6.1.4 Close the vehicle track parallel to the main foreshore road. Where there are tracks on the dune ridges re-vegetation measures will need to be considered. Fence and sign as required.

6.1.5 Encourage residents to plant trees on their lots by making seedlings readily available.

6.2 The Centre

This unit includes the caravan park and extends to the boat ramp.

6.2.1 Plan and landscape the caravan park, picnic site and toilets using fast growing tree species such as Peppermints, Acacia's or those noted in Section 2.3. Trees will define caravan/tent bays, provide shade and improve the visual amenity.

6.2.2 In the future a toilet facility will need to be provided within the caravan park.

6.2.3 Use the vehicle access track as the main path to the beach and provide a second path at the eastern end of the caravan park.

6.2.4 Limit vehicles to the eastern end of the beach so that the central beach is safe for people.

6.2.5 Define a carpark near the picnic site.

6.2.6 Monitor the condition of dune vegetation and the number of tracks through the dunes. Fence off any areas if necessary. As this is the main visitor centre of the settlement the improvements to the caravan/camping area have a high priority. The foredunes are well covered by vegetation but this needs to be monitored regularly.

6.3 The Western Foreshore

This unit includes the boat ramp and extends to the western edge of the reserve.

6.3.1 The boat ramp track provides vehicle and pedestrian access to this part of the beach. The carpark will be extended so that vehicles and trailers will be required to use it rather than continue the existing practice of parking on the beach.

6.3.2 Several exposed dune ridges are severely eroded by wind scouring people's tracks. These dunes need to be repaired and managed. Project priorities have been established as noted below:

- the secondary dune ridge behind the Lion's Lookout
- the dunes behind the rocky headland
- the secondary dune in front of the front row of cottages in this unit

6.3.3 The projects generally involve mulching the soil, seeding or planting and constraints on people's use of these sites. Alternative paths and signs will be provided as necessary.

The following materials will be used:

- Mulches - tree prunings, seaweed or woodchips
- Plants - spinifex seed heads, marram culms, Olearia axillaris seeds etc.
- Fencing depends on location. Wood fences are recommended for safety and visual reasons. Picket and wire fences are expendable and appropriate for the seaward edge of dunes.
- Signs - routed wooden with painted lettering or international format.
- Lookout - wooden platform or limestone surface
- Steps - rail sleepers widely spaced, wooden planks, etc.

7. SUMMARY OF MANAGEMENT PROPOSALS

The proposals for each unit are noted in order of priority.

7.1 Western Unit

7.1.1 Dune restoration projects:

- Lion's Lookout dune ridge
- Western headland foredunes
- Secondary dune ridge in front of cottages

7.1.2 Extend boat ramp carpark.

7.2 Central Unit

7.2.1 Landscape and develop caravan park, provide additional facilities.

7.2.2 Erect signs and control visitors' use of the area as outlined.

7.3 Eastern Unit

7.3.1 Prevent the regular burning of foreshore vegetation.

7.3.2 Close off foreshore tracks.

7.3.3 Landscape and encourage leaseholders to grow trees.

APPENDIX 1

FAUNA LIST COMPILED FROM W.A. MUSEUM RECORDS (See Muir 1981)

Cercatetus concinnus	Pygmy possum
Isoodon obesulus	Bandicoot
Macropus fuliginosus	Western Grey Kangaroo
Pseudocheirus peregrinus	Ring-tail Possum
Rattus fuscipes	Southern Bush-rat
Pseudomys shortridgei	Shortridges Native Mouse
Exotic Mammals	
Felis cattus	Feral cat
Mus musculus	House mouse
Oryctolagus cuniculus	Rabbit
Vulpes vulpes	Fox
Birds	
Calyptorhynchus bandinii	White-tailed Black Cockatoo
Phalacrocorax carbo	Black Cormorant
Charadrius ruficapillus	Red-capped Dotteral
Aquila audax	Wedge-tailed Eagle
Dromains novaehollandiae	Emu
Larus novaehollandiae	Silver Gull
Falco berigova	Brown Hawk
Phylidonyris novaehollandiae	New Holland Honeyeater
Falco cenchroides	Kestral
Dacelo gigas	Laughing Kookaburra
Gymnorhina tibicen dorsalis	Western Magpie
Coturnix australis	Brown Quail
Corvus coronoides	Australian Raven
Platycerius icterotis	Western Rosella
Zosterops gouldii	Western Silver-eye
Calidris reficollis	Red-necked Stint
Hirundo neoxena	Welcome Sparrow
Hydropogne caspia	Caspian Tern
Acanthiza pusilla	Brown Thornbill
Acanthiza chrysorrhoea	Yellow-rumped Thornbill

APPENDIX 1

Rhipidura leucophrys	Willy Wagtail
Pachycephala pectoralis	Golden Whistler

Reptiles by common names

Geckos

Legless Lizards

Goannas

Skinks

Python

Venomous Snakes

Frogs

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