LOWER ORD RAMSAR SITE

Draft Management Report

June 1998

Department of Conservation and Land Management
Kununurra, Western Australia 1998

PREFACE

All national parks, conservation parks, nature reserves in Western Australia are vested in the National Parks and Nature Conservation Authority (NPNCA), all marine parks, and marine nature reserves and marine management areas are vested in the Marine Parks and Reserves Authority (MPRA). The Department of Conservation and Land Management (CALM) manages the conservation estate on behalf of these authorities.

The declaration of marine conservation reserves follows a different process than for the terrestrial estate. Basically a Notice of Intent (NOI) to establish the reserve must be prepared in agreement with the Ministers for Fisheries and Mines. Immediately prior to the publication of an NOI a proposed indicative management plan must also be issued. This report indicates the area recommended to become a Marine Park in keeping with previous recommendations and broadly identifies some management issues and strategies for that Marine Park. It does not pre-empt the formal NOI process or the indicative management plan but will be used as a basis for that work. It is inappropriate to discuss terrestrial management issues at the Site without also including the marine environment.

This management report follows the same format as is adopted by CALM in the preparation of draft management plans for the authorities. It is intended that once approved by the Corporate Executive of CALM and the authorities this report will form the basis of a draft plan to be released for public comment. If acceptable, a final plan will then be presented to the Minister of the Environment for approval.

The report covers the Parry Lagoons Nature Reserve C42155, Ord River Nature Reserve C31967 and the proposed Cambridge Gulf Marine Park. It covers a period of management of the area of 10 years.

Attached to the report are a series of appendices that provide information on the flora and fauna of the Site, consultants' reports and other material used in the compilation of the management document.

The management report also contains relevant strategies from the draft regional management plan released for public comment in 1998 which covers CALM's Kimberley Region.

ACKNOWLEDGMENTS

The Environment Australia Biodiversity Group through the National Wetlands Program provided financial assistance for the preparation of this management report.

This report was prepared under the guidance of a team comprising;
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Contributions and advice during the preparation of this draft plan were provided by:

- Staff of the Department's Kimberley Region and East Kimberley District, notably Dave Grosse, Jenny Wilksch and Allan Thomson.
- Staff from CALM's specialist branches including Richard Hammond, Rod Properjohn, John Cleary, Chris Portlock, Norm McKenzie and Tony Start
- Contracted specialists including Russell Gueho from Northern Habitat and the archaeological consultants Gaye Nayton, Darren Cooper and Cathie Clement.

Many people, both individuals and agency representatives, made valuable contributions to the development of this document.

The cover photographs from the top are Marlgu Lagoon (Photo: Jenny Wilksch), Lower Ord Floodlplain (Photo: Tanya Vernes) and The Needles (Photo: Paul Hyndes).

(Photo: Chris Done)

NOMENCLATURE

Inclusion of a name in this publication does not imply its approval by the relevant nomenclature authority.

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Locality
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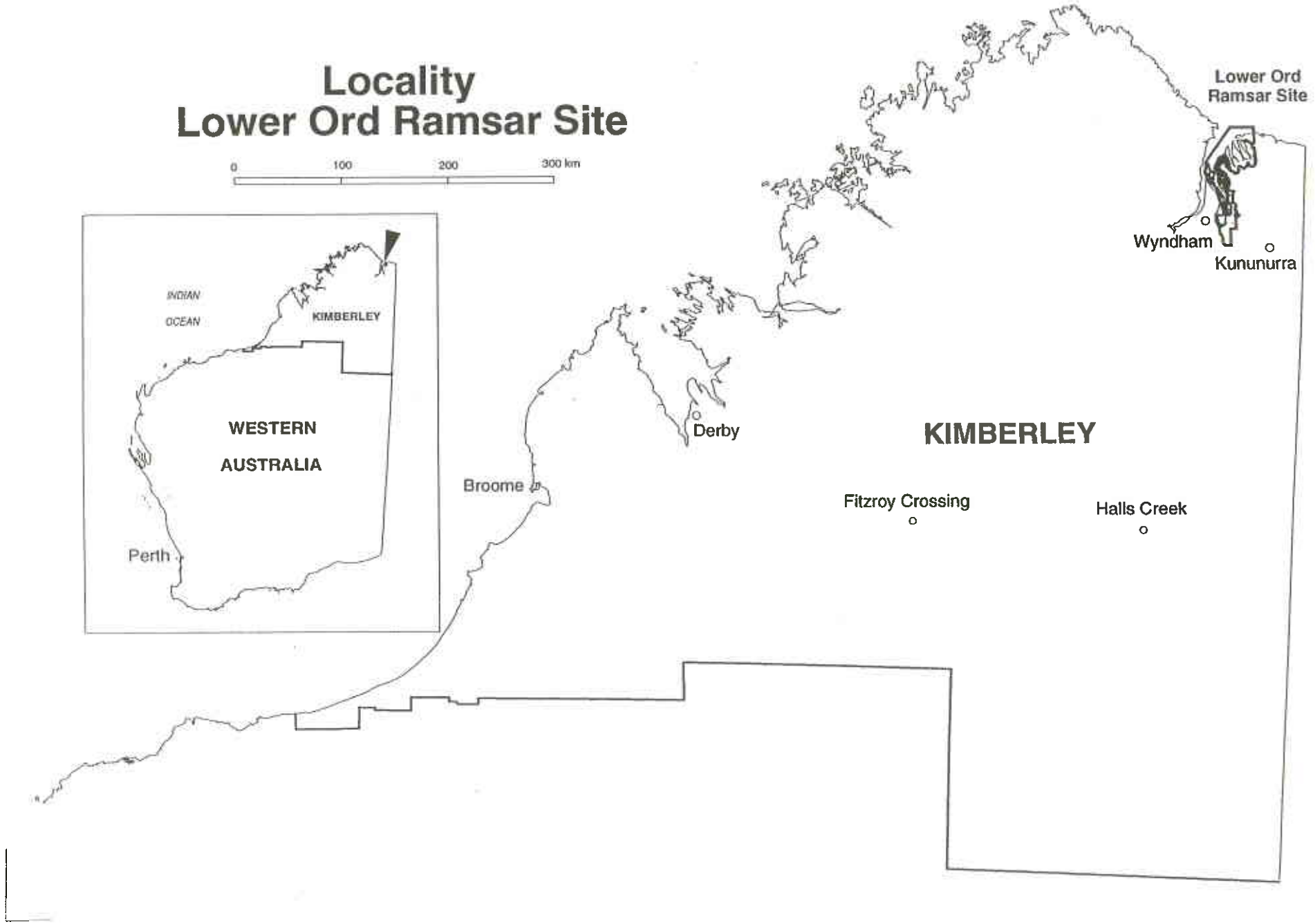


INTRODUCTION

1. BRIEF DESCRIPTION

This report covers the Lower Ord Ramsar site, most of which is comprised of the Ord River Nature Reserve, the Parry Lagoons Nature Reserve, a proposed National Park and a proposed Marine Park. Within this report the whole area will be referred to as 'the Site'. Details of the existing and proposed conservation reserves are;

Ord River Nature Reserve No. 31967 Class C (79,842 ha);
Parry Lagoons Nature Reserve No. 42155 Class C (36,111 ha);
Proposed Parry Lagoons National Park (Approximately 39,500ha) comprising parts of the two existing nature reserves;
Proposed Cambridge Gulf Marine Park (Approximately 110,500 ha).

The Site boundaries do not conform with the boundaries of the lands and waters named above but changes are proposed to ensure they do so.

The western boundary of the Site is located some 15 kilometres from the town of Wyndham in the East Kimberley of Western Australia. The nearest point of the Site to the town of Kununurra is some 47 kilometres north west of that town. The area is managed by CALM's East Kimberley District (Kimberley Region) which covers the shires of Wyndham/East Kimberley and Halls Creek.

The Site experiences a dry tropical climate with Wyndham having an average annual rainfall of 695 millimetres. Rainfall is monsoonal and is usually restricted to a hot, humid wet season from November to March. The dry season is characterised by warm, dry days with periods of steady south-easterly winds. Average maximum temperatures vary from 39° C in December to 30° C in July. Other 'seasons' are recognised by people who live in the area such as the period at the end of the dry season prior to the onset of rains as the "build-up", a time of discomfort with high temperatures and humidity but little rain. The end of the wet season is also often acknowledged as a separate time with easterly winds beginning to blow signalling the start of the dry season with the land still green and with abundant surface water.

The Ord River Nature Reserve includes the spectacular feature of the False Mouths of the Ord. Here there are vast areas of mudflats, mangrove communities and a maze of tidal creeks. To date fourteen of the sixteen species of mangrove found in Western Australia have been recorded. It is also important because of the presence of mangrove dependent bird species not found elsewhere.

The original Ord River Nature Reserve was declared because it took in land adjacent to the lower sections of the Ord River which were considered important habitat for the estuarine crocodile *Crocodylus porosus*. Fine specimens of this animal can be seen in this area.

A major attribute of the Parry Lagoons Nature Reserve that is readily identified is the presence of many waterbird species often in great numbers. With additions to the reserve in 1991 it also now includes a variety of important habitats such as, rainforest (aquifer forest), freshwater springs, grasslands, woodland, rugged sandstone country and floodplain.

The inclusion of Adolphus Island into the proposed Cambridge Gulf Marine Park is seen as an important step adding substantial variety to the protected values of the Site and contributing to the Site's vast biological diversity. The Wilson Report identified the values of the proposed Cambridge Gulf Marine Park as;

'... high biological diversity of the Cambridge Gulf estuary, ..., the unique character of the estuary in terms of its geomorphic and biological community structure, and the importance of the system as a contributor to the biological productivity of Bonaparte Gulf.' (Part II - 13)

There are a number of demands being placed on the area ranging from an increase in tourist visitation, continued illegal hunting activities through to the unstudied impacts of the proposed horticultural use of lands immediately adjacent to the reserve. There have been, and are likely to be, changed river and ground water regimes because of the damming of the Ord River for agriculture and energy production.

The identification of appropriate fire management strategies is also seen as important.

Activities currently taking place at the Site are primarily of a passive nature through the appreciation of the area's natural values. These activities include bushwalking, birdwatching, tours and photography. Recreational fishing in the lower Ord and the False Mouths of the Ord is considered to be an important activity for local people. There is also increasing interest in fishing tours and wildlife tours in general. There is a need to plan for overnight camping in certain areas of the Site.

In 1996 with funding from Environment Australia a report was prepared by Wetlands International on 'Management Planning for Ramsar Sites in the Kimberley Region of Western Australia'. Much of the information contained in that document has been included in this report.

This management report has been prepared to help resolve conflicts, to plan for future needs, to facilitate people's enjoyment of the area and to ensure the Site's values are protected, and where necessary, repaired.

2. RAMSAR LISTING

The Ramsar Convention is an inter-government treaty that provides the framework for international cooperation for the conservation of wetland habitats. Australia has signed this treaty and obligations under it are then allocated to the States, with CALM the responsible agency for Western Australia. Thus CALM has special obligations relating to the conservation of these wetlands.

Morligu Lagoon during the dry season. (Photo: Richard Hammond)

The Lower Ord Ramsar site is one of nine wetland areas in Western Australia recognised as Wetlands of International Importance under the Ramsar Convention. There are three other sites in the Kimberley region, which are Lakes Argyle and Kununurra, Roebuck Bay and Eighty-Mile Beach (incorporating the Mandora Marsh). The Kimberley sites were added to the Ramsar Convention list in June 1990. The 1996 report prepared with funding from Environment Australia mentioned above covered all these areas.

Part of the False Mouths of the Ord showing mangroves and backing mudflats (Photo: John Cleary)

3. PUBLIC PARTICIPATION

Community input to this report was sought via a number of avenues.

Stakeholders were either written to or contacted in person asking them if they had any information, issues of concern and points of view on the Site. These groups and individuals were;

Kimberley Development Commission
Kimberley Tourism Association
Kununurra Tourist Bureau
Shire of Wyndham/East Kimberley
Western Australian Tourism Commission

Various government agencies were made aware that the report was in preparation, such as Fisheries WA and the Water and Rivers Commission, with an invitation to raise any issues they thought relevant. This same information was made available to a number of committees dealing with planning and the environmental management of the Ord irrigation area and sections of the Ord River.

A consultant was engaged to identify those Aboriginal people who might have affiliations with or an interest in the Site. In all cases the consultant was requested to contact the Kimberley Land Council and the Mirriuwung Gajerrong group of families as the area is affected by two Native Title claims.

Articles were placed in local newspapers to encourage discussion with the community on particular issues.

When this report progresses to becoming the basis of a draft management plan, and as part of the formal requirements when addressing marine conservation reserve issues, more extensive consultation will need to take place. This will include the establishment of an advisory committee.

4. NPNCA, MPRA AND CALM MANAGEMENT POLICIES

The statement of mission adopted in CALM's Strategic Plan is:

TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.

It is intended that the Site will be comprised of three conservation reserve categories and CALM's primary objectives for the management of those reserves are:

> **National Parks**: Areas managed for nature conservation, scientific study and public enjoyment that have important conservation, cultural or scenic values that are nationally or internationally significant in terms of landscape and biota.
>
> **Nature Reserves:** Areas managed for nature and scientific study, with important nature conservation values such as occurrence of particular flora, fauna, communities or habitats.
>
> **Marine Parks:** Marine areas managed for nature conservation, scientific study, public enjoyment and sustainable commercial and recreational fishing where appropriate.

This report is based on the policies of the National Parks and Nature Conservation Authority (NPNCA), the Marine Parks and Reserves Authority (MPRA), the Reserves Scientific Advisory Committee (RSAC) and the Department of Conservation and Land Management (CALM). These policies are derived from legislation, principally the CALM Act (1984), the Acts Amendment (Marine Reserves) Act (1997), the Wildlife Conservation Act (1950) and associated regulations. Policies are published and distributed throughout CALM as policy statements and are available to the public on request.

5. MANAGEMENT GOALS

Conservation
Conserve physical, hydrological, biological, cultural, seascape and landscape resources and values.

Aboriginal Culture
Formalise cooperative management of land, waters and cultural resources with Aboriginal traditional owners.

Water Management
Seek to maintain, and where appropriate enhance, the protection of the aquatic resources.

Recreation
Facilitate public enjoyment of natural and cultural resources and values in a manner compatible with conservation and other goals.

Community Relations
Develop mechanisms for community input to the development and implementation of a plan of management and promote informed appreciation of natural and cultural resources and values.

Commercial and Other Uses
Ensure that commercial and other uses are managed in a manner that minimises impact on other values.

Interaction with Nearby Lands and Waters
Promote cooperation in matters associated with the use of nearby lands and waters.

Knowledge
Promote knowledge of, and research into, the natural and cultural environment, and monitor and control impacts of management activities and public use.

Safety
Promote the safe use of the Site.

6. OBJECTIVES

Tenure and Boundaries
- Ensure that land tenure and boundaries are appropriate to protect the Site's environmental and cultural values.

Management Zones
- Provide a basis for the regulation of activities within defined zones so that human uses of the Site do not conflict with each other and are compatible with conservation objectives.

Site Management Committees
- Establish a broad based advisory committee with representation from community groups and major stakeholders.
- Provide the primary mechanism for management to be conducted cooperatively by CALM and the Aboriginal traditional owners through the establishment of a management council.

Organisational Roles and Responsibilities
- Seek to develop complementary management programmes between CALM, Water Corporation, Water and Rivers Commission, Fisheries Department, Agriculture WA and other organisations in the area.

Geology, Landforms and Soils
- Protect and conserve geological features, landforms and soils.

Hydrology
- Manage ground and surface water resources to protect water dependant ecosystems and cultural values.

Flora and Vegetation
- Conserve the native flora and vegetation of the Site.
- Provide special protection to rare, endangered and restricted vegetation associations and species.

Fauna
- Conserve native fauna populations.
- Provide special protection to rare, endangered and restricted species of fauna and their habitats.

Fire

- Protect community and environmental resources and values at the Site from damage or destruction by wildfire.
- Use fire as a management tool to enhance habitat diversity and to achieve other land management objectives.

Weeds and Non-local Species

- Control and, if possible, eradicate weed and other non-local species.

Feral Animals

- Control and, if possible, eradicate feral animal populations at the Site.

Rehabilitation

- Rehabilitate areas degraded as a result of past and present land uses.
- Use local plant species to restore disturbed areas to as near a natural state as possible.

Non-Aboriginal Heritage

- Protect the Non-Aboriginal heritage of the Site.

Aboriginal Culture

- Provide Aboriginal traditional owners the opportunity to maintain their cultural links with the Site in keeping with conservation and other objectives.
- Ensure that all areas of spiritual significance to Aboriginal people are respected in keeping with the wishes of the traditional owners.

Landscape

- Minimise the impact of any activity on the landscapes of the Site.

Attractions and Existing Use

- Provide recreational opportunities that do not impact adversely on the natural and cultural values of the Site and increase awareness and enjoyment of those values.

Access

- Provide and maintain access that is consistent with the maintenance of natural and cultural values, and with the diverse range of visitor needs.

Bushwalking

- Provide and maintain walks and observation points from which the area's natural attributes can be viewed to enhance visitor experience.

Day Use

- Provide and maintain day use areas while ensuring that the values are not adversely affected.

Camping

- Provide for low impact camping in designated areas provided that the activity is sustainable for the environmental setting.

Water-based Activities

- Provide for water-based activities where this does not lead to degradation of the environment, compromise cultural values or lead to unacceptable levels of conflict with other user groups.

Pets

- Exclude pets and other domestic animals from the Site.

Visitor Safety

- Take all reasonable steps to ensure the safety of visitors to the Site.
- Provide procedures for responding to emergencies that may occur at the Site.

Information and Interpretation

- Provide visitors with information that will enhance their safety, knowledge, appreciation and enjoyment of the natural and cultural values of the Site.

Education

- Encourage and facilitate the use of the reserves by educational groups in a way that contributes to the knowledge of the Site whilst minimising their impact on the area's values.

Community Involvement

- Develop, encourage and facilitate liaison with the community and involvement in implementing the management plan.

Commercial Tourism Operations

- Encourage commercial tourism operations in the area that are environmental and socially sensitive and, where possible, are of educative or interpretive value to visitors.
- Encourage Aboriginal ownership of and participation in commercial enterprises that involve Aboriginal cultural heritage.
- Provide a mechanism for Aboriginal tradition owners to have a primary role in determining the use of Aboriginal cultural material by commercial tour operators.

Mineral Exploration and Mining

- Subject all exploration and mining proposals to a full and formal environmental impact assessment.

Basic Raw Materials

- Grant access to basic raw materials only where the road or facility is within the boundaries of the Site or the use of the basic raw materials provides access for the protection and management of the Site and provided that a more environmentally acceptable alternative is not available.

Service Corridors

- Define and seek suitable vesting for service corridors.
- Re-direct the development of service corridors from the Site to areas that will have minimal impact on the Site's values.

Nature Conservation Research

- Increase knowledge of the Site's values
- Increase knowledge and understanding of the ecological and hydrological processes of the Site.
- Evaluate the environmental impacts of activities taking place in the Site.

Social Research

- Monitor use and forecast future recreation demands.
- Monitor the impact of visitor use and management activities.
- Increase knowledge of cultural values.

Staffing and Resources

- Explore all options to provide for the implementation of the report including sponsorship of activities and joint agreements.
- Provide opportunities for Aboriginal people to be employed in the management of the Site wherever possible.

Plan Monitoring and Review

- Monitor the implementation progress of the report annually and adjust works programmes as required to ensure compliance.

7. KEY ISSUES FOR FUTURE MANAGEMENT

Many issues relevant to management of the Site are considered in this report, however, the following are considered to be key issues (not in order of priority):

- fulfilment of obligations under the Ramsar treaty,
- impacts of catchment management and adjacent land use on water quality,
- fire management,
- weeds and feral animals,
- visitor use and pressures,
- resolution of land tenure matters.

LAND USE MANAGEMENT

8. LAND TENURE AND BOUNDARIES

The objectives are to ensure that land tenure and boundaries protect the Site's environmental and cultural values and appropriate lands and waters are incorporated within the Site.

Maps 1 to 5, prepared as part of the vegetation mapping project, show the boundaries of existing and proposed reserves

Prior to 1992 what is now the Parry Lagoons Nature Reserve was made up a number of reserves with different purposes including; conservation of fauna, protection of flora and fauna, stock routes, and use and requirements of the government. Most of the original conservation reserves were gazetted in 1971. In keeping with CALM recommendations for the area the original gazettals were revoked in 1992 and the single Parry Lagoons Nature Reserve was created.

The Ord River Nature Reserve was originally gazetted in 1973 with the purpose of conservation of flora and fauna with it often being referred to as 'the crocodile reserve'. As was also recommended for this a substantial increase in the size of this reserve occurred in 1992 with the inclusion of the False Mouths of the Ord. (Approximately 24,000 ha to approximately 80,000 ha)

The changes in tenure that are proposed in this report are;

> Declare the Cambridge Gulf Marine Park to be vested in the MPRA. Boundaries should conform to those identified in the publication 'A Representative Marine Reserve System for Western Australia' with the addition of Adolphus Island. The Marine Park should include all lands within its boundaries such as islands and mudflats not currently reserved as part of the conservation estate. Importantly this Marine Park would afford protection to the intricate system of tidal creeks in the False Mouths of the Ord.
>
> All land currently vested as nature reserves south of the Ord River will become the Parry Lagoons National Park. This would mean a change in tenure for part of the Ord River Nature Reserve and all of the Parry Lagoons Nature Reserve. This change would allow for the more effective management of the recreational and tourism uses of this area. Zoning would be employed to resolve conflicting uses.

There are three boundary issues that require attention. Currently the boundary of the Ramsar wetland does not conform to the boundaries of existing and proposed reserves. This is because the original alignment was based on previous reserve boundaries. In order to identify the importance of the system of reserves in the area it is recommended that the Ramsar boundaries be modified to conform to reserve boundaries. This process is a formal one involving the State Government, the Federal Government and the Ramsar Bureau.

In the north east corner of the Parry Lagoons Nature Reserve the Goose Hill Creek is to be found both on the reserve and on the adjacent pastoral lease. This area of the Ivanhoe pastoral lease, Mantinea Flats, has been identified as suitable for horticultural development as part of the expansion of the Ord River irrigation scheme. It would be appropriate that all of the Goose Hill Creek and an associated buffer area be included within the proposed Parry Creek National Park.

The boundaries of the Ord River Nature Reserve in the vicinity of the False Mouths of the Ord have very little management relevance as they are based on a line 40 metres above high tide. The management boundary should be further inland in all cases so that they can be clearly identified. This is a major management issue. It would be best to solve it in consultation with the owners of Carlton Hill Station. As part of a joint approach an alignment could be arrived at which satisfies the management requirements of both parties. This boundary could be formally defined and land tenure changes brought about where additions are made to the Ord River Nature Reserve.

In addressing issues and formulating recommendations this report is written as if the suggested tenure changes have been implemented.

RECOMMENDATIONS

1. **Declare the Cambridge Gulf Marine Park vested in the MPRA.**

2. **Declare the Parry Lagoons National Park being all currently CALM managed reserves south of the Ord River to be vested in the NPNCA.**

3. **Modify the Ramsar boundary to follow the boundary of existing and proposed conservation reserves.**

4. **Resolve inappropriate boundary alignments of all reserves most importantly adjacent to the False Mouths of the Ord and Goose Hill Creek.**

9. MANAGEMENT ZONES

The objective is to provide a basis for the regulation of activities within defined zones so that human uses of the Site do not conflict with each other and are compatible with conservation objectives.

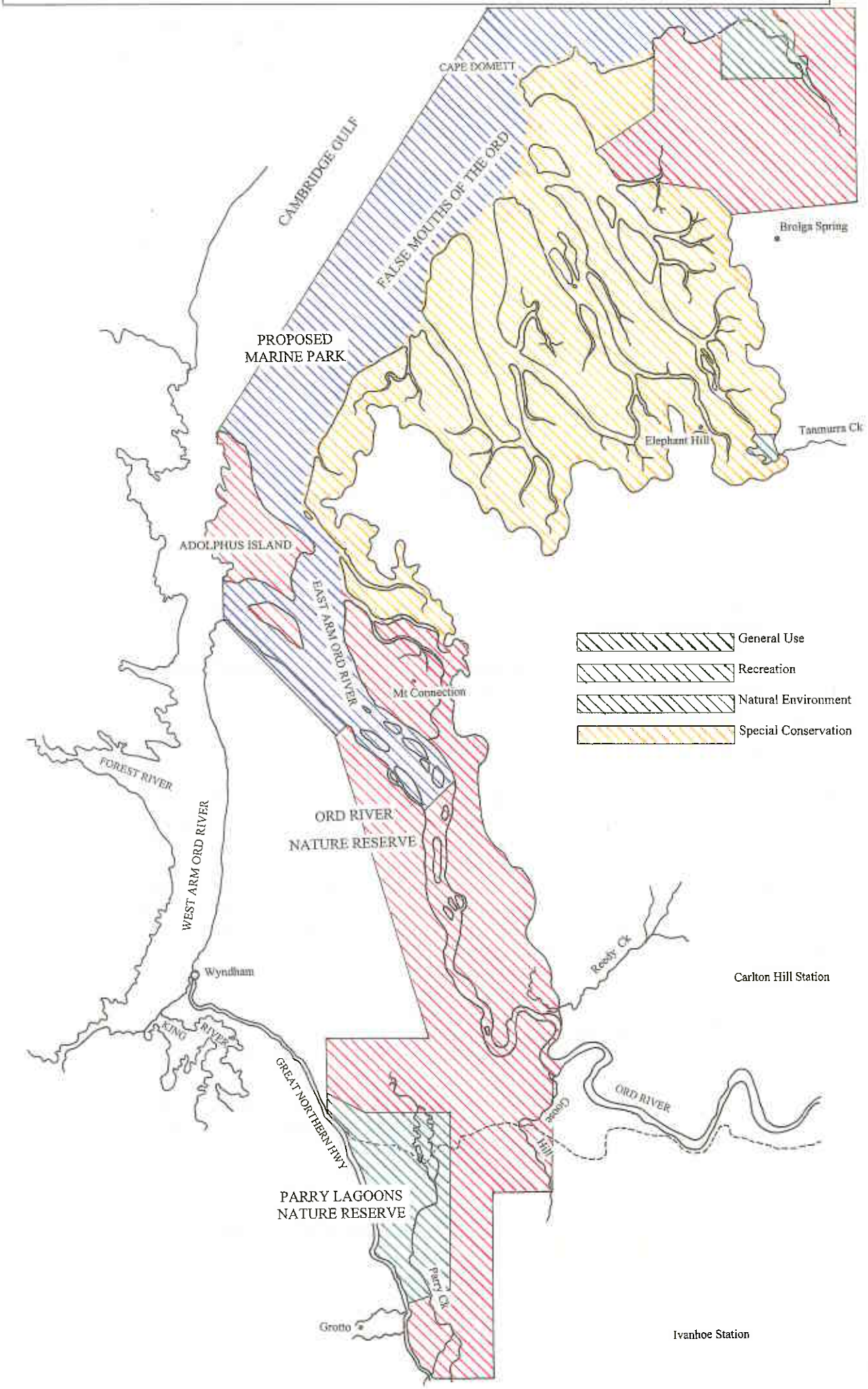
The concept of zoning to manage conservation areas in general, and people in particular, is based on the principle that uses or activities that share similar or compatible environmental and cultural requirements can be allocated to designated areas or 'zones'. Allocating specific uses and activities to areas can be either spatial, temporal or both. Typically, such allocation is determined on the basis of environmental and cultural values, land use capabilities, visitor needs and management considerations. A clear zoning scheme also helps to communicate management intentions to the public.

The proposed zoning plan reflects knowledge of the conservation significance of the area, the vegetation, topography and the intensity and types of uses. The zoning scheme will be used as a guide for future management.

The management zones identified for the Site are at this stage presented in a very simple format. It is expected that as the values of the area are more appropriately defined and this is compared to community use expectations that the zoning scheme will be modified over time. The zones currently applied are:

General Use
This provides for commercial and recreational uses consistent with the conservation of natural resources. For example, in the marine park, this includes fishing, both commercial and recreational, within the sustainable limits of natural resources. The area with this zoning is the bulk of the proposed Cambridge Gulf Marine Park.

ZONING PLAN


CAPE DOMETT
CAMBRIDGE GULF
FALSE MOUTHS OF THE ORD
Broiga Spring
PROPOSED
MARINE PARK
Elephant Hill
Tanmurra Ck
ADOLPHUS ISLAND
EAST ARM ORD RIVER
Mt Connection
General Use
Recreation
Natural Environment
Special Conservation
FOREST RIVER
WEST ARM ORD RIVER
ORD RIVER
NATURE RESERVE
Wyndham
KING
RIVER
Reedy Ck
Carlton Hill Station
GREAT NORTHERN HWY
Goose
Hill
ORD RIVER
PARRY LAGOONS
NATURE RESERVE
Peart
Ck
Grotto
Ivanhoe Station

Special Conservation
These areas contain features that deserve special protection because they contain or support unique vulnerable or threatened species, best examples of natural features, or best representatives of plant communities. For the terrestrial estate access within this zone will be strictly controlled, and will be restricted to foot access only, except for essential management purposes.

Visible evidence of management will be low. Commercial concession operations for recreation activities may be provided, for example boat tours, where there is no conflict with other users. Commercial fishing will not be allowed in these areas and restrictions may be placed on recreational fishing. Any activity deemed to be in conflict with the intent of this zone would not be allowed, for example hovercraft. Areas that are zoned in this manner include the False Mouths of the Ord, Cape Domett and the Needles.

Part of the False Mouths of the Ord (Photo: John Cleary)

Natural Environment
These areas will be maintained in their natural state and may sustain a selected range of low-key nature based recreation activities that have minimal environmental impact. Controlled access by private vehicles or vessels may be permitted, and visible evidence of management will be minimised. Commercial tourist uses will be facilitated. Areas with this zoning include Adolphus Island, Mt Connection, much of the Parry Lagoons National Park and parts of the Ord River.

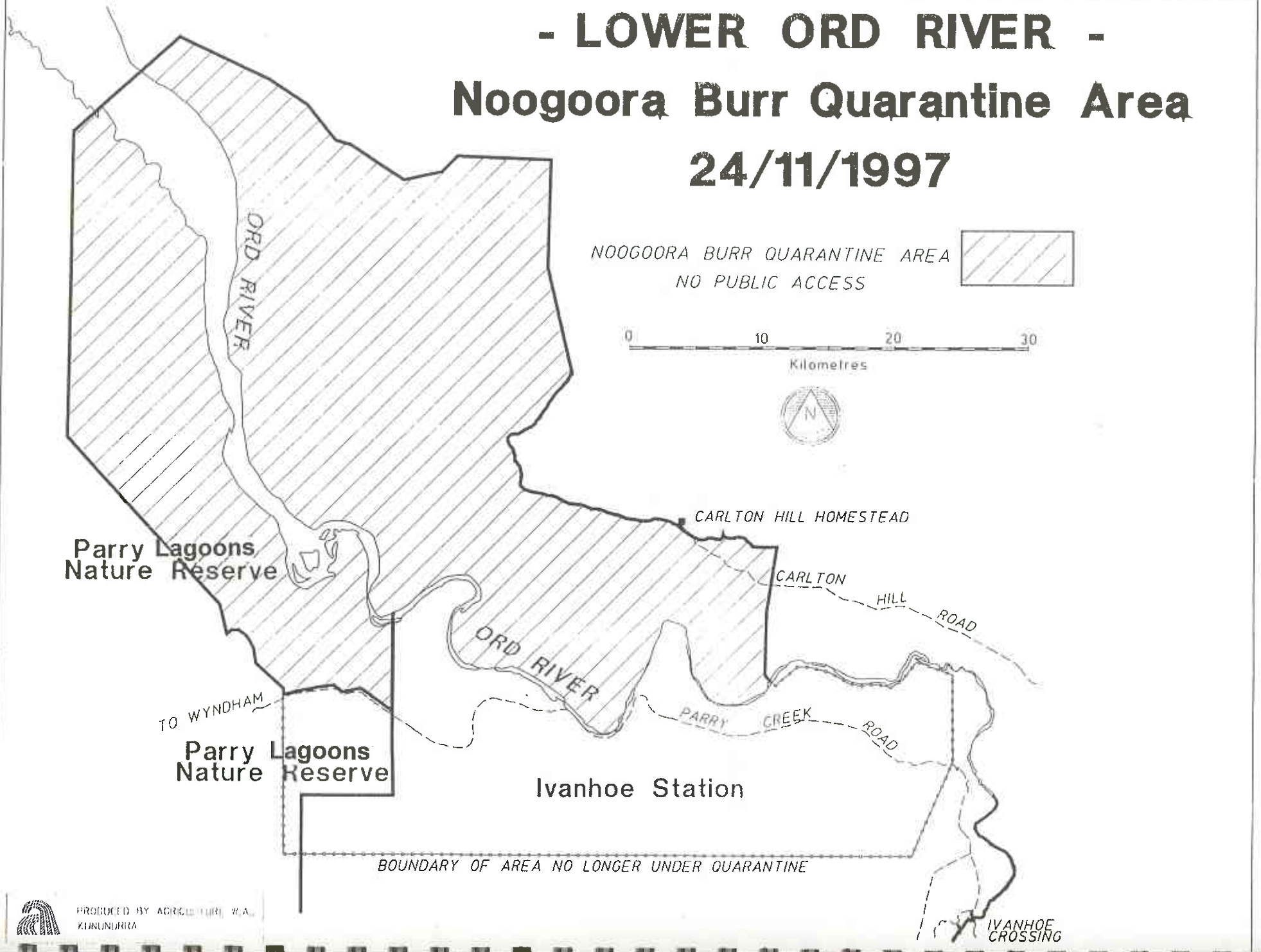
Recreation
This provides for recreational uses and facility development consistent with the conservation of natural resources. Commercial concession operations for recreation activities may be provided where there is no conflict with other uses. Facilities included within these zones include boardwalks, interpretation facilities, toilets and campgrounds. Areas with this zoning include Marlgu Lagoon, Alligator Hole and Tanmurra Creek.

Apart from the zones recommended in this report a portion of the Site is currently placed in quarantine by Agriculture Western Australia to prevent the spread of Noogoora Burr *Xanthium occidentale* and facilitate its control. No public access is allowed into this area. In the event of this quarantine

- LOWER ORD RIVER -

Noogoora Burr Quarantine Area

24/11/1997



restriction being removed by Agriculture Western Australia an appropriate CALM zoning will be established for the area.

RECOMMENDATION

1. **Base future management of the Site on a zoning scheme.**

10. COOPERATIVE MANAGEMENT

The objective is to ensure that traditional owners are involved in the management of the Site.

The East Kimberley is an area where the Aboriginal people still demonstrate a close affiliation with the natural environment. CALM is committed to involving Aboriginal people who have identified links as traditional owners, in the management of its estate. There are many benefits in the adoption of this approach to land management, Aboriginal people and the broader community.

It is recommended that a system of cooperative management be entered into for the Site involving the traditional owners of the area. The best method to achieve this is through the establishment of a management council comprised of CALM personnel and traditional owners. In keeping with park councils established by CALM elsewhere the main function of this council would be as the primary agent for Aboriginal participation in Site management. Apart from assisting in the preparation of management plans the Council would assist CALM, within the provisions of the CALM Act, in a variety of other areas. These would include the implementation of approved management plans, development of policy in relation to Aboriginal interests in the Site and to provide advice to the Minister for the Environment in all matters relating to Aboriginal involvement in the Site.

RECOMMENDATION

1. **Form a management council for the Site based on the model adopted elsewhere by CALM.**

CONSERVATION AND NATURAL RESOURCE MANAGEMENT

11. CONSERVATION OVERVIEW

The conservation objective for the Site will be to protect the biological, physical, cultural, seascape and landscape values of the Site and in so doing meet the obligations relating to conservation in the context of the Ramsar treaty.

Apart from the implementation of appropriate management strategies for the conservation of the values within the Site it is clear that a primary task facing the managers of this location is to attempt to ensure that compatible land management occurs adjacent to the Site. Of equal importance is the need to ensure that the catchment management of the Ord, including the use of the waters for the Ord irrigation scheme, recognises and takes account of the values of the Site.

Yellow Mangrove (Ceriops tagal) at the edge of mudflats (Photo: Tanya Vernes)

Within the Site, and has been mentioned previously, fire and weed management are seen as two important areas requiring particular emphasis. This is particularly so given the expected increasing visitation to the Site and subsequent use of it.

12. RAMSAR AND OTHER OBLIGATIONS

The objectives are to ensure the ecological character of the Site is maintained and all obligations covered by treaty and agreements are met.

In 1971 a convention was held in the Iranian city of Ramsar which resulted in governments nominating wetlands worthy of being listed as internationally important wetlands. Australia was the first contracting party to the convention. Wetlands are selected as Ramsar sites on the basis of ecological, botanical, zoological, limnological or hydrological criteria.

A major feature of the Ramsar Convention is the promotion of the wise use of wetlands, which is defined as;

> *The wise use of wetlands is their sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem.* (Davis 1993)

Apart from the need for policies to be operating at a coordinated national level there are broad requirements that need to be aimed for at the site level. In terms of improving our knowledge of wetlands and their values it is necessary to undertake and maintain an inventory of wetlands and their values, monitor changes in the ecological character of wetlands, support research in areas of management priority, undertake training for implementing wise use of wetlands and develop education and public awareness programs to promote the wise use of wetlands. Specific action at the sites includes incorporating an inter-disciplinary approach to their management, consider human activities under local circumstances, integrate management planning at a catchment level and adopt or refine technologies to ensure wise use (Finlayson 1996).

The official contact point for the Ramsar Convention within Australia is the Wetlands, Waterways and Waterbird Unit of Environment Australia. Environment Australia only exercises direct control on Ramsar matters affecting Commonwealth land. In Western Australia the responsible agency is CALM, which joins other States and Territories in regular informal and formal discussions on the Ramsar Convention. Apart from the nomination of important wetlands the Convention also obliges the contracting parties to formulate wetland policies, create wetland nature reserves, promote the wise use of wetlands, monitor listed wetlands to ensure they retain their special ecological characteristics, train managers in wetland management and consult each other on these and other issues.

Appendix 2 describes in detail the guidelines for implementing the wise use concept. These guidelines promote increased knowledge of the wetlands and their values by undertaking and encouraging appropriate research.

At the Ramsar conference in Brisbane in 1996 the Western Australian Government announced its involvement in a shorebird conservation project called the East Asian-Australasian Shorebird Reserve Network. This project seeks to address the conservation needs of migratory shorebirds through the development of an international network of sites managed for shorebird conservation. The Western Australian Government nominated Parry Lagoons for inclusion in the project. The Shorebird Reserve Network does not have legal implications. Responsibility for the management of sites remains with the nominating agency.

RECOMMENDATIONS

1. **Ensure that the Site is managed in accordance with the guidelines developed by the Ramsar Convention.**

2. **Formally change the boundary of the Site to comply with the boundaries of existing and proposed terrestrial and marine conservation reserves.**

13. GEOLOGY, LANDFORMS AND SOILS

The objective for this section is to protect and conserve geological features, landforms and soils.

The north of the Site is generally referred to as the Cambridge Gulf lowlands and is dominated by tidal flats with small occurrences of sand dunes. There are quaternary coastal silt and evaporite deposits with small amounts of Devonian quartz sandstone, minor limestone and conglomerate. The rocks of the area are described as being Palaeozoic.

The quaternary coastal silt and evaporite deposits dominate the Site southward till approximately the line of the Parry Creek Road (the old Wyndham to Darwin Road). Also found within this location are black soils and alluvium associated with the Ord River.

South of the Parry Creek Road the geology is most apparently Carpentarian Pentecost sandstone, making up the steep sided hills and gorges where water has carved through. Also present are examples of black soil, alluvium, and sandy soils. The rocks below this landscape are Carpentarian rocks associated with the Kimberley Basin.

The Site is composed of primarily depositional floodplain and estuarine environments associated with the mouth of the Ord River and the Cambridge Gulf. There are three relatively distinct wetland units. The southern part of the Site is dominated by Parry Creek. This includes a 20-km length of a seasonally flowing creek running through upland environments, and an alluvial floodplain complex. The floodplain is flooded to a variable extent in the wet season but after the rain ceases, except for a few semi-permanent and permanent water holes associated with incised channels and claypans, it quickly dries out. The upstream (southern) portion of the floodplain is freshwater while lower (northern) sections, if not inundated by saline water, are surrounded by salty soils.

The Ord River floodplain showing Marlgu Lagoon toward the end of the dry season (Photo: John Cleary)

Extending north from the floodplain of Parry Creek to the Cambridge Gulf are the lower reaches of the Ord River. Although the upstream end of the Site on the Ord River carries a perennial flow of freshwater, the downstream sections, when not in flood, soon start to become saline and are increasingly influenced by tides. The tidal amplitude at the coast can be as much as 8 metres. The upstream end the river channel is around 150 metres wide, increasing to over 5 kilometres wide near the mouth. Processes of sediment deposition dominate along the entire length of the river on the Site. Broad sandy or gravelly spits and bars occur along upstream reaches while unstable mud bars and islands become common toward the mouth. The damming of the Ord River is considered to have dramatically changed the sedimentation process with anecdotal evidence indicating that parts of the river have become shallower because of the lack of scouring by floodwaters. This is in spite of the river carrying less sediment.

Burbidge and Messel (1979) reported that *'We found the river had cut new channels upstream of 37 km and that available air photography and maps were of little value when navigating'*. Within the greater alluvial plain through which the river runs there is evidence that the river channel has a long history of instability. These changes are still occurring as is evidenced by recent aerial photography. The 1990 and 1994 photography are no longer accurate for islands, the river bank shape and the vegetation on the Ord River.

North from the mouth of the Ord River, the Site extends for some distance around the coast to include an estuarine complex known as the 'False Mouths of the Ord'. This consists of a deltaic maze of channel-ridden, tidally inundated coastal mud flats and islands. It is only the northern-most channel in

this complex that receives much freshwater input; this from the relatively small and ephemeral Emu, Station and Tanmurra Creeks.

Mudflats and the sandstone feature of Mt Connection surrounded by woodland (Photo: Tanya Vernes)

The catchments of short creeks entering the Site are bounded by the sandstone hills of the Erskine Ranges to the west of Parry Creek and by the Onslow and Hargreave Hills and the limestone Ningbing Range to the east of the False Mouths (Traves 1955). Both Parry Creek and the False Mouths have very small catchments compared to that of the Ord River which has a catchment of 55 300 km^2.

Historically, the flooding and drying cycles, and the massive sediment deposition from the Ord River would have been major determinants of ecological processes on the Site. However, with the river now dammed at two points upstream the hydrological and sediment deposition characteristics have changed markedly. Once a river with only seasonal flow, it is now perennial due to constant discharge from the Diversion Dam of the Ord River Irrigation Area some 85 kilometres upstream (Wark undated). The main Argyle Dam on the Ord River, some 140 kilometres upstream from the Site, is highly effective at constraining wet season flood peaks and trapping sediment loads from the majority of the catchment. Since the construction of the Argyle Dam the wet season flood peaks and sediment pulses in the lower Ord are almost certainly determined more by the pattern of flooding and sediment yield from the Dunham River. This is a tributary of the Ord River with catchment of less than 4 000 km^2 which flows into the Ord River just below the Diversion Dam.

Compared to pre-dam conditions the Ord River now floods less frequently and for shorter periods. It is likely that the alignment of the main stream channel of the lower Ord is more stable than in times past, though shallower and wider.

14. FLORA AND VEGETATION

The objectives are to conserve the native flora of the Site and to provide special protection to rare, endangered and restricted vegetation associations and species.

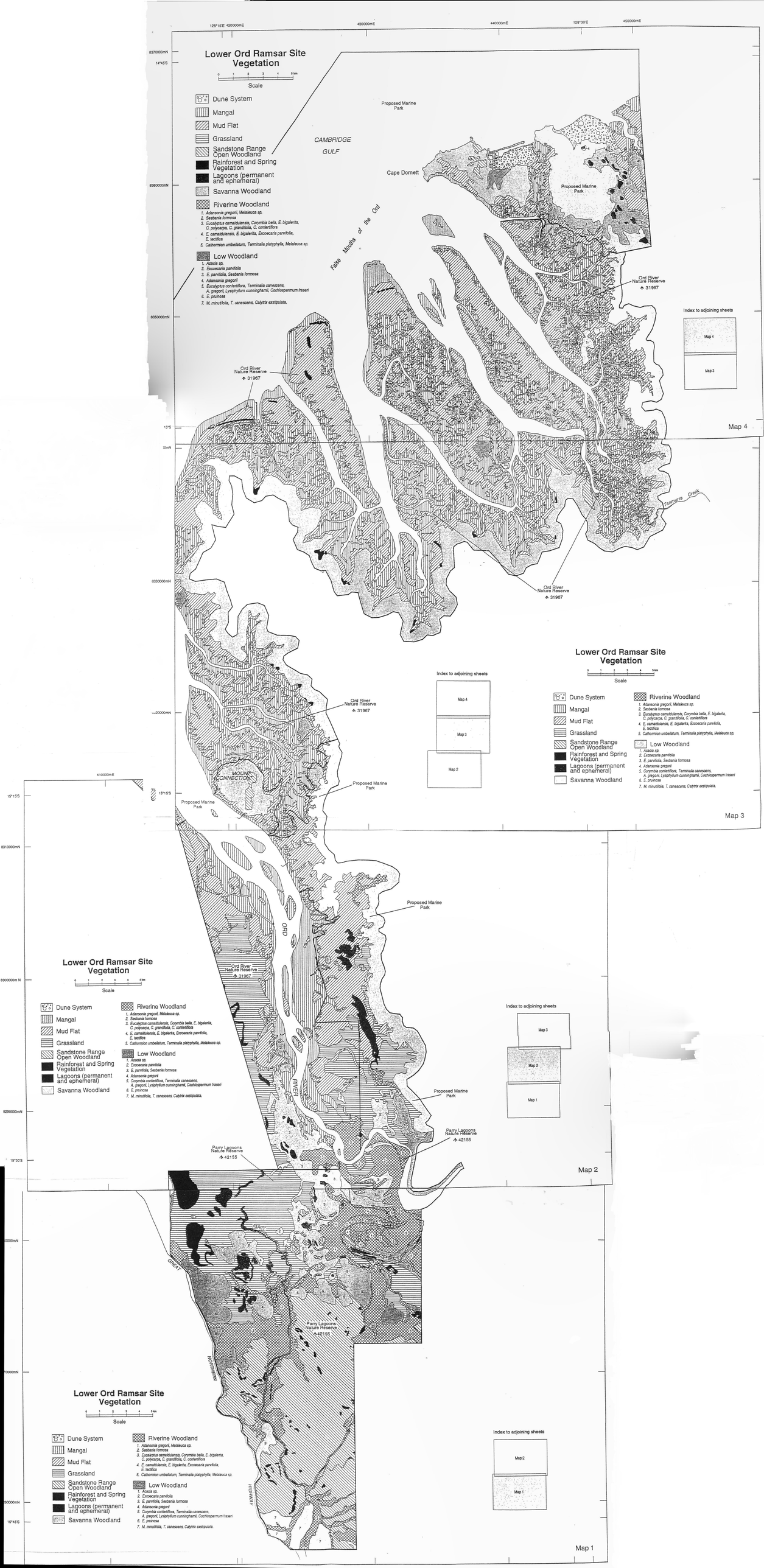
The Site contains a wide variety of vegetation communities ranging from vast grasslands, mangroves, savanna woodland, harsh spinifex associated with sandstone, riverine, small patches of rainforest, emergent swamp vegetation and aquatic flora. The flora has to date been poorly documented. J. S. Beard undertook broad scale mapping of the Kimberley in 1971 and at that scale the Site was described as having the following associations;

1. *Lysiphyllum cunninghamii*, *Eucalyptus microtheca*, *Adansonia gregorii* over *Dicanthium fecundum* and *sorghum* grasses.
2. Mudflat.
3. Mangal.
4. Rugged sandstone country comprised of *Eucalyptus dichromophloia*, *Eucalyptus tetrodonta* (?) over *Sorghum* grasses and *Triodia* species.
5. *Eucalyptus miniata* and *E. tetrodonta* woodland over *Triodia* grasses and *Sorghum*.
6. *Eucalyptus tectifica*, *Eucalyptus foelscheana* woodland over *Themeda triandra* and *Sehima nervosum*.
7. *Eucalyptus polycarpa*, *Eucalyptus papuana* woodland over *Triodia* grasses and *Sorghum*.

Mangrove and sedge community on an unmapped island in the Ord River (Photo: Tanya Vernes)

There have been a number of plant collections over the years that have been registered with the WA Herbarium and a search by the Herbarium of their records has contributed significantly to the preparation of a flora list of the Site. It is clear that there remain extensive areas where additions can be made to the list.

Further work was undertaken as part of the preparation of this report and the vegetation mapping accomplished is shown on maps 1 to 5. Appendix 3 gives a listing of flora species recorded at the Site to date and appendix 4 lists species recorded either adjacent to the Site or the exact location is unknown.


Lower Ord Ramsar Site Vegetation
Scale
0 1 2 3 4 5 km
Dune System
Mangal
Mud Flat
Grassland
Sandstone Range Open Woodland
Rainforest and Spring Vegetation
Lagoons (permanent and ephemeral)
Savanna Woodland
Riverine Woodland
1. Adansonia gregorii, Melaleuca sp.
2. Sesbania formosa
3. Eucalyptus camaldulensis, Corymbia bella, E. bigalerita, C. polycarpa, C. grandifolia, C. confertiflora
4. E. camaldulensis, E. bigalerita, Excoecaria parvifolia, E. lectifica
5. Cathormion umbellatum, Terminalia platyphylla, Melaleuca sp.
Low Woodland
1. Acacia sp.
2. Excoecaria parvifolia
3. E. parvifolia, Sesbania formosa
4. Adansonia gregorii
5. Eucalyptus confertiflora, Terminalia canescens, A. gregorii, Lysiphyllum cunninghamii, Cochlospermum fraseri
6. E. prunosa
7. M. minutifolia, T. canescens, Calytrix exstipulata.
Index to adjoining sheets
Map 4
Map 3
Map 2
Map 1
Proposed Marine Park
CAMBRIDGE GULF
Cape Domett
False Mouths of the Ord
Ord River Nature Reserve ↟ 31967
Tarrnurra Creek
MOUNT CONNECTION
ORD
RIVER
Parry Lagoons Nature Reserve ↟ 42155
Parry Lagoons Nature Reserve ↟ 42156
GREAT NORTHERN HIGHWAY
128°15'E
128°30'E
420000mE
430000mE
440000mE
450000mE
410000mE
8370000mN
8360000mN
8350000mN
8330000mN
8310000mN
8300000mN
8290000mN
14°45'S
15°S
15°15'S
15°30'S
15°45'S
Map 4
Map 3
Map 2
Map 1

Very small patch of rainforest at the edge of mudflats north of the Ord River (Photo: Tanya Vernes)

The mapping has given a more detailed description of the vegetation of the Site. The following descriptions of the associations defined relate directly to the maps.

1. **Dune System.**

Coastal dunes with *Spinifex longifolius* and *Ipomoea pes-caprae* form a low cover with a heavy infestation of the introduced species *Calotropis procera* along the top of the dunes.

Vine thicket vegetation occurs in the sheltered swales. At present the vine thicket is degraded by cattle grazing. The understorey consists of low trees, shrubs and vines. There is virtually no ground flora apart from a few young seedlings. Common species in the vine thicket include *Gyrocarpus americanus*, *Brachychiton viscidulus*, *Exocarpos latifolius*, *Crotalaria cunninghamii*, *Laportea interrupta*, *Flueggea virosa*, *Jasminum didymum*, *Operculina aequisepala*, *Protasparagus retusifolia*, *Grewia retusifolia* and *Canarium australianum.*

Pockets of *Melaleuca dealbata* with a sedge understorey form in the most sheltered drainage areas. *M. acacioides*, *Adansonia gregorii* and *Xerochloa imberbis* occur in patches on the sandy flats between the sea and the woodland or mangal areas.

2. **Mud Flat.**

Bare mud with very high salinity. This hypersalinity is a result of frequent flooding followed by intense evaporation. Vegetation is largely absent, however there are occasional individuals or clumps of *Adansonia gregorii* and short grasses occurring where there is freshwater seepage. Less frequently inundated areas of the mudflat support low shrublands of samphire and low grasslands of *Sporobolus virginicus* and *Xerochloa imberbis*. Associated plants include *Brachyachne convergens*, *Dactyloctenium radulans*, *Salsola kali*, *Neptunia spp.* and *Fimbristylis spp.*

Mangroves line the narrow tidal channels across the mudflats in some areas but the scale of mapping precluded their inclusion.

Grasslands in the southern section of the Site generally replace mudflat. It is a gradual transition from mudflat to grassland as it is from mangal to *Sesbania/Excoecaria* riverine woodland.

3. **Mangal.**

Extensive areas of mangroves occur within the False Mouths of the Ord. They line most of the shores of this area and the channels and the drainage creeks that incise the mudflats. Where salinity and flooding conditions are suitable they cover the mudflats. Of the sixteen species of mangrove recorded for Western Australia fourteen are found at the Site.

Species include; *Avicennia marina, Lumnitzera racemosa, Ceriops tagal, Bruguiera parviflora, B. exaristata, Excoecaria agallocha, Osbornia octodonta, Rhizophora stylosa, Camptostemon schultzii, Sonneratia alba, Xylocarpus moluccensis, Aegialitis annulata* and *Aegiceras corniculatum,*

As salinity and flooding conditions change mangal is gradually replaced along the banks of the Ord River by fringing *Sesbania formosa* or *Excoecaria parvifolia* low woodland.

Mangals are often zoned (occurring in distinct bands) according to a variety of physical, chemical and biological factors. The map scale used in this report precluded showing those zones.

Mangroves also occur as pure stands, paired associations and mixed stands. The most common paired association is between *Avicennia marina* and *Ceriops tagal.*

4. **Grassland.**

The herbland/grassland communities that occur on the Parry Lagoon's floodplain are the most extensive in WA. *Oryza australiense* and *Diplachne parviflora* dominate the wetland grassland. The semi-woody herb *Sesbania cannabina* forms an extensive closed herbland at wetland margins and across the floodplain in the wet season, dying off and collapsing during the dry. The other annual shrub present is *Aeschynomene indica. Sorghum spp.* grows on the drier margins. *Sporobolus spp.* occurs in near tidal areas. Samphires include *Halosarcia indica* and *Tecticornia verrucosa.* The dominant sedge in the marshes is *Eleocharis brassii.*

5. **Low Woodland.**

On the accompanying maps 'low woodland' is divided into seven categories. The numbers of these categories are shown on the maps and the descriptions are given here.

1. Acacia spp.

Acacia dominated woodland occurs within, but separate to, mangal communities and mudflats. This is most likely as a result of differing soils and moisture conditions. The fringing vegetation of these stands is predominantly *Melaleuca acacioides* and less commonly *M. acacioides* and *Ceriops tagal*, Grasses can also form a zone between the mangal and/or mudflat such as at the Red Hill woodland, where *Acacia lysiphloia* also forms an outer zone. Surrounding Mt Connection there is an *Acacia* dominated woodland with fringing vegetation of *M. acacioides.* The dominant species is *Acacia lysiphloia* on the western and southern sides. This woodland has scattered *Adansonia gregorii, Eucalyptus miniata, E. microtheca* and *E. pruinosa.* The dominant tall grass is *Heteropogon contortus.*

2. Excoecaria parvifolia.

Almost pure *Excoecaria parvifolia* stands occur on the flood plains near Wild Goose Creek, graduating into grassland south and west, and mudflat to the north. *E. parvifolia* is also the dominant vegetation around some soaks and lagoons such as Marlgu.

3. Excoecaria parvifolia* and *Sesbania formosa.

Excoecaria parvifolia and *Sesbania formosa* forms in association with *S. cannabina, Parkinsonia aculeata, Passiflora foetida* and occasional *Eucalyptus tectifica* around Wild Goose Creek.

4. Adansonia gregorii.

Adansonia gregorii dominated woodlands occur in three main areas of the Site. The Pivot Hill basalt outcrop supports *Adansonia gregorii* woodland over hummock grasses with fringing vegetation on the lower northern side of *Terminalia arostrata, Gyrocarpus americanus* and *Lysiphyllum cunninghamii.*

Telegraph Hill is a basalt outcrop that supports *A. gregorii* as the dominant species with *Gyrocarpus americanus*, *Cochlospermum fraseri*, *Terminalia canescens*, *Grevillea striata* and *Lysiphyllum cunninghamii.*

The sand/alluvium deposits in the very northern section of the Site support an *Adansonia gregorii* dominated woodland over grasses. Some soakage areas of *Sesbania formosa*, *Typha domingensis* and sedges also occur.

5. Corymbia confertiflora*, *Terminalia canescens*, *Adansonia gregorii*, *Lysiphyllum cunninghamii* and *Cochlospermum fraseri.
The sandstone-dolomite outcrops occurring in Parry Lagoons Nature Reserve forms rocky mounds with little soil supporting the above species over spinifex hummock grasses.

At the southern end of the reserve where the Old Hall's Creek Road joins the Great Northern Highway this association also includes *Eucalyptus tectifica*, *Corymbia grandifolia, Melaleuca minutifolia*, *Atalaya spp.* over *Sorghum* grasses.

6. Eucalyptus pruinosa.
A woodland of *Eucalyptus pruinosa* with scattered *Corymbia grandifolia*, *C. confertiflora, Lysiphyllum cunninghamii*, *Terminalia canescens*, *Adansonia gregorii*, *Grevillea striata* and *Gyrocarpus americanus*.

7. Melaleuca minutifolia.
A low shrubland of *Melaleuca minutifolia, Terminalia canescens and Calytrix exstipulata,* on dry, rocky, sandstone hills. Other common species include *Corymbia confertiflora*, *E. pruinosa*, *E. tectifica* and *Adansonia gregorii* Found in drainage areas are *Grevillea pyramidalis*, *Cochlospermum fraseri*, *Hakea spp*. There is some *Owenia vernicosa* and *Eucalyptus miniata* in localised areas.

6. **Sandstone Range Open Woodland.**
The rocky hills of Pentecost Sandstone support open woodlands that include *Corymbia drysdalensis* and *Terminalia canescens* with scattered *Xanthostemon paradoxus*, *Owenia vernicosa* and *Adansonia gregorii* over spinifex and tussock grasslands. There is some *Eucalyptus tectifica*, *Corymbia grandifolia* on lower slopes.

Terminalia canescens is common, often occurring as the dominant species.

On Adolphus Island there are steep slopes of sparse woodland cover including *Gyrocarpus americanus*, *Acacia spp.*, *Calytrix spp.*, *Melaleuca minutifolia* (?), *Corymbia drysdalensis*, *Adansonia gregorii*, *Brachychiton incanus* and *Terminalia spp.*

The Mt Connection outcrop has a sparse tree cover. The summit has scattered *Adansonia gregorii* over spinifex hummock grasses and the lower slopes include *Lysiphyllum cunninghamii*, *Ficus leucotricha*, *Gyrocarpus americanus*, *Cochlospermum fraseri*, *Brachychiton paradoxus*, *Terminalia canescens* and *Grevillea refracta.* The peak of the silty quartz at the southern end has a few individuals of *Corymbia drysdalensis* but is otherwise treeless.

7. **Riverine Woodland.**
This is divided into five further associations.

1. Adansonia gregorii* and *Melaleuca spp.
The drainage areas at the interface of the sandstone ranges and mudflat on Adolphus Island support *Adansonia gregorii* and *Melaleuca spp.* with some scattered *Cathormion umbellatum.*

2. Sesbania formosa
Sesbania formosa forms stands adjacent to the Ord River south of mangal vegetation. Other species include; *Passiflora foetida*, *Excoecaria parvifolia*, *Melaleuca leucadendra* (?), *Acacia*

spp., *Adansonia gregorii*, *Eucalyptus camaldulensis* and *Pandanus aquatica*. *Parkinsonia aculeata* is also present,

3. Eucalyptus camaldulensis, E. bella, E. bigalerita, Corymbia polycarpa, C. confertiflora.* and *C. grandifolia

Also included with these eucalypts are *E. tectifica*, *E. microtheca*, *Acacia plectocarpa*, *Melaleuca spp*, *Adansonia gregorii*, *Buchanania obovata*, *Trichodesma zeylanicum* and *Crotalaria cunninghamii*. Less abundant species include *Pandanus spiralis*, *Calytrix exstipulata*, *Verticordia spp.*, *Gardenia spp.*, *Exocarpos latifolia*, *Gyrocarpus americanus*, *Ficus opposita*, *Acacia colei*, *A. translucens*, *Jacksonia spp.*, *Lysiphyllum cunninghamii*, *Grevillea pyramidalis* and *Calotropis procera*. The ground layer consists mainly of *Sorghum*. *Themeda triandra* is common in patches.

4. Eucalyptus camaldulensis, E. bigalerita, E. tectifica* and *Excoecaria parvifolia.

At Wild Goose Creek there is an open forest consisting of *Eucalyptus camaldulensis* and *E. bigalerita* dominant with *E. tectifica*, *Excoecaria parvifolia*, *Cathormion umbellatum*, *Melaleuca leucadendra*, *Parkinsonia aculeata*, *Xanthium occidentale*, *Passiflora foetida* and scattered occurrences of *Acacia farnesiana* on the outer edges.

***5. Cathormion umbellatum, Terminalia platyphylla* and *Melaleuca* sp.**

Patches of *Cathormion umbellatum*, *Terminalia platyphylla* and *Melaleuca spp.* occurs predominantly on the floodplains in the north of Parry Lagoons Nature Reserve.

8. **Rainforest (aquifer forest) and Spring Vegetation**

There is *Pandanus spiralis* dominated vegetation around freshwater springs such as at Palm Springs. Rainforest species are also present.

Scree slope rainforests occur occasionally on the steep sides of the sandstone ranges. These are usually very small patches.

Species that have been recorded for these areas include *Abrus precatorius*, *Brachychiton diversifolius*, *Exocarpos latifolius*, *Crotalaria cunninghamii*, *Passiflora foetida*, *Flueggea virosa*, *Jasminum didymum*, *Operculina aequisepala*, *Protasparagus retusifolia*, *Grewia retusifolia*, *Canarium australianum*, *Laportea interrupta*, *Gymnanthera oblonga*, and *Brocea javanica*.

Freshwater springs occur between the mudflat/mangal interface and savanna woodland. Other species associated with spring areas include *Cyperus spp.*, *Terminalia platyphylla*, *T. ferdinandiana*, *Pandanus spiralis*, *Ficus opposita* and *Lophostemon grandiflorus*.

A freshwater spring located on the west side of the Ord River near the mangal and Sesbania interface is dominated by *Sesbania formosa* with *Pandanus spiralis*, *Melaleuca leucadendra*, *Parkinsonia aculeata* and *Ficus sp.*

As for vine thicket vegetation, these patches of scree slope, aquifer and spring vegetation have some protection from fire due to moist conditions and topographic characteristics.

9. **Major Rivers and Lagoons (permanent and ephemeral).**

Only the major semi-permanent creeks and lagoons have been included in the mapping. The Ord River is the only permanent waterway included in the mapping and is described according to the relevant classes occurring along its banks.

Principal aquatic plants in the semi-permanent lagoons and seasonal wetlands include *Ipomoea diamantinensis*, *Nymphaea gigantea*, *Nymphoides indica*, *N. crenata*, *Utricularia spp.* and *Ceratophyllum spp.*.

The most common species found along the main rivers and their tributaries are: *Terminalia. platyphylla*, *T. bursarina*, *Barringtonia acutangula*, *Melaleuca argentea*, *M. leucadendra*, *Eucalyptus bella*, *E. camaldulensis*, *E. bigalerita*, *Lophostemon grandiflorus*, *Acacia colei*, *Ficus coronulata* and *Nauclea orientalis*. The tall reed *Phragmites karka* is patchily distributed.

The reed *Typha domingensis*, probably either rare or absent from the Lower Ord prior to damming, has now become established in dense stands along most freshwater reaches of the river. Billabongs in the floodplains of the northern section of the Parry Lagoons Nature Reserve tend to be lined with *Excoecaria parvifolia, Cathormion umbellatum, Barringtonia acutangula* and *Terminalia platyphylla.*

Narrow Riparian Communities

The fringing vegetation of minor streams is distinct from the surrounding vegetation however it could not be included in the map due to the scale.

10. **Savanna woodland**

This is woodland adjacent to mangal and mudflat areas in northern section of the reserve. Predominantly *Eucalyptus miniata* and *E. tetrodonta* woodland. Some patches of *Acacia* woodland occur within this and *Acacia* species are found throughout. Drainage lines predominantly have *Adansonia gregorii, Melaleuca spp.* and *Pandanus spp.*. Other common species include *Eucalyptus tectifica* and *Corymbia polycarpa. Melaleuca acacioides* fringes areas between woodland and the mudflats

There is a *Eucalyptus tetrodonta* dominated woodland in the Cape Domett area with *E. miniata* and *Corymbia polycarpa* present also. The ground layer consists of annual *Sorghum* and *Plectrachne pungens.* The seaward fringe consists of an *Acacia* dominated woodland around Cape Domett and in some areas the vegetation is prostrate to approximately 50cm tall.

The dominant species in the savanna woodland south of Brolga springs has been recorded as *Eucalyptus tectifica, Corymbia byrnesii* and *C. confertiflora. Eucalyptus miniata* and *Corymbia polycarpa* have been recorded in this area also

Particular attention needs to be given to the protection of the vegetation of several small freshwater springs. Past land use activities and the associated impact of inappropriate fire regimes has had an impact on these. For example a small spring to the south east of the Site has been fenced out of the Site in the past. The boundary of the Site in this location should be fenced correctly.

Other communities worthy of special focus are the various patches of rainforest that are often dependent on underlying aquifers. These can be impacted upon in the same way as the springs mentioned above and monitoring is required.

Part of the False Mouths of the Ord showing the zonation of mangrove species (Photo: Richard Hammond)

Non-local plants and weeds are discussed in Section 21.

No species of declared rare flora have been found at the Site. The flora lists in the appendices show those species considered to be priority flora.

RECOMMENDATIONS

1. **Continue to document the diversity of flora found at the Site.**

2. **Ensure that an assessment of the status of flora is undertaken prior to any works taking place.**

3. **Implement the mapping and monitoring of any identified special vegetation communities.**

4. **Implement a program of identifying priority flora species found within the Site.**

5. **Undertake protective fencing of special or endangered communities.**

15. FAUNA

The objectives are to conserve native fauna populations and to provide special protection to rare, endangered and restricted species of fauna and their habitats.

198 bird species have been recorded from the Site to date. Appendix 5 is a listing of those species. The focus for the fauna of the Site has very much been on waterbirds. The Site supports significant populations of this avifauna though numbers vary dramatically through the year depending on the amount of water present in lagoons. From floodplain habitats associated with Parry Creek up to 77 waterbird species have been recorded, including 22 listed under international conservation treaties. The early part of the dry season, May to July, as the floodplains dry out, appears

to be the time when the greatest numbers of waterfowl congregate at the Site. The highest count recorded was 27 000 birds and it is thought that more than 20 000 probably occur annually. Abundant species with State or nationally significant aggregations reported include plumed whistling-duck *Dendrocygna arcuata* and glossy ibis *Plegadis falcinellus*.

Parry Lagoons is also important for shorebirds. The Site is considered to be of international importance for its populations of red-kneed dotterel *Erythrogonys cinctus,* Australian pratincole *Stiltia isabella,* Oriental pratincole *Glareola maldivarum* and little curlew *Numenius minutus*. Information suggests the area is also internationally important for sharp-tailed sandpiper *Calidris acuminata,* common greenshank *Tringa nebularia,* and marsh sandpiper *Tringa stagnatilis*. The Site is one of the five most important wetlands in Western Australia for migratory shorebirds (in terms of the number of species) and around the tenth most important Site in Australia.

Rare or threatened species include the freckled duck *Stictonetta naevosa,* garganey *Anas querquedula,* pectoral sandpiper *Calidris melanotos,* long-toed stint *Calidris subminuta,* painted snipe *Rostratula benghalensis* and zitting cisticola *Cisticola juncidis*.

Star Finch(Neochmia ruficauda) (Photo: Broome Bird Observatory)

Eight waterfowl species are known to breed on the Site but no comprehensive breeding surveys have ever been conducted. Of these the most significant is the magpie goose *Anseranas semipalmata.*

Monitor lizard (Varanus panoptes). (Photo: David Grosse)

A major reason for the declaration of the Ord River Nature Reserve was to protect important estuarine crocodile habitat. At that time there were concerns about the population numbers of this animal. Yearly monitoring indicates that numbers of crocodiles are remaining stable but there is no significant amount of breeding habitat within the Site. The harvesting of crocodiles for commercial use is discussed in Section 37.

A mammal survey was conducted over four days in 1986 at the False Mouths of the Ord. This recorded the first known population of Mosaic-tailed Rat *Melomys burtonii* in WA and a rich bat fauna comprising some 17 species. As part of the preparation of the report further work was conducted from 25 September 1997 to 30 September 1997 with a team which included Norm McKenzie and Tony Start (Principal research officers from the Science and Information Division of CALM). The aim of this was to focus on parts of the False Mouths of the Ord and land adjacent to Cape Domett. This work added to the bird list of the Site with a number of mangrove dependent species being identified.

Other mammals include the northern nail-tailed wallaby *Onychogalea unguifera*, agile wallaby *Macropus agilis* and the long-haired rat *Rattus villosissimus*. Parry Creek is the 'type locality' of Woodward's rock-rat *Zyzomys woodwardii*, which is found in sandstone boulder country. This animal has not been collected for many years.

Beach used by Flatback Turtles (Natator depressus). Cape Domett in the background. (Photo: Richard Hammond)

Just north of Cape Domett, on a sandy beach near the feature known as 'the Needles', is a large flatback turtle *Natator depressus* rookery. This is the major Western Australian area of activity of this Australian regional endemic. A limited amount of research has been conducted on this species. Consideration should be given to special protection of this location. This is particularly of relevance as other agencies have nominally identified Cape Domett as a possible site for the development of a port facility.

Flatback turtle (Natator depressus) hatchlings at the Cape Domett rookery. (Photo: David Grosse)

Fish populations on the Site have received little attention. Two species of freshwater fish, the catfish *Neosilurus hyrtlii* and a rainbowfish *Melanotaenia splendida*, have been recorded from Parry Lagoons and the barramundi *Lates calcarifer* is a prominent species targeted by recreational and commercial fishing in estuarine regions. The regional significance of the estuarine environments on the Site as breeding and nursery grounds for marine fish and crustaceans is thought to be high but this has yet to be quantified.

There are no published data available on the status of the invertebrate fauna of the Site.

Introduced fauna on the Site includes feral cats, cattle, horses and donkeys.

RECOMMENDATIONS

1. **Continue surveys to record the distribution, abundance and other details of fauna. Some emphasis is required to assess the marine environment.**

2. **Protect and monitor populations of declared rare and specially protected species.**

16. HYDROLOGICAL AND ESTUARINE PROCESSES

The objective is to manage ground and surface water resources to protect water dependent ecosystems and cultural values.

The Site is dependent on a wide variety of interacting hydrological processes operating at a large scale. Numerous seasonal creeks, such as Parry Creek and Tanmurra Creek, flow only as a result of wet season monsoonal rains. These creeks can carry immense amounts of water spreading out across the countryside but quickly diminish in flow and eventually dry once the rains stop. It is thought that Parry Creek is now a major contributor to the flooding of the floodlplain where it leaves Deception Range whereas the Ord River would have been dominant prior to its damming.

Over the past 10 years the channel at the top of the photo has silted up and the island no longer exists. (Photo: Chris Done)

The massive tidal flows and the associated interaction with freshwater flows from the Ord River determine the character of much of the Site. The vegetation growing along the banks of the river, for example, is a direct reflection of the interaction between the freshwater flows of the river and the saltwater fluctuations of the tides. The False Mouths of the Ord exists because of the nature of the tidal activity and the associated deposition and erosion processes.

The status of the groundwater resource in the area is also of great importance. Many of the lagoons and springs depend on groundwater.

Little is understood of how these process operate at the Site and by implication there is little understanding as to what extent they can be impacted upon. There have been no formal studies on the changes that have been brought about by the damming of the Ord River. It is clear that the flows of the Ord River have changed from being seasonal with associated episodes of massive flooding to a situation where there are constant freshwater flows and a dramatic diminution in large-scale episodic events.

It is highly likely that demands on the use of the waters of the Ord River will change in the future. Recent statements that changes to the water regime brought about as a result of the expansion of the Ord River Irrigation area will not impact on the Ramsar Site are seen as inadequate. For example little is known of the impact of large scale extraction of water directly from the Ord River immediately upstream of the site to provide water to a proposed horticultural development. Associated with this are plans to pump saline groundwater out of the area in the event of the groundwater rising due to irrigation. Pressures may also be placed on the quality of the waters of the Ord from this groundwater extraction and the discharge of drainage waters from irrigation areas.

Mineral exploration has been taking place in the Cambridge Gulf. If this leads to the discovery of a resource worthy of exploitation, possibly through dredging operations, then actions undertaken must be balanced with an understanding of the potential impacts in this high energy system. This will need to include investigations away from any sites of activity.

RECOMMENDATIONS

1. **Undertake research into establishing baseline data on the hydrological and estuarine process of the Site.**

2. **Adopt a highly cautious approach in the assessment of any activities that might impact on these processes.**

17. FIRE MANAGEMENT

The objectives are to protect community and environmental resources and values at the Site from damage or destruction by wildfire and to use fire as a management tool to enhance habitat diversity and other land management objectives.

Fire management is considered to be the major issue in the Kimberley region particularly with respect to avoiding inappropriate fire regimes and using fire as a land management tool.

There is evidence to show that across the top end of Australia fire was used widely by Aboriginal people prior to European colonisation. Seafarers recorded fires throughout their travels and at all times of the year. The use of fires must remain a significant component in the management of the Site.

In general it appears that in the Kimberley there has been a shift away from a mosaic of different types of burning to fires during the hottest and driest times of the year. The result is that the occurrence of large end of dry season fires has led to inevitable changes in the structure and composition of vegetation communities with associated impacts on the distribution and abundance of fauna species.

Fire at the Site does appear to mirror this general scenario with large areas being burnt in single events during the late dry season. This is exacerbated by the close location of the Site to the town of Wyndham. There is no direct monitoring of the effect of fires at the Site.

CALM is attempting to ameliorate the effects of these large fires through the use of a prescribed burning programme early in the dry season and hand lighting of fires in strategic locations.

The values at risk include the lives of visitors to the Site, people involved in fire management activities, flora and fauna communities, and adjoining lands. Protection of these values and assets must be considered in the development of fire prevention and management strategies. Overall guidance in arriving at on-ground management is aided through the use of Departmental strategies as follows:

Fire Suppression

1. Meet legal obligations under the Bush Fires Act and the CALM Act by responding to fires that occur on or near CALM managed land to a degree that is appropriate to the values at risk.

2. Assess response to a fire in the light of potential damage to the following values, in order of priority:
   (a) Human life.
   (b) Community assets, property or special values (including environmental values).
   (c) Cost of suppression in relation to values threatened.

3. Where values dictate, the Department will encourage communication and liaison which will give timely warning of the presence of a fire threatening a community or environmental values.

Use of Fire

4. Use planned fire only where this is in accordance with an approved management plan, necessary operations or, where such plans do not exist, to protect and maintain the designated priority land use.

5. Prepare written prescriptions in advance, for approval by senior designated officers, before any planned fires are undertaken.

6. For areas where the primary landuse is wildlife conservation, use fire in such a way as to promote the greatest possible diversity and variety of habitats within prevailing physical or financial constraints.

7. Use prescribed fire or other methods to reduce fuels on appropriate areas of CALM lands, where it can be demonstrated that is the most effective means of wildfire control, and where undesirable ecological effects do not result.

Liaison

8. Ensure effective liaison with neighbours, Fire and Rescue Service of WA, Shires, Bush Fires Board and other fire control organisations.

9. Promote mutual aid inter-agency agreements for fire control on lands of mixed tenure with common fire problems.

Public Awareness

10. Provide for public education in relation to the role and use of fire in ecosystem management, and hazard and risk reduction.

Research

11. Undertake research into fire prevention and control, fire ecology and fire behaviour on CALM lands to improve the scientific basis for, and effectiveness of, fire management programs.

In broad terms the East Kimberley district will continue to use fire to assist in the control of wildfire. This will be undertaken through the hand lighting of fires either along existing roads or through the selection of appropriate areas to be burnt using cross country four wheel drive motorbikes. The use of fire bombing techniques with incendiary devices being dropped from aircraft will continue. Increased efforts will be made to undertake burning as soon as possible after the end of the wet season particularly in ridge country.

RECOMMENDATIONS

1. **Prepare and implement a Fire Master Plan from which annual fire management programs will be developed.**

2. **Implement a fire impact monitoring system with the minimum requirement being the establishment of photo monitoring points.**

3. **Inspect all wildfires reported and implement actions according to the criteria defined above.**

4. **Liaise with the Shire of Wyndham/East Kimberley, the Bush Fires Board and adjoining landowners to ensure the provision of strategic fire protection for the Site.**

18. NON-ABORIGINAL CULTURAL HERITAGE

The objective is to protect the Non-Aboriginal heritage of the Site.

In preparing this report a study was undertaken of the Site to determine those aspects which are or might be considered to be of some historical importance. The location of a number of these has been mapped and they include fencelines, dams (turkey nests), roads, quarries, buildings, telegraph station and telegraph poles. The Heritage and Precinct Management Team of the Department of Contract and Management Services was contacted and a suitably qualified consultant was engaged.

Telegraph Hill wireless station ruins which overlook Marlgu Lagoon (Photo: Darren Cooper)

It is not only people of European backgrounds that were involved in the area but included people such as the Chinese and Afghans.

The consultant summarised the historical context of the area. The overall picture of the timing of non-Aboriginal exploration and development of the Kimberley region can be found in general Western Australian histories. Only one brief local history has been written (cf. Shire of Wyndham 1986) which gives more detail of people and places. Queensland pastoralists established the first station in the East Kimberley in 1884 on the Ord River, and Wyndham was gazetted two years later in 1886. The discovery of gold at Halls Creek ignited the Halls Creek gold rush between 1886 and 1887. While the rush lasted only two years the fields continued to operate long after the rush had ended.

Cobble feature of the second Halls Creek Road. (Photo: Darren Cooper)

The East Kimberley was not distinguished as a separate division in blue book (Western Australian annual government reports) and census records until 1891. At this stage the records covered Wyndham and the pastoral hinterland separately. The 1891 census map indicating that the general area contained 29 non-Aboriginal people. Census information from individual stations was recorded for the first time in 1901. At this point there were 68 people (mostly males) living in Wyndham with nine people living at Stud Station and seven at Dead Horse Station. These were the only stations in the East Kimberley division the rest being designated to the Kimberley Goldfields division.

The work specifications and the executive summary of the consultants is given in Appendix 8. The complete report is available upon request from the Kununurra office of CALM. Due to the time of year, funding and time restrictions the locations inspected were limited to readily accessible areas south of the Ord River. Some historical information is contained in that report for the first Halls Creek Road, the second Halls Creek Road, the wireless station at Telegraph Hill and Goose Hill Station (Ascot Government Station).

It is clear from the work that has been undertaken to date that there are locations of historical importance within the Site and that further documentation of these is warranted. Also needed is an assessment of the whole Site.

RECOMMENDATIONS

1. **Undertake a full survey of the historical significance of the Site.**

2. **Align any planned works that may affect the cobblestone surface of the second Halls Creek Road around those areas.**

3. **Assess the condition of the second Halls Creek Road along with the identification of any artefacts and features.**

4. **Undertake an historical assessment of the date of construction of the second Halls Creek Road along with who it was constructed by and how rare an example of the method of construction it might be.**

5. **Prepare a conservation plan for the Telegraph Hill location.**

6. **Undertake works affecting the Goose Hill Station (Ascot) location only after an historical significance survey of the area has been carried out.**

19. ABORIGINAL CULTURAL HERITAGE

The objectives are to provide Aboriginal traditional owners the opportunity to maintain their cultural links with the Site in keeping with conservation and other objectives and to ensure that all areas of spiritual significance to Aboriginal people are respected in keeping with the wishes of the traditional owners.

Specialist consultants were engaged to investigate traditional Aboriginal use of the Site. A report titled 'A Preliminary Survey of Aboriginal Interest and Association with the Lower Ord Ramsar Site' was prepared and the work requirements and recommendations are given in Appendix 9. The material within this section has been taken from that report. It is important to emphasise that this work is of a preliminary nature only.

The Site falls within the boundaries of the following Aboriginal language groups; Gadjerrong, Miriuwung, Dulbung, Guluwaring, Djangade and Baimbarr.

As a result of the (non-Aboriginal settlement) history of the area, the traditional system of land ownership and management has been eroded and confused. Many of the original inhabitants were removed permanently from the area preventing the continuance of land management practices. With the continued growth of the cattle industry many Aboriginal people moved or were moved onto particular stations that were not within their traditional boundaries.

There is now in Wyndham, Kununurra and surrounding areas a large and diverse group of Aboriginal people who see themselves as having *recent traditional interest*. The feeling is that they and their families have been resident in the area for many years as a result of the settlement of the area. They and their families have used and enjoyed the natural resources of the region, combining cultural knowledge and rituals with more modern techniques, and as such view themselves as having a legitimate traditional interest in the land, even though their tradition is viewed as recent.

The results from inquiries with the Aboriginal Affairs Department (AAD) revealed 18 recorded Aboriginal sites within the Ramsar area. The variety and type of sites recorded are useful in considering the extent of traditional usage of the area. The sites identified included ethnographic and archaeological sites and included the following evidence of past activity;

Skeletal remains
Burial sites
Artefact scatters
Mythological sites

Quarries
Paintings
Ceremonial
Grinding/grooves.

The range of sites suggests the area was well used and the presence of burial sites, paintings, mythological and ceremonial sites also suggests that it was of significance.

As was explained by AAD, the Sites Register is a register of sites people choose to record. As all Aboriginal sites are automatically protected under the Western Australian Heritage Act, Aboriginal groups do not have to register and record their known sites. It is an offence under the act for non-Aboriginal people not to report a site found. It is in fact more usual for Aboriginal groups to avoid recording their known sites in an effort to ensure ownership of the information remains with the traditional owners. This, in effect, ensures that anyone wishing to access the information have to negotiate directly with the custodians of the area.

RECOMMENDATIONS

1. **Ensure that activities do not impact detrimentally upon known Aboriginal sites.**

2. **Train staff in the recognition of Aboriginal sites and the obligations under the Western Australian Heritage Act.**

3. **Assign the Ramsar site management council the task of establishing guidelines for Aboriginal site management.**

4. **Ensure Aboriginal people are involved in determining what should happen at identified Aboriginal sites including interpretation and commercial (tourist) use, if any.**

20. NATIVE TITLE AND RIGHTS OF TRADITIONAL USAGE

The objective is to ensure that the outcomes of the Native Title claim process are effectively applied to the Site.

The entire Site is subject to Native Title claims. These claims are lodged on behalf of;

> The Miriuwung and Gajerrong peoples, lodged by Miriuwung and Gajerrong Families Land Council, known as the Miriuwung Gajerrong Claims 1 and 2, represent by both the Aboriginal Legal Service (ALS) and the Kimberley Land Council (KLC).
>
> The Gwini, Walmbi and Wunnubal peoples, lodged by the Balangarra Aboriginal Corporation, known as the Balangarra Claims 1 and 2 and represented by the Kimberley Land Council.

In broad terms the Miriuwung Gajerrong claims impact the land and waters on the eastern side of the Cambridge Gulf and also encompasses the Parry Lagoons Nature Reserve. The Balangarra claims impact on the land and waters on the western side of the Gulf. There is some overlap between the claims in the waters of the Cambridge Gulf with both including areas such as Lacrosse Island.

Legislation recognises Aboriginal rights to hunt and fish for food. Under Section 23 of the State's Wildlife Conservation Act 1950 Aboriginal people are exempted from some of the provisions related to the taking of certain flora and fauna. Aboriginal people may take flora and fauna for food from land, including Crown land, but not from either a nature reserve or a wildlife sanctuary. The consent of the occupier of the land is required. In the case of national parks and conservation parks the consent of CALM's Executive Director is necessary for Aboriginal people to hunt, fish or gather food for their

own sustenance. Conditions associated with approval include that the species taken is not likely to become unduly depleted, food taken is not sold and the activity is consistent with other land management objectives.

As the Native Title claim process is on going there are no specific recommendations associated with this section. There is a need to await the outcome of that process before proceeding with specific activities associated with the Site.

21. NON-LOCAL PLANTS, WEEDS AND DISEASE

The objective is to control and, if possible, eradicate weed and other non-local species.

Weed species on the Site are recognised as a significant problem. A large portion of the Ord River Floodplain lies within a Noogoora burr *Xanthium occidentale* quarantine area. The prickly shrub parkinsonia *Parkinsonia aculeata* has formed extensive thickets in riparian, river levee and floodplain situations. The banks also support populations of rubber bush *Calotropis procera* and some leucaena *Leucaena leucocephala* that has spread from agricultural areas upstream.

Introduced Parkinsonia aculeata encroaching on wetlands. (Photo: Tanya Vernes)

The discovery of a small patch of bellyache bush *Jatropha gossypiifolia* on the reserve adjacent to Parry Creek is of some concern. Efforts have been made to remove this outbreak including grubbing and spraying. This appears to have been successful to date but constant monitoring will be required in order to ensure it does not once again become established. This vigilance is required due to the long term viability of the seed now at the Site. Several watercourses have been inspected using quad bikes without any further outbreaks being discovered.

Previously staff from Agriculture Western Australia and their contractors did control work on Noogoora burr. Recently, however, little work has been done. In the event of Agriculture Western Australia formally advising that they will no longer undertake that work there would have to be a large injection of funds in order for CALM to take on the task. Without those funds a strategy of containment would be adopted.

CALM with assistance from Greencorp has undertaken control work on Parkinsonia and funds have been allocated by the East Kimberley District to continue that work. There is a need, however, for an injection of substantial funds over the longer term.

Of particular concern is the presence in the Northern Territory of species of exotic plants that have already become significant environmental problems. These plants are not as yet found at the Site but it is possible they might be introduced. Examples of these are devils claw *Martynia annua*, salvinia *Salvinia molesta* and mimosa *Mimosa pigra*. It is important that liaison with agencies of the Northern Territory responsible for weed control is maintained.

To date no plant diseases have been identified.

RECOMMENDATIONS

1. **Implement control of introduced plants according to the Agriculture and Related Resources Protection Act (1976) and the CALM Policy No. 14 - Weed Management.**

2. **Develop a weed control strategy for the Site. In particular species that are identified as being the greatest threat to the integrity of the Site should be mapped.**

3. **Train staff in weed identification and control.**

4. **Liaise with the agencies of the Northern Territory with responsibility for introduced plant control.**

22. INTRODUCED ANIMALS

The objective is to control and, if possible, eradicate feral animal populations in the Site.

Feral animals are those introduced species that have become established as wild or naturalised populations and under that definition the cat, donkey, cattle, horse and dog have been found at the Site.

Feral animal control is a major management issue. (Photo: Ian Solomon)

Control of feral animals is an important strategy by which conservation objectives on CALM managed lands can be achieved. Feral animals have the potential to seriously impact on natural systems through direct effects such as;

Predation.
Habitat destruction.
Competition for food and territory.
Possible introduction of disease.
Environmental degradation by selective grazing.

Work on introduced animals at the Site needs to on a priority basis. These priorities would be formed by assessing the impact of the animals, the efficiency and effectiveness of control measures, participation of other stakeholders and the capacity for long term monitoring of the situation.

The Department also has responsibilities for control of declared animals on CALM managed lands under Sections 39-41 of the Agriculture and Related Resources Protection Act 1976.

A study on the cat problem is considered to be a priority in terms of impact on native fauna across the region. Little is known of the status of this species at the Site and work on this is essential.

Cat in chimney at Telegraph Hill (Photo: Chris Done)

The impact of donkeys and cattle on the vegetation is greatest along river frontages, alluvial flats and ephemeral swamps. At present CALM undertakes an aerial shooting programme in the proposed Parry Lagoons National Park, with the consent of adjoining landowners, to control cattle and donkeys. This has been shown to greatly reduce the pressure on the natural environment. North of the Ord River, including areas of the False Mouths of the Ord, stock control is a major problem. The nature of the terrain makes fencing of gazetted boundaries either very expensive or impossible. The problem must be addressed and the best way to go about this, in the first instance, is to hold discussions with the managers and/or owners of adjoining properties to see if an amenable solution can be arrived at.

As was identified in CALM's regional plan there is concern about the potential for further damaging introductions of animal species. An example is the spread of the cane toad *(Bufo marinus)* across the top end of Australia. It is suggested that with the current spread rate it is unlikely that this toad will

reach the Kimberley within the next ten years, however, this could change dramatically with an inadvertent introduction into the Ord River irrigation area. At some stage the likely impact of this species on the fauna of the Kimberley will need to be assessed.

RECOMMENDATIONS

1. **Implement control of introduced animals according to the Agriculture and Related Resources Protection Act (1976).**

2. **Develop a feral animal control strategy for the Site.**

3. **Enhance current control programmes.**

4. **Liaise with the agencies of the Northern Territory with responsibility for feral animal control.**

5. **Liaise with adjoining landowners in order to improve stock control as a matter of priority.**

23. REHABILITATION

The objective is to rehabilitate areas disturbed as a result of past and present land uses. To achieve this local plant species will be used to restore disturbed areas to as near a natural state as possible.

Wherever possible, seed or cuttings from native species in the immediate locality should be used in rehabilitation operations. This ensures the greatest degree of success as well as enabling rehabilitated areas to resemble as closely as possible the natural vegetation.

The Departmental policy on the rehabilitation of disturbed land will be applied to the Site.

> Disturbance is defined as any activity or process producing, or likely to produce, long-term degradation of habitats and ecosystems.

Further;

> Such things as mining or quarrying, clearing for agriculture, dieback disease, grazing pressure, excessive (or inappropriate) burning and physical damage by vehicles, machinery and people, may cause disturbance. It is expressed in various ways including changes to natural assemblages of plants and animals, soil compaction and/or erosion, salination and reduction in water quality, safety problems or threats to private land or other habitats.

In the vicinity of Marlgu Lagoon rehabilitation works have taken place in order to stabilise the floodplain immediately adjacent to the lagoon. This area had become degraded due to vehicles driving to the edge of the lagoon. Works undertaken have included the re-alignment of tracks and contour ripping of degraded areas. This latter operation has performed the dual function of assisting in the natural establishment of vegetation and preventing vehicle access to the area.

At the Site there is a requirement to undertake rehabilitation of unwanted tracks and illegal camping areas.

RECOMMENDATIONS

1. **Specify and establish priorities as to the areas that require rehabilitation programs.**

2. **Rehabilitate degraded areas in accordance with CALM Policy No. 10 (Rehabilitation of Disturbed Land) and guidelines.**

3. **Prepare a detailed rehabilitation program and review the program on an annual basis.**

4. **Monitor the effectiveness of rehabilitation works on a regular basis.**

5. **Involve interested individuals and groups in rehabilitation projects.**

RECREATION AND TOURISM

24. RECREATION OVERVIEW

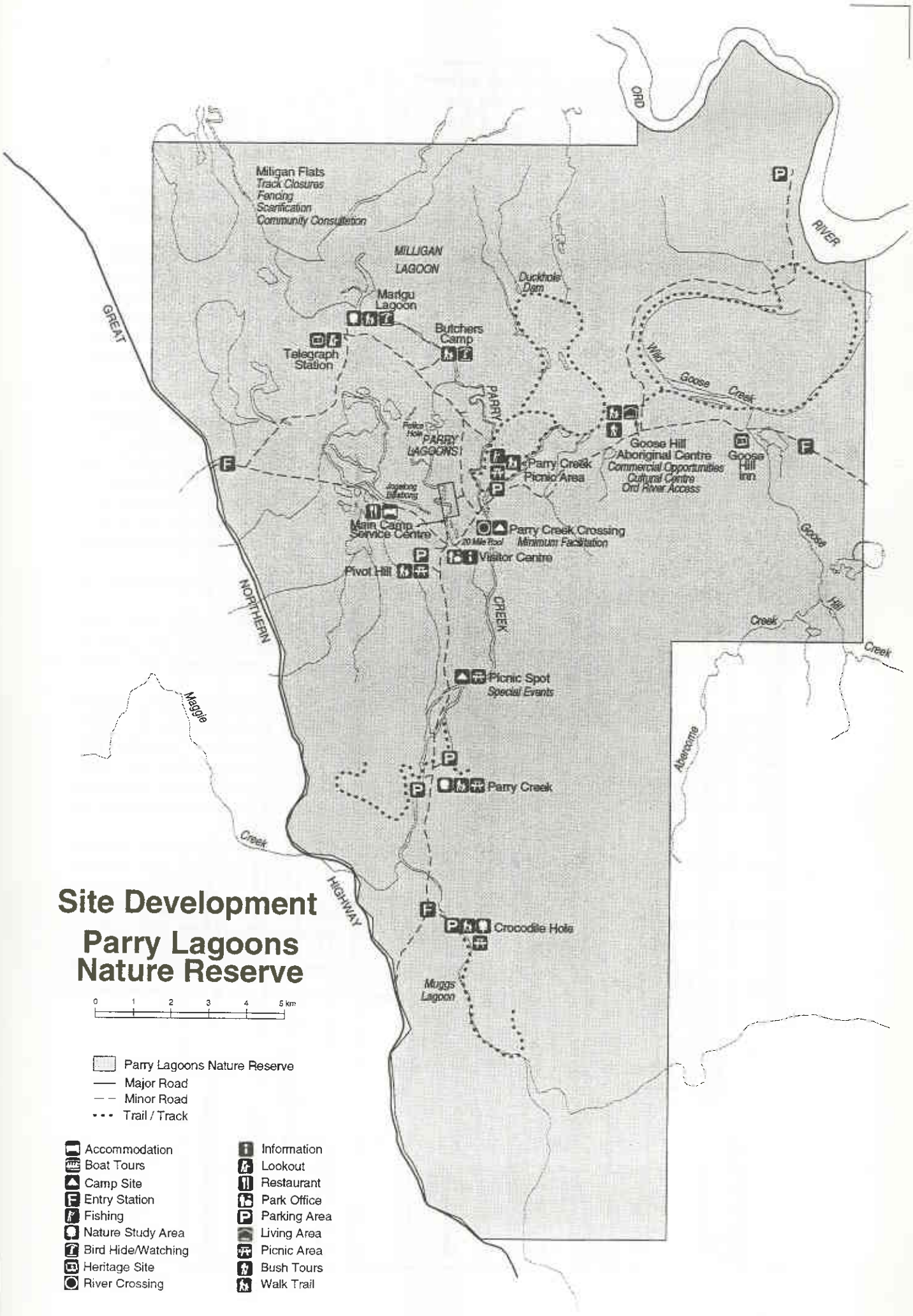
In preparing this document the consultants Northern Habitat were employed to undertake an introductory scoping study of the recreational and tourism opportunities which the Site provides. The work requirements and recommendations of that report are given in Appendix 10. As with other consultants reports this is available upon request from the Kununurra office of CALM.

It is clear that the Site can provide a wide variety of unique visitor experiences reliant on nature based activities. Apart from individual contemplative interactions with a range of environments there are opportunities for group activities and the involvement of the commercial tourism industry. In broad terms the management of these can be effectively achieved through the adoption of appropriate land tenures and the implementation of a broad zoning scheme which gives clear direction to site management.

The spectacular 'Needles' at the northern end of the Site. (Photo: Tanya Vernes)

Through the cautious establishment of appropriate management strategies the visitor experience can be facilitated and enhanced without detracting from the very values that attract people in the first place. The gradual and growing interest in the Site by visitors will be of economic benefit to the town of Wyndham, located near the Site. This is particularly relevant for a community seeking to increase opportunities for people living at that location. Attention should be given to linking the attractions of the Site and the facilities available in Wyndham.

The range of recreational activities which take place at the Site include fishing, birdwatching, photography, camping, boating and hunting (which is illegal). Tourism activities presently taking place includes scenic tours, birdwatching, fishing and Aboriginal tourism.


Site Development
Parry Lagoons
Nature Reserve
0 1 2 3 4 5 km
Parry Lagoons Nature Reserve
Major Road
Minor Road
Trail / Track
Accommodation
Boat Tours
Camp Site
Entry Station
Fishing
Nature Study Area
Bird Hide/Watching
Heritage Site
River Crossing
Information
Lookout
Restaurant
Park Office
Parking Area
Living Area
Picnic Area
Bush Tours
Walk Trail
Miligan Flats
Track Closures
Fencing
Scarification
Community Consultation
MILLIGAN
LAGOON
Duckhole
Dam
Marigu
Lagoon
Butchers
Camp
Telegraph
Station
PARRY
LAGOONS
Parry Creek
Picnic Area
Goose Hill
Aboriginal Centre
Commercial Opportunities
Cultural Centre
Ord River Access
Goose
Hill
Inn
Wild
Goose
Creek
Main Camp
Service Centre
Parry Creek Crossing
Minimum Facilities
Visitor Centre
Pivot Hill
Picnic Spot
Special Events
Parry Creek
Crocodile Hole
Muggs
Lagoon
GREAT
NORTHERN
HIGHWAY
PARRY
CREEK
Maggie
Creek
Abercrombie
Creek
Creek
ORD
RIVER

RECREATION AND TOURISM DEVELOPMENT – PARRY LAGOONS NATIONAL PARK

VEHICLE ACCESS

Type	Location	Comments
Two-wheel Drive	Parry Creek Road (Service corridor vested in appropriate agency) Old Halls Creek Road Marlgu Nature Study Drive Spur roads into recreation and tourism sites	Terrain and costs preclude guaranteeing all weather access.
Four-wheel Drive	Bastion Range Road on the west side of the national park	All roads and tracks not covered in the two categories will be closed and rehabilitated following full public consultation

FACILITIES AND SERVICES

Location	Type	Facilities	Comments
Parry Creek Road/Marlgu Drive Junction	Entry station	Visitor orientation. Fee collection. Information distribution	Could either be staffed or have a self registering system subject to visitor and management needs.
Parry Creek Road – east end	Entry station		
Old Halls Creek Road/Great Northern Highway	Entry station		
Crocodile (Alligator) Hole	Picnic area	Parking for coaches and cars. Picnic tables. Toilets.	Target numbers 2 coaches and 15 cars with a moderate to high carrying capacity.
Crocodile (Alligator) Hole	Nature study	Short trail to Muggs Lagoon with a longer trail south along Parry Creek to a high viewing point.	Aspects of interest include Aboriginal heritage, scenic quality, landform geology and wildlife.
Parry Creek	Picnic area	Parking for coaches and cars. Picnic tables. Toilets. Viewing platform. Pedestrian bridge. Walking trails	Target numbers 1 coach and 12 cars with a moderate carrying capacity.
Wyndham Picnic (Parry Creek)	Camp Site	Camping areas. Toilets. Games areas. Meeting areas. Shelter frames.	Catering for group camping and special events. Target numbers are for up to 500 people with the area having a high carrying capacity.
Pivot Hill	Nature Study	Car park. Walking trail.	Target numbers 6 cars with a low to moderate carrying capacity.
Parry Creek Crossing	Camp Site	Defined camping bays. Spur access tracks. Toilets.	Well defined dispersed individual camping. Target numbers 12 camp sites. Carrying capacity low.
Parry Creek Road and Old Halls Creek Road intersection	Main Camp Service Centre	Lodge style accommodation. Caravans and camping. Visitor centre. Tour bookings.	The preferred approach is to investigate a venture with private property owners.
Marlgu Nature Study Drive	Picnic area/Nature Study	Parking. Interpretation facilities. Toilets. Heritage trail. Nature trails. Viewing platforms. Tables.	The site planning for this has been initiated and parts of the plan implemented. Carrying capacity high. Target numbers 3 to 4 coaches and 20 cars.
Goose Hill Aboriginal Centre	Cultural interpretation	Guided tours. Recreation and interpretation facilities.	This would be developed only according to the expressed wishes of Aboriginal people.

By applying the principles outlined in the following sections a draft recreation and tourism and development plan was prepared for the proposed Parry Lagoons National Park. This is depicted on the site development map.

25. PUBLIC ACCESS

The objective is to provide and maintain access that is consistent with the maintenance of natural and cultural values, and with the diverse range of visitor needs.

Access to the Site varies from limited amounts of bushwalking, four-wheel drive vehicles, two wheel drive vehicles, motor bikes and boats. It is envisaged that air access will need to be considered in future management, in all probability by helicopter. Individuals, groups and commercial tours, including bird watching and fishing adventure tours undertake the access to the site. It is important that the type and location of access to the Site does not conflict with other uses and lead to deterioration in the values of the Site.

The main area of concern that has been identified is the driving of four-wheel drive vehicles off designated tracks and the random establishment of new tracks each year. People from local communities mainly undertake this activity. Apart from the establishment of a maze of tracks across grasslands, people are also driving into the Noogoora burr quarantine area. There is the potential for the spread of this burr, increased fire risk and erosion. The tracks are also visually unattractive. The main reason for this is to access the Ord River, waterholes and lagoons. The illegal taking of wildlife such as the Australian bustard, turtles and crocodiles is also occurring. Because of these problems it is unlikely that the Site could sustain designated off road activities.

All vehicular access into the Site will be on defined roads and tracks.

Some work has been done by CALM in the vicinity of Marlgu billabong to deter off road driving including the establishment of improved roads and parking bays, the placing of bollards and signs across previous main access points and the rehabilitation of previously degraded areas.

Because of the large area of grasslands and the multitude of locations in which they can be accessed control of off-road activity is going to be difficult to achieve however there can be significant improvements. This can be achieved by fencing and signposting 'popular' routes, particularly those which lead to the quarantine area, rehabilitating unwanted access sites, discussing with the local community the possible establishment of managed access routes to important areas, public education and increased patrolling of the Site by CALM staff.

Boating opportunities within the Site vary. With parts of the Noogoora burr affected area being removed from quarantine public access to all of the Ord River by boat is now possible.

Further studies are needed to identify management problems exist or are likely to develop with boating activities. One area of particular interest is the False Mouths of the Ord.

During the wet season it is often necessary to close tracks because of flooding and CALM erects signs at that time explaining why the action is necessary.

Kununurra to Wyndham powerline (Photo: Tanya Vernes)

An issue associated with access is the provision of service corridors. These corridors are required to provide easements for gazetted roads, powerlines, communications and possibly water. At present the Parry Creek Road is not gazetted as a road. With the future development of an irrigated horticulture area on the eastern boundary of the Site this road may become important for people accessing the town of Wyndham. Once again with the changes to the Noogoora burr quarantine area greater tourist use is expected by people driving from Kununurra to Wyndham. Adjacent to the road is the powerline running from Kununurra to Wyndham. It is recommended that the Parry Creek Road be defined as a service corridor with excision from the proposed National Park and vesting in an appropriate agency. Part of that process should include whether the current alignment is appropriate. It is the only corridor under consideration at this stage.

RECOMMENDATIONS

1. **Review the condition of roads and tracks within the Site as a priority. Actions arising should include the need for tracks and roads to be closed, realigned or upgraded. An assessment of the need for further designated access alignments should also be made at that time.**

2. **Maintain the access, from the Great Northern Highway, along the Parry Creek Road, past the old telegraph station, to the Marlgu Lagoon to two wheel drive standard.**

3. **Close tracks and roads when conditions warrant.**

4. **Assess the management requirements of boating activities within the Site.**

5. **Prohibit the use of off road vehicles.**

6. **Define the Parry Creek Road as a service corridor with appropriate vesting. CALM to negotiate with relevant agencies as to possible future demands for other corridors.**

26. FACILITIES

The objective is to continue to provide and maintain facilities of a high standard.

Facilities are those structures that are built within the Site for the benefit of visitors and managers of the Site. These should enhance the visitor experience and assist in the protection of the Site. They are usually associated with camping grounds, toilets, water supply, signs and information provision.

The facilities currently at the Site include walkways, bird observation platforms, signs, and interpretation panels. The zoning of parts of the Site for recreation will allow for the development of other facilities as the need arises.

The bird viewing platform at Marlgu Lagoon. (Photo: Richard Hammond)

Areas requiring particular attention are at the junction of Parry Creek Road crosses Parry Creek, Alligator Hole, boat launching and camping point 4 kilometres east of the Needles and where Tanmurra Creek joins the False Mouths of the Ord. At all these locations camping occurs and there are no facilities with a resultant detrimental impact on the location. The allocation of some areas to camping can remain of a low-key nature but planning for future demand should take place.

Camping and other visitor and manager facilities could be provided either adjacent to the Site or, in particular, on the freehold land within the proposed National Park. There are opportunities for CALM to collaborate with private enterprise in this area. In the near future toilets will be placed at Marlgu Lagoon.

All works undertaken will be to a high standard with a regular maintenance program.

RECOMMENDATIONS

1. **Establish designated camping areas at the Site.**

2. **Negotiate with the owners of the land within the proposed National Park as to the feasibility of establishing visitor and manager facilities at that location.**

3. **Review facility requirements on an annual basis.**

27. WILDLIFE OBSERVATION AND INTERACTION

The objective is to enhance the experience and knowledge of visitors to the Site by providing opportunities to experience, learn about and appreciate their natural attributes.

Nature can be appreciated in many ways by experiencing the environment through activities such as bushwalking, birdwatching, viewing scenery and photography. These can be enjoyed in their own right or as an adjunct to other activities like picnicking or canoeing.

(Photo: Marion Lester)

Birdwatching is a very popular at the Site particularly around Marlgu Lagoon. Areas of the Ord River contain a variety of habitats ranging from deep water (fresh and estuarine) which is popular with diving species such as cormorants, darters and pelicans to shallow areas that attract wader and shorebird species. Mangrove habitats are represented, as are woodlands, grasslands, marshes, wooded swamps and riverine communities. The Site has large populations of seasonal waterbird visitors and a number of rare species have been seen. These have included garganey, freckled duck, painted snipe and the zitting cisticola. The mangals support in excess of 20 species of birds found only in mangroves, which is one of the highest concentrations in the world. The provision of a walkway and bird observation platform at the Marlgu Lagoon by CALM has contributed to the attraction of the area for bird watchers. During the tourist season CALM has conducted birdwatching sessions at the Site.

The Site has a spectacular array of opportunities for wildlife and scenic photography. Photography enthusiasts actively seek out the two species of crocodile found at the Site.

Nature based commercial tourism is increasing. People have been brought to Marlgu Lagoon in small four-wheel drive vehicles to large 50 seat buses. Several tour operators specialising in birdwatching visit Marlgu Lagoon on a regular basis and continued advertising for this type of operation occurs. Many opportunities exist within the Site for other nature based tourism activities including tours of the wetland, mangroves, waterways, turtle nesting, crocodile spotting and woodland walks. Departmental guidelines can be readily implemented if there are any tourism proposals focussing on specific animals such as turtles and crocodiles.

RECOMMENDATIONS

1. **Provide information on the flora and fauna of the Site using appropriate media such as display boards and pamphlets in order to enhance visitors' appreciation and knowledge the area.**

2. **Continue the development of the walkway and viewing platforms.**

28. PICNICKING

The objective is to provide facilities appropriate to the environmental setting that encourage visitor enjoyment and understanding of the Site values.

Along with other recreational activities the bush picnic is often seen as an important activity. The location where this activity has taken place is at Alligator Hole and Marlgu Lagoon but neither site has had any facility development. Planning is taking place to remedy this situation at Marlgu Lagoon, which has the greatest demand. The choice of the location for picnic areas will attempt to separate vehicle traffic and people.

At present there are no plans to establish day use barbecue facilities on the Site. If needed it may prove to be more appropriate to place these facilities on the freehold block if the negotiations referred to in Section 26 prove to be successful.

RECOMMENDATIONS

1. **Provide facilities for picnicking at Marlgu and Alligator Hole.**

2. **Ensure that all developments are planned carefully beforehand.**

3. **Maintain these areas in a safe, clean and tidy condition.**

29. RECREATIONAL FISHING

The objective is to ensure that recreational fishing takes place without conflict with other Site users and in a sustainable manner.

Recreational fishing, including crabbing, is a very popular activity within the Site in areas such as the Ord River, False Mouths of the Ord, lagoons and other areas of Cambridge Gulf. In freshwater areas the fish species targeted are mainly barramundi and sooty grunter. The sooty grunter is often said to be an important food resource for Aboriginal people. Fishing in saltwater areas broadens out the range of possible catches including threadfin salmon, cod and mulloway. Apart from individuals, fishing clubs are known to use the area. It is understood that crabbing occurs in search of the mud crab but the extent of this activity is unknown.

Two local tour operators provide day and extended fishing trips along the Ord River and into the False Mouths of the Ord. It is likely that demand for extended fishing charters will increase.

Elsewhere around the Kimberley coast there has been an increase in the number of fishing camps. These are areas either on islands or the mainland where overnight accommodation is provided during extended fishing charters. With the proximity of Wyndham to the Site it is not envisaged that fishing camps will be catered for within the Site.

Fishing activities are primarily regulated under the Fisheries Act. Fisheries Western Australia (FWA) have declared a recreational fishing zone which extends from the Diversion Dam wall to the mouth of the Ord River. There are fishing zone specific size and possession limit for barramundi. A fishery management plan is being prepared by FWA for this zone. The intention is to ensure that all fishing activities are sustainable and do not impact on the environment of the river

As has been mentioned consultation is required with FWA for the establishment and management of a marine park. The management of recreational fishing is an important issue requiring extensive negotiations with FWA and stakeholders.

RECOMMENDATIONS

1. **Survey the current recreational fishing activities within the Site including the establishment of a suitable monitoring programme.**

2. **Implement fishing strategies to address issues which might be identified as a result of 1. in consultation with Fisheries Western Australia.**

30. BOATING

The objectives are to ensure that boating and other water-based activities are conducted in a manner consistent with the zoning and purpose of the Site and so as not to conflict with other users.

The range of boating activities that could take place at the Site includes small dinghy use for fishing, boat tours, canoes, jet skis, hovercraft, houseboats and airboats. Generally speaking the use of craft which elsewhere have been criticised because of their potential for impact on the fauna of an area would need to be strictly controlled or prohibited from use in certain zones. The craft that fall into this category include hovercraft, airboats and jet skis.

Little information is currently available on boating within the Site but it is apparent that there are many opportunities yet to be explored. Each type of boating activity will be assessed on a case by case basis.

RECOMMENDATIONS

1. **Investigate the level and type of boating activity taking place within the Site.**

2. **Implement controls, in keeping with the zoning scheme, on certain types of vessels.**

31. ORGANISED EVENTS

The objective is to ensure that organised events are compatible with the purposes of the Site and do not impact upon other users.

The only organised event known to occur within the Site is the annual Parry Creek picnic that is run by the Wyndham Lions Club. This event is a family based outing run over a long weekend and attracts up to several hundred people. This event has been held for a number of years. Concerns have been raised about the location of the event, the poor quality of facilities in place and the condition in which the

location is left following the event. Through the implementation of a site development plan improvements in the management of the location are intended.

All organised events need to operate under a license with conditions established well before the event is due to take place. In the case of regular events then the license would need to be re-negotiated on an annual basis. Conditions would include environmental and cultural considerations.

RECOMMENDATIONS

1. **Ensure that organised events operate under a license with conditions that protect the Site's values.**

2. **Charge fees or obtain bonds from the organisers of organised events to cover costs that may be incurred, in accordance with CALM policy.**

32. VISITOR FEES

The objective is to have a fee system that is commensurate with the policy adopted elsewhere in the Kimberley region.

CALM has adopted the user pays principle. Funds are generated through a system of commercial concessions and visitor fees. These monies are used to assist CALM in meeting its management obligations.

The recouping of fees from visitors to the CALM managed estate can offset the costs of management and raise funds for the provision and maintenance of facilities and services for users. Whenever possible, and appropriate, fees will be collected from users when a service or opportunity is provided as long as the benefit to the Department (which may include protection of surrounding resource values) exceeds the cost of collection. Elsewhere a variety of alternative recoupment methods have been used including visitor entry fees, vehicle entry fees, camping fees and voluntary donations. The level of fees is set from time to time by the Minister for the Environment.

At present no fees are charged in association with use of the Site. Tour operators visiting areas such as Marlgu Lagoon are licensed under a broad system that covers visitation to the CALM managed estate in general. In the short term no on-site fee payment will be implemented as the resources necessary to collect fees is not available. It is intended that over time that will change either through coin-operated pass issuing machines, a ranger presence or through the involvement of private enterprise. Fees charged will be comparable with those elsewhere in the region.

RECOMMENDATION

1. **Continue to assess a visitor fee system for the Site.**

33. VISITOR SAFETY

The objectives are to take all reasonable steps to ensure the safety of visitors to the Site and to provide procedures for responding to emergencies that may occur at the Site.

CALM has a 'duty of care' to users of CALM managed land under the Occupiers Liability Act. The Department encourages safe use of areas under its management.

Along with many other remote and rugged areas of the Kimberley use of the Site has particular risks such as lack of water supplies and very high temperatures. The presence of crocodiles and how to avoid attack is brought to the attention of Site users. The climate, tides and navigation hazards can make boating risky.

Visitors should be encouraged to take all possible steps to ensure their own safety. Because of the vastness of the Site there can be long delays before help is on hand if a problem occurs. The coordination of search and rescue operations is a responsibility of the WA Police Department. Where incidents happen on lands managed by CALM it is often the Department that will organise an initial response. The skills and resources of the Department may also be required to assist Police in dealing with emergencies outside areas managed by CALM. Staff are regularly trained in basic first aid and emergency procedures.

In many ways staff are reliant on people using the Site acting responsibly such as carrying their own emergency equipment and ensuring that other people are made aware of their location and activities.

RECOMMENDATIONS

1. **Undertake an overall risk management assessment of the Site.**

2. **Alert users of the Site to the hazards they might face through both on and off-site information.**

3. **Seek to prevent public access to areas where a serious safety issue is identified.**

2. **Develop emergency management guidelines for the Site.**

3. **Continue to train staff in Incident Control Systems (ICS).**

COMMERCIAL AND OTHER USES

34. COMMERCIAL OVERVIEW

Whilst some commercial use of the Site does occur it is considered that, with the implementation of appropriate management strategies, a variety of opportunities still await development. Directions for use of the Site will focus on developing nature based-tourism programs that highlight the area's conservation values. Along with this Aboriginal people will be encouraged to participate in these programs with primary responsibility for the development of programs interpreting Aboriginal culture.

Commercial fishing activities are regulated under the Fish Resources Management Act and are managed by FWA. With the establishment of the proposed Cambridge Gulf Marine Park the addressing of commercial fishing issues will be through consultation between the two departments and stakeholders.

The harvesting of crocodiles will continue to occur within the Site via a regulation system managed by CALM.

The range of existing and potential tours of the Site was identified by Northern Habitat as follows;

Scenic - A number of opportunities exist for people to enjoy the spectacular scenery of the Site both on ground and from the air.

Nature based - As mentioned previously there are a range of activities from birdwatching through to ecosystem interpretive tours.

Boat - Subject to a clear understanding of the potential hazards associated with some boating activities then canoeing, houseboats and river cruises are possibilities. Restrictions on use may need to be considered.

Bicycle - A Wyndham based operator has previously approached CALM about conducting this type of tour in the proposed National Park.

4WD motorbike - This has been suggested but in keeping with the restrictions placed on the use of off road vehicles then it is unlikely to be approved.

4WD vehicle and coach - This type of tour currently occurs.

Horse riding - In keeping with the approach adopted at a regional level this type of tour would be considered for the Site. There would need to be clear guidelines developed to ensure it was undertaken with minimal impact.

Historic - Interpreting the Non-Aboriginal use of the Site.

Aboriginal culture - Provided that there was no impact on the flora and fauna of the Site then this could include interpretation of culturally important locations and bushtucker gathering activities.

Bushwalking - The Site offers plenty of scope for the development of day and extended tours.

Aircraft - Scenic flights by fixed wing aircraft and helicopter already occur to some extent. These have the potential to impact on wildlife but this could be adequately managed. There is a strong potential for the Site to be linked with CALM's Ibis aerial highway.

Photographic - As discussed previously there are a variety of opportunities for this specialist activity.

Leadership - There is potential at the Site to cater for these courses.

Extended Fishing - There may be an increase in the demand for this activity, particularly with the lifting of restrictions for parts of the Noogoora burr quarantine area.

Hunting - one issue that has been raised is the use of guided hunting to target feral animals and the sustainable hunting of native species such as crocodiles. This activity occurs elsewhere in the world but would require the development of Government policy before it could be considered at the Site.

In addition to this there may well be opportunities in the future for the provision of visitor facilities on a commercial basis.

35. COMMERCIAL CONCESSIONS

The objective is to ensure that all commercial uses of the Site operate under suitable licence or lease arrangements.

All private tour operators conducting commercial tourist activities on conservation areas are required to obtain a licence in accordance with the CALM Amendment Regulations 1993. Tour operations are undertaken under either a general 'Class T' license for general activities or a 'Class E' license which are granted to a restricted number of operators usually entailing some form of exclusive use of an area or activity. Class E licenses are subject to a rigorous selection procedure. There is the potential for 'Class E' licenses to be developed at the Site.

In the event of aerial access being granted to the Site then a fee would be charged. The final cost structure would be arrived at through consultation between the proponent and CALM.

An informal licence is issued when the activity is a guided tour, instructional course or leisure activity of a non-commercial nature and a fee for this licence may not necessarily apply.

Conditions apply to all licences to minimise any impact of an activity or to aid in management of the value being appreciated by the public

RECOMMENDATIONS

1. **Ensure all formally approved commercial concession operations operate under a lease or licence agreement with appropriate conditions with regular review.**

2. **Ensure that commercial concession operations maintain appropriate standards with respect to information, quality of service provided and minimal environmental impact.**

36. COMMERCIAL FISHING

The objective is to allow for ecologically sustainable commercial fisheries in the Site.

Commercial fishing in the Site is managed by FWA through legislative, consultative and enforcement mechanisms. In line with recreational fishing all aspects of management of commercial fishing must be in consultation with the Fisheries Department. The main commercial fishing that occurs within the Site targets barramundi.

With the declaration of the Marine Park a zoning scheme will be applied which would aim to avoid conflict between recreational and commercial fishing and avoid areas of special environmental value. The first area identified as not allowing for commercial fishing is the special conservation zone of the False Mouths of the Ord. Consultation is required between FWA and stakeholders to arrive at the distance to which the False Mouths of the Ord can be approached.

At present there are no aquaculture enterprises operating within the Site and non have, as yet, been proposed. In the event of applications being made then these will be considered on a case by case basis taking into consideration the type of aquaculture, the location, potential for conflict with other users and the environmental impact.

RECOMMENDATIONS

1. **Exclude commercial fishing from special conservation zones.**

2. **Establish appropriate conditions for commercial fishing in natural environment zones.**

3. **Consult with FWA in the licensing of commercial fishing operations including aquaculture.**

37. CROCODILE HARVESTING

The Australian population of the estuarine crocodile, *Crocodylus porosus*, is listed on Appendix II of the Convention on International Trade In Endangered Species of Wild Fauna and Flora (CITES). International trade in the species is regulated in accordance with CITES requirements and the identification of products in trade. The freshwater crocodile, *C. johnstoni*, is also listed on Appendix II of CITES. Management of the two crocodile species in Western Australia is undertaken through the implementation of a published management program.

In line with Government policy the Department facilitates the harvesting of estuarine crocodiles from the Cambridge Gulf and associated river systems. Following the consideration of the population monitoring data, licences may be issued to take a certain number of animals. Under the guidelines for

the issuing of those licences it is a standard condition that no animals may be taken for commercial purposes from conservation reserves and areas adjoining.

In order to avoid confusion over what is meant by 'adjoining', for the Site this is defined as all lands and waters within one kilometre of the existing nature reserve boundaries. This condition will be placed on all licenses issued that may affect the Site.

Estuarine crocodile (Crocodylus porosus). (Photo: Paul Hyndes)

RECOMMENDATIONS

1. **Continue to implement the Department's crocodile management plan.**

2. **Ensure the one kilometre restriction is enforced.**

38. FILMING

The objectives are to ensure that filming activities do not impact upon the Site and that appropriate levels of fees are charged.

The Kimberley region is naturally attractive to individuals and groups wanting to use the visual amenity of the area in filming ventures. This may range from promotional videos of the area's values, specific subject films such as crocodiles, as a setting for a fictional story and advertising of products that may or may not be related to the natural environment. Filming on CALM managed land is viewed as the commercial use of a publicly owned resource and as such fees and conditions apply. This is in keeping with the general approach to commercial activities.

It is recognised that each filming or photography endeavour may be different and in general terms each will be considered on its own merits. Special dispensation can be considered when the final product is of a strictly educational nature or the benefit's gained from the promotion of an area are considered to outweigh financial gain.

RECOMMENDATION

1. **Operate all commercial filming activities within the Site under a licensing system in accordance with FWA and CALM requirements.**

39. ABORIGINAL LIVING AREAS

The objective is to ensure that areas designated for occupation by Aboriginal people within the Site will not detract from the environmental and cultural values of the Site.

For some time there have been discussion between CALM and the legal representatives of an Aboriginal Title Claimant of the Site regarding the establishment of a living area on the Site. Discussions on this matter have occurred on and off for a period of ten years but within the last two the issue has been more actively pursued. In order to grant this request the approval of the National Parks and Nature Conservation Authority is required or a gazetted management plan must be in place. CALM is not opposed to the principle of establishing a living area within the Site. The establishment of living areas in the Purnululu National Park evidences this. At present a living lease application exists for the Goose Hill area.

Much of the present level of frustration on the granting of the living area has been brought about because of a lack of guidelines as to how an application might be assessed. This has at times resulted in heightened expectations of the applicant followed by disappointment.

There has been some discussion as to whether the area selected should be operated under a lease agreement with CALM or that the area should be excised from the proposed National Park. Given the problems of formal excision of an area of land and the greater controls that can be put in place through a lease it is felt that, at least in the first instance, the location should be managed as part of a legal lease.

There is a clear requirement to establish obligatory environmental guidelines prior to the granting of any areas. These should be arrived at in consultation between the proponent and CALM in the first instance for referral to the NPNCA and possibly the Environmental Protection Authority.

The experience gained in the present application process is important in arriving at procedures that treat all applications in a fair and equitable manner. The procedures arrived at can be used for all the CALM managed estate in the Kimberley region. As a matter of guiding principle all matters relating to a living lease application should be considered as proponent driven. Issues which a proponent would need to address in a manner satisfactory to CALM would include a suitable environmental impact assessment, secure location details, definition of traditional links with the location and the resolution of any concerns or conflict with other interest groups or possible applicants.

RECOMMENDATIONS

1. **Seek the policy advice of the NPNCA on the number of living areas that might be accommodated within the site.**

2. **Refer all living lease applications to the NPNCA for their information prior to negotiations with the proponent proceeding.**

3. **Institute an assessment process where the applicant is required to address and resolve all issues of concern.**

4. **Establish a living lease at the Goose Hill location using the process established as a result of recommendation 3.**

40. MINING AND EXPLORATION

The objective is to ensure that all exploration and mining proposals are to be subject to a suitable level of environmental impact assessment.

There has been strong interest in the Cambridge Gulf by mining companies because of the possible presence of alluvial diamonds and some exploration has taken place.

Applications for the granting of mineral exploration leases within the Site have been made in the past. CALM has generally opposed the granting of exploration rights for those parts of the leases that might affect the Site and these objections have been upheld. Equally of concern would be the establishment of mining activity adjacent to the Site having 'downstream effects' and as such all activities would need to be rigorously assessed prior to commencement.

RECOMMENDATIONS

1. **Assess all applications for non-ground disturbing exploration within the Site following currently established guidelines.**

2. **Seek to exclude the Site from all ground disturbing exploration and mining activities. If this is not possible all proposed activities should be subject to a full formal environmental impact assessment.**

41. GRAVEL AND BASIC RAW MATERIALS

The objective is to grant access to basic raw materials only where the road or facility is within the boundaries of the Site or the use of the basic raw materials provides access for the protection and management of the Site. This is dependent on a more environmentally acceptable alternative not being available.

Basic raw materials, including gravel, limestone, sand and rock aggregates are needed for road construction and recreation site developments within reserves. It is preferred that these materials are obtained from outside parks and reserves, or from areas that are already disturbed or which are of lower conservation value. However, transporting gravel and other industrial materials from areas outside reserves increases the construction costs and could lead to the unwanted introduction of weeds and disease.

Gravel and other industrial materials may only be extracted from parks and reserves in accordance with the State Gravel Supply Strategy and NPNCA Policy Statement No A5 on Basic Raw Materials. Extraction is regulated under the Local Government, CALM and Mining Acts.

Some material for road improvement has been taken from an existing quarry within the Site. It is important that the use of existing locations and proposals for future extractions receive, as a minimum, an internal environmental impact assessment.

RECOMMENDATIONS

1. **Undertake environmental impact assessments for all basic raw material use proposals affecting the Site.**

2. **Institute quarantine procedures for all materials brought to the Site in order to prevent the introduction of weeds and disease.**

42. INTERACTION WITH NEARBY LANDS AND WATERS

The objective is to develop complementary management programmes between CALM, landowners and other organisations with responsibilities in the area.

Individuals and organisations with management responsibilities for adjoining lands and water include; pastoral lease holders, freehold title owners, Water Corporation, Water and Rivers Commission, Fisheries Western Australia, Department of Transport and the Shire of Wyndham/East Kimberley.

As has been previously identified in this document there are both problems and opportunities associated with adjoining land uses. In respect to private lands resolution of stock problems is necessary as well as exploring the potential for reciprocal arrangements for management of the Site.

The Fisheries Department has a major role to play with respect to the management of the Site having primary carriage of fisheries legislation. It is important that close liaison is developed between this department and CALM. Equally in the area of water management and environmental issues close consultation needs to be maintained with those agencies with statutory responsibility for the management of the State's water resources.

RECOMMENDATION

1. **Establish a technical group of affected government organisations to discuss issues of mutual interest and resolve any matters of concern. From this group working agreements can be drafted.**

COMMUNITY RELATIONS

43. COMMUNITY INVOLVEMENT AND VOLUNTEERS

The objectives are to develop, encourage and facilitate liaison with the community and involvement in implementing the management plan.

Community involvement is an integral part of CALM's operations. The principal benefits from community involvement are better informed decisions that will have greater public acceptance. There can also be beneficial relationships between CALM and the public through the development of an appreciation for the Department's role, responsibilities, actions and availability of resources.

CALM facilitates support from volunteers working as groups or as individuals. A volunteer may be defined as someone who undertakes work of their own free will, without payment, for the benefit of the community and themselves. Volunteer activities are of value to CALM, not only because the department's work capabilities and skills base are expanded at minimal cost, but also because such activities build communication links and understanding between the Department and the community.

CALM has a formal policy and administrative framework for volunteer activities (Policy No. 32, Volunteers) which includes initiatives to provide more volunteer opportunities, and to provide training to both volunteers and CALM staff. Matters including industrial relations aspects of volunteer activities, workers compensation insurance and public liability are managed by a Perth-based Community Involvement Co-ordinator.

RECOMMENDATIONS

1. **Involve individuals and organisations in helping to manage the Site.**

2. **Develop volunteer programs with suitably qualified staff acting as program coordinators to implement management practices at the Site as needed.**

44. PUBLIC EDUCTION AND INTERPRETATION

The objectives are firstly, to provide visitors with information that will enhance their safety, knowledge, appreciation and enjoyment of the natural and cultural values of the Site. Secondly, to encourage and facilitate the use of the Site by educational groups to add to the knowledge of the area.

An effective information, interpretation and education strategy is essential in achieving the goals and objectives of management of the Site. It informs the public of attractions, facilities and recreational opportunities available and provides an avenue to appreciate and better understand the natural environment. At the same time it fosters appropriate behaviour so that adverse impacts on the environment are minimised.

In general the information process is comprised of the three factors of information - providing details on facilities activities and regulations; interpretation - discussing cultural and natural values; and education - providing detailed materials and programs designed to facilitate learning by target groups.

A range of information, interpretation and education programs will be developed for the Site. It is important that these programs are integrated both across the Site and with the activities of other organisations.

Many people in the community are unaware that conservation reserves exist in the area or that there is an international declaration for the area. There is little understanding of the operation and implications of the Ramsar listing.

RECOMMENDATIONS

1. **Develop and implement a communication plan for the Site.**

2. **Develop a range of interpretation and education programs and facilities that highlight the Site's natural features, cultural heritage and management issues.**

3. **Use the Site to promote the ideals of the Ramsar convention.**

4. **Encourage the use of the Site by educational groups.**

RESEARCH AND MONITORING

45. RESEARCH AND MONITORING

The objective is to plan and implement an integrated program of research and monitoring of natural environments and visitor use.

Research and monitoring are essential components of effective management and provide a scientific basis for management.

These two aspects need to be oriented to both natural and social environments as illustrated in the guidelines for implementation of the wise use concept of the Ramsar Convention.

At the same time resource opportunities for research and monitoring are severely limited. Research in the Kimberley is expensive because of the remote nature of the area, the rugged landscapes and often trying climatic conditions.

One of the primary research requirements of the Site continues to be the documentation of the natural and cultural resources of the Site. It is from that point that research and monitoring of management activities gains relevance because of having a baseline from which to work.

CALM has undertaken a limited amount of biogeographical work in the past and as part of the preparation of this report. The Department is also currently involved with technical working groups seeking funds to prepare a water allocation plan for the Ord River area which will address both quantity and quality of water and its requirements with respect to protecting essential environments of the Ord. It is hoped that during this process a better understanding of the hydrological processes at the Site and impacting upon it will be gained.

Research projects and monitoring programs can benefit from involving volunteers, educational institutions and individual researchers as this can potentially reduce research and monitoring costs, and can help provide information to the broader community.

RECOMMENDATIONS

1. **Prepare a working plan that identifies areas of priority for research and monitoring. In the preparation of this seek the advice of CALM experts and external expertise.**

2. **Encourage volunteers, educational institutions and other organisations to participate in research and monitoring projects.**

3. **Ensure that research activities do not detrimentally impact on the Site's values.**

IMPLEMENTATION

46. RESERVE DEDICATION

The objective is to ensure that land tenure within the Site is appropriate and that changes to tenure are resolved quickly.

The adoption of appropriate land tenure for the Site is seen of the utmost importance. Of concern is that implementation of tenure recommendations will become bogged down in a long consultative process whereby the original intent becomes changed. With the implementation of correct land tenures management policies for the Site can be more readily brought to fruition.

RECOMMENDATION

1. **Establish a working group to drive the reserve dedication process within an allotted time frame.**

47. STAFFING

The objectives are to establish an appropriate level of staffing of the Site, to provide opportunities for Aboriginal people to be employed in the management of the Site and ensure that all staff are adequately trained.

It is recognised that the commitment of staff available to work on caring for the Site is below the desirable level. However the available resources and other priorities operating at the District and Regional level determine this.

At present when patrols need to be undertaken or work is to be done staff travel on a daily basis from the town of Kununurra some 100 kilometres distant. It would be more appropriate, given the importance of this location, that at least one staff member be based in the town of Wyndham. This would be seen as a positive move by the local community and improve the interaction with the users of the Site. This would also facilitate the development of positive interaction between traditional owners and CALM.

The person occupying this ranger position would need to be trained in, amongst other things, wetland management and Aboriginal issues. This person would have the responsibility for the day to day management of the Site and for programs facilitating the involvement of Aboriginal people in the management of the Site.

An important role of the position is to access all possible sources of funds to implement any recommendations adopted. Apart from the allocation of district funds there are a range of grants which could be accessed along with the potential for developing joint enterprises with the private sector. Sponsorship could also be considered.

RECOMMENDATION

1. **Establish a ranger position for the Site based in the town of Wyndham.**

2. **Develop a program to explore employment opportunities for Aboriginal people.**

3. **Ensure that staff are adequately trained.**

48. WORKS PROGRAMMING

The objective is to ensure that an annual work program is adopted from the recommendations in this report.

It is the responsibility of the East Kimberley District to implement adopted recommendations. From this document specific management actions will be defined and a work program drawn up. The process involved will be to clearly define what priority a particular action should have and nominate the person responsible for its action. This program will be subject to regular review during implementation with full annual reviews.

RECOMMENDATION

1. **Establish a works program group chaired by the District Manager (East Kimberley).**

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APPENDIX 1 - WORK REQUIREMENTS FOR CONTRACT WITH ENVIRONMENT AUSTRALIA

The Consultant shall prepare a management report for the Lower Ord Ramsar site. The Consultant shall ensure that as far as possible the plan is consistent with the "Guidelines on Management Planning" and "Guidelines on Wise Use" for Ramsar sites and the recommendation regarding the essential character of wetlands and the need for zonation within wetland reserves. These concepts were adopted by the Ramsar Convention and described in the Annex to Resolution C.5.7, Recommendation C.4.10 and Recommendation C.5.3 of the Fifth meeting of Contracting Parties.

Collect, collate and summarise existing data and information relevant to the management of the Site from any available sources. Identify issues relating to the management of the Site.

Undertake consultation with key stakeholders and interest groups, regarding the study and the Ramsar Convention.

Subject to the successful progress in the preparation of the report then it can be made available to the public.

The report must be submitted to the Wetlands, Waterways and Waterbirds Unit of the Environment Australia Biodiversity Group for comment prior to its release for public comment.

In time the report will form the basis of a draft management plan for the Site to be formally progressed into a final gazetted management plan under CALM's legislation.

APPENDIX 2 - GUIDELINES FOR IMPLEMENTATION OF THE WISE USE CONCEPT OF THE RAMSAR CONVENTION.

Introduction
Article 3.1 of the Convention states that the Contracting Parties *'shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory.'*

The third meeting of the Conference of the Contracting Parties in Regina, Canada, from 27 May to 5 June 1987, adopted the following definition of wise use of wetlands:

'The wise use of wetlands is their sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem.'

Sustainable utilisation is defined as 'human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations'.

Natural properties of the ecosystem are defined as 'those physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them'.

The wise use provisions apply to all wetlands and their support systems within the territory of a Contracting Party, both those wetlands designated for the List, and all other wetlands. The concept of wise use seeks both the formulation and implementation of general wetland policies, and wise use of specific wetlands. These activities are integral parts of sustainable development.

It is desirable in the long term that all Contracting Parties should have comprehensive national wetland policies, formulated in whatever manner is appropriate to their national institutions. However, as recognised by the report of the Workshop on Wise Use of the Regina Meeting, elaboration of national wetland policies will bee a long term process, and immediate action should be taken to stimulate wise use. The guidelines presented below therefore include both elements for comprehensive national wetland policies and priority actions.

Establishment of National Wetland Policies
National wetland policies should as far as possible address all problems and activities related to wetlands within a national context. These may be grouped in different sections:

1. *Actions to improve institutional and organisational arrangements, including:*

   (a) establishment of institutional arrangements which will allow those concerned to identify how wetland conservation can be achieved, and how wetland priorities can be fully integrated into the planning process; and
   (b) establishment of mechanisms and procedures for incorporating an integrated multi-disciplinary approach into planning and execution of projects concerning wetlands and their support systems, in order to secure wetland conservation and sustainable development.

2. *Actions to address legislation and government policies, including:*

   (a) review of existing legislation and policies (including subsidies and incentives) which affect wetland conservation;
   (b) application, where appropriate, of existing legislation and policies of importance for the conservation of wetlands;
   (c) adoption, as required, of new legislation and policies; and
   (d) use of development funds for projects which permit conservation and sustainable utilisation of wetland resources.

3. *Actions to increase knowledge and awareness of wetlands and their values, including:*

   (a) interchange of experience and information on wetland policy, conservation and wise use between countries preparing and/or implementing national wetland policies, or pursuing wetland conservation;
   (b) increasing the awareness and understanding of decision-makers and the public of the full benefits and values, within the terms of wise use, of wetlands. Among these benefits and values, which can occur on or off the wetland itself, are:
   - sediment and erosion control,
   - flood control,
   - maintenance of water quality and abatement of pollution,
   - maintenance of surface and underground water supply,
   - support for fisheries, grazing and agriculture,
   - outdoor recreation and education for human society,
   - provision of habitat for wildlife, especially waterfowl, and
   - contribution to climatic stability:

   (c) review of traditional techniques of wise use, and elaboration of pilot projects which demonstrate wise use of representative wetland types; and
   (d) training of appropriate staff in the disciplines which will assist in implementation of wetland conservation action and policies.

4. *Actions to review the status of, and identify priorities for, all wetlands in a national context, including:*

(a) execution of a national inventory of wetlands including classification of the sites;
(b) identification and evaluation of the benefits and values of each site (see b above);
(c) definition of the conservation and management priorities for each site, in accordance with the needs and conditions of each Contracting Party.

5. *Actions to address problems at particular wetland sites, including:*

(a) integration from the outset of environmental considerations in planning of projects which might affect the wetland (including full assessment of their environmental impact before approval, continuing evaluation during their execution, and full implementation of necessary environmental measures). The planning, assessment and evaluation should cover projects upstream of the wetland, those in the wetland itself, and other projects which may affect the wetland, and should pay particular attention to maintaining the benefits and values listed in 3b above;
(b) regulated utilisation of the natural elements of wetland systems such that they are not over-exploited;
(c) establishment, implementation and, as necessary, periodic revision of management plans which involve local people and take account of their requirements;
(d) designation for the Ramsar List of wetlands identified as being of international importance;
(e) establishment of nature reserves at wetlands, whether or not they are included in the List; and
(f) serious consideration of restoration of wetlands whose benefits and values have been diminished or degraded.

Priority actions at national level

Whether or not national wetland policies are being prepared, several actions should receive immediate attention at the national level in order to facilitate the preparation of national wetland policies, and to avoid delay in practical implementation of wetland conservation and wise use. Contracting Parties will naturally select actions, according to their own national priorities and requirements, from those listed above under 'Establishment of national wetland policies'. They may wish to carry on institutional, legislative or educational measures (such as those listed under sections 1, 2,3 above) and at the same time initiate inventories of scientific work (such as those listed under section 4); in this way the institutional, legislative and educational instruments will be available in time to deal with scientific results. Equally, Contracting Parties wishing to promote wise use of wetlands without waiting until national wetland policies have been developed, may, based on their situation and needs, wish to:

(i) identify the issues which require the most urgent attention;
(ii) take action on one or more of these issues;
(iii) identify the wetland sites which require the most urgent action; and
(iv) take action at one or more of these wetlands, along the lines set out under 'Priority actions at particular wetland sites' below.

Priority actions at particular wetland sites

As at the national level, immediate action may be required in order to avoid destruction or degradation of important wetland values at particular wetland sites. These actions will undoubtedly include some elements listed in section 5 above, and Contracting Parties will select those appropriate to their own national priorities and requirements.

Whenever planning is initiated for projects which might affect important wetlands, the following actions should be taken in order to promote wise use of the wetland:

(i) Integration from the outset of environmental considerations in planning of projects which might affect wetlands (including full assessment of their environmental impact before approval);
(ii) continuing evaluation during their execution; and
(iii) full implementation of necessary environmental measures. The planning, assessment and evaluation should cover projects upstream of the wetland, those in the wetland itself, and other projects which may affect the wetland, and should pay particular attention to maintaining the benefits and values listed in 3b above.

ADDITIONAL GUIDANCE FOR THE IMPLEMENTATION OF THE WISE USE CONCEPT

Introduction

In the early years of the Convention, the wise use provision proved to be difficult to apply. Most attention was focused upon the designation of sites onto the Ramsar List in line with global priorities to secure the conservation of internationally important areas. Over time, as the essential need to integrate conservation and development has become recognised throughout the world, the Contracting Parties to the Ramsar Convention have made wise use a central theme for the functioning of the Convention.

The Third Meeting of the Conference of the Contracting Parties also decided to establish a Working Group on Criteria and Wise Use (Recommendation 3.1), charged inter alia with the development of draft guidelines for the implementation of the wise use concept. These guidelines were adopted by the Fourth Meeting of the Conference of the Contracting Parties at Montreux, Switzerland, in 1990 (Recommendation 4.10).

In addition to adopting the guidelines, the Contracting Parties requested the Wise Use Working Group to undertake additional tasks including *'fostering further development and refinement of the guidelines to apply to a diversity of wetland types, regions, resources and uses ..'*

In 1990, the Ramsar Convention Bureau initiated the coordination of a three-year project on the wise use of wetlands funded by the Government of The Netherlands. The Wise Use Working Group was also requested by the Montreux meeting to oversee the implementation of this project, which comprises a series of case studies demonstrating applications of the wise use concept in different ecological and socio-economic situation throughout the world.

Several basic conclusions can be drawn from the case studies considered under this project:

1. Social and economic factors are the main reasons for wetland loss and therefore need to be of central concern in wise use programs.

2. Special attention needs to be given to the local populations who will be the first to benefit from improved management of wetland sites. The values that indigenous people can bring to all aspects of wise use need special recognition.

3. Although one agency may be responsible for coordinating national action to conserve wetlands, other public and private institutions have expertise which is of importance for effective long-term wetland management. Wise use programs should seek to involve and, where appropriate, work through these partners.

4. Specific site projects may often demonstrate the need for more general institutional requirements for the wise use of wetlands.

5. Where wetlands form an integral part of a wider coastal zone or catchment, wise use must also take into account the problems of the surrounding coastal zone or catchment.

6. While comprehensive understanding of the ecological constraints of a wetland system should be sought, activities affecting wetlands need to be governed by the 'precautionary principle' when such knowledge is not available. In other words, if the impact of specific actions is not clearly understood, then these actions should be prohibited even if there is insufficient evidence to prove a direct link between the activities and resulting wetland degradation.

In view of the lessons learned from the case studies and further analysis by the Wise Use Working Group, additional guidance is proposed to the Contracting Parties to the Ramsar Convention for the application of the wise use provision of the Convention. This guidance must be applied in the light of other national and international obligations for nature conservation, including the conservation of biodiversity, climate change and pollution control measures, as adopted by the UN Conference on Environment and Development (UNCED, Rio, 1992) and in other international fora.

The 1992 Convention on Biological Diversity is of special relevance for the conservation and wise use of wetlands, and the preparation of national biodiversity strategies, action plans and programs as required under the Convention on Biological Diversity may provide good opportunities to include wetland conservation and wise use on a wider scale.

The following point of guidance address the main elements for the application of the wise use concept. They are meant to amplify the Wise Use Guidelines by providing further assistance to those officials responsible for the application of the Ramsar Convention. As the wise use concept is central to all aspects of the convention, this guidance is also relevant for action to be taken under several of the obligations of the convention, including international cooperation, reserve creation and the conservation of listed sites.

1. ESTABLISHMENT OF NATIONAL WETLAND POLICIES

1.1 Institutional and organisational arrangements

1. The main message given by the wise use guidelines is that the wise use of wetlands requires a coordinated approach on a national scale; this necessitates planning , which can be in the framework of wetland policies, conservation policies or policies with a broader scope (environment, application of water laws, or resource planning); institutional and administrative arrangements should be made.

   Obstacles to the development of national wetland policies may however include:
   - a lack of institutional mechanisms designed to encourage the involvement of both public and private sectors of the society, at regional or local level as well as at national level;
   - insufficient coordination among public agencies;
   - policies that discourage conservation and wise use objectives;
   - inadequate policy research programs; and lack of cooperative arrangements with neighbouring countries for joint management of shared wetlands or wetland species.

2. There are many different ways in which countries may attempt to overcome these obstacles.

   A few examples can be given:

   - At international level, countries may wish to establish cross-boundary water commissions or other coordinating boards to avoid action in one country adversely affecting wetlands in another country and to guarantee that water quality and quantity are maintained in such a way as to preserve the functional values of wetlands. In addition, countries that are range states for migratory species dependent on wetlands may wish to establish coordinated conservation programs for those species and set common guidelines on development aid in the field of conservation and wise use of wetlands.

- At national level, countries might create inter-ministerial boards or commissions, national wetland committees or other bodies to oversee coordination and cooperation for wetland management. These bodies should include wide representation (based on a catchment approach) from the authorities with responsibility for wetlands and might include government agencies dealing with environment, nature conservation, agriculture, forestry, aquaculture, hunting, fishing, shipping, tourism, mining, industry, health, development assistance, and other relevant subjects; they should also include interested governmental and non-governmental conservation organisations.

- At local level, countries might establish procedures to guarantee that local populations are involved in the decision-making process related to wetland use and to provide local populations with sufficient knowledge of planned activities to assure their meaningful participation in the decision -making process.

  There should be established working groups or advisory boards representing users, NGOs and local authorities.

1.2 **Policy/Legislation and other appropriate measures**

Governments can use several instruments to promote policy such as legislative tools; five different mechanisms are necessary in order to implement wise use in practice:

1. Periodical review of existing legislation to ensure that it is generally compatible with the wise use obligation, and make adjustments if necessary; this applies to particular legislation regarding mandatory wetland destruction or to that which encourages such destruction through tax benefits and subsidies.

2. General wise use legislation for wetlands should consider the following:

- inclusion of wetlands in the zones of land-use plans which enjoy the highest degree of protection;
- institution of a permit system for activities affecting wetlands. This should include a threshold under which a permit would not be required, as well as a general exemption for activities which , because of their nature, are deemed to be compatible with any performance obligation;
- execution of an environmental impact assessment in order to determine if a proposed project is compatible with the general requirements of wise use and the maintenance of the ecological character of the wetlands concerned.
- special rules relating to the contents of an environmental impact assessment will be needed in order to ensure that no important factor specifically related to wetlands is overlooked. The cumulative effects of separate projects should also be taken into consideration. Environmental impact assessments should also be prepared not only for activities and projects in the wetlands concerned but also for activities outside these areas when they may have significant effect on wetlands. Environmental impact assessments should also cover the long-term effects of proposed activities, projects, plans and programs as well as interactions between all components of the water system at the catchment level.
- monitoring of the effects of authorised actions and carrying out unbiased environmental audits of these actions when they have been completed;
- institution of a system of management agreements between relevant government agencies, landowners and landusers to provide for positive management measures by the latter when this is required for the maintenance of the ecosystem.
- provision of financial incentives including taxes and subsidies to encourage activities which are compatible with the maintenance of wetlands, and which promote and contribute to their conservation. Financial tax incentives should not permit activities which have detrimental effects upon wetlands;
- obligation to refrain from introducing alien species, and to take preventive measures to minimise the risk of accidental introductions; existing guidelines for these purposes need to be taken into consideration;
- obligation to make all appropriate efforts to eradicate introduced and translocated species which may cause significant ecological disturbances in water systems and, in addition, provide for the possibility of claiming civil damages from those responsible for unlawful introductions; and
- right of appeal by private organisations against governmental agency decisions which might violate obligations laid down by law.

3. Legislation for the conservation and wise use of specific wetland sites (e.g. Ramsar sites, ecologically sensitive areas, areas with a high degree of biodiversity, sites containing endemic species, wetland nature reserves).

Such legislation will generally apply to large wetland areas where human activities compatible with the conservation of the ecosystem should be maintained, encouraged and developed for the benefit of local populations. This legislation will be in addition to those provisions laid down in the previous paragraph in respect of wetlands in general. It should consider the following points:

- definition of a special legal status for large wetland areas allowing for the control of any potentially damaging activity, including agriculture, forestry, tourism, fishing, hunting, aquaculture;
- division of those wetlands into different zones with particular regulations applying to each type of zone; these regulations would be defined to ensure that the carrying capacity of the area concerned is not exceeded in respect of each activity authorised;
- encouragement of traditional and other ecological and sustainable activities in these areas through incentives and advice; establishment of a management system in each area which should have legal support and of a management body to oversee the implementation and to ensure that regulations are observed;
- association of populations living in or close to the area with its management, through appropriate representation; scientific institutions and conservation NGOs should also be associated with management, at least in an advisory capacity;

- application of special environmental impact assessment rules to these areas in view of their particular environmental sensitivity; and
- submission of activities which may have adverse affects on the area, to environmental impact assessment or to other forms of evaluation. Such activities should only be authorised when the evaluation has shown that no significant damage to the area will occur.

4. Review of division of jurisdiction among government agencies.

This issue, which concerns both territorial and functional matters, often constitutes a considerable obstacle to integrated management of wetlands since it needs to be based on a catchment-wide approach. A review of legal and administrative constraints which prevent management at the correct scale (e.g. catchment-wide management) should be undertaken with a view to developing appropriate solutions to jurisdictional problems. Particular attention should be paid to the need to manage coastal wetlands as single units, irrespective of the usual division of jurisdiction between land and sea.

5. Development of cooperative arrangements for water systems shared between two or more countries to achieve wise use.

This will entail the conclusion of agreements for the conservation, management and wise use of such systems as required by Article 5 of the Convention. As relevant, elements of the present guidance should be used in the development of these agreements,. Furthermore, such actions need to be pursued in coordination with or through other existing treaties such as the 1992 Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals and the 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context.

2. KNOWLEDGE OF WETLANDS AND THEIR VALUES

In order to manage wetlands, it is necessary to have adequate knowledge of their functioning. To promote and apply the wise use of wetlands, inventory, research, monitoring and training activities should be undertaken.

The values of wetlands need to be much more widely promoted in educational programs and to the general public. Special attention should be devoted to targeting audiences by taking geographical, economic and political considerations into account. Different mechanisms should be used to approach each target audience.

Some countries have had considerable experience in the application of the wise use concept. Important sources of information are the case studies on wise use published by the Ramsar Convention Bureau. The Bureau, with the assistance of its partners, could be used as a focal point for information pertaining to wise use implementation.

2.1 Inventory

Inventories can produce information in the form of maps, check-lists, regional analyses, narratives of ecological or cultural resources. However, they need not be elaborate to be useful. The goals of an inventory may vary so that defining goals will help to determine the methods and extent of each inventory.

1. Some goals for an inventory may include:

- identification of resources (ecological, cultural and traditional);
- determination of these resources in geographic or socio-economic context;
- identification of known uses of wetlands;
- identification of priorities for research (improved knowledge base), management and protection;
- identification of present and potential problems;
- provision of a tool for future planning and monitoring.

A wetland inventory should not be seen as a final document , but rather as a continuing process. It can be a long term commitment for both collecting and updating information. Inventories may include input from various disciplines, such as ecology, limnology, hydrology, social sciences, agronomy, wildlife management, fisheries, as well as input from policy makers.

2. Possible applications of an inventory may include:

- base-line information for land use and management planning;
- base-line for future monitoring;
- information for impact assessments;
- availability of data through publication of regional, national or local inventories, such as those carried out for Africa, Asia, the Neotropics and Oceania;
- provision of quantifiable data for future management application;
- tools for recognising diminishing or threatened types of wetlands;
- drawing associations between wetland types/sizes with socio-cultural uses and needs to help develop standardised approaches for these classifications; and
- setting of priority actions whether for research, policy or management.

2.2 Monitoring

Monitoring is the process of measuring change in ecological character in any wetland over a period of time.

1. The following points should be observed in any monitoring effort:

- the need to produce objective information;
- the need to follow up any activity taking place in a wetland;
- the knowledge gained from a specific project or activity, but also from activities taking place in similar wetlands.

Monitoring can be carried out at different levels of intensity, depending on available funding and/or technology. It should be noted that monitoring does not automatically require sophisticated technology or high investment.

2. The following approaches might be used:

- changes in wetland area or catchment utilisation can be monitored by remote sensing or field observations;
- ecological character and productivity can be monitored using available information or quantitative sampling techniques;
- changes in social values and uses may be monitored by participatory observation.

2.3 Research

Research can be anything that expands upon basic knowledge. Particular areas that may deserve attention are both identification and quantification of wetland values, sustainability of wetland use, and landscape functioning and modification. Contracting Parties should take positive steps to acquire and, when possible, share any knowledge developed on wetland values, functions and uses.

1. Priority research actions may include:

- the development of a vocabulary of terms, understandable world-wide;
- the development of means to emphasise landscape or catchment approaches in management;
- the development of techniques for monitoring ecological change and forecasting the evolutions of wetland characteristics under the pressure of present uses;
- the improvement of the knowledge base of wetland functions and values, especially the socio-economic values of wetlands, in order to learn about the traditional management techniques of the local populations and their needs;
- the improvement of the knowledge of the scientific classification of wetlands micro-organisms, plants and animals, and the lodging of study specimens with museums or other appropriate institutions;
- the development of methodologies to evaluate sustainable practices;
- the provision of the data on which alternative/wise use technologies can be developed;
- the development of techniques for restoration of wetlands.

2. The above-mentioned research questions represent an indication of needs. In practice, it can be expected that the number of specific research questions to be addressed will increase as progress is made in natural resource programs. Research priorities must be based on management needs.

2.4 Training

1. Attention should be devoted to four aspects of training:

- the definition of training needs;
- the differing needs between regions countries and sites. Expertise may not always be available and some key aspects of wise use may not be covered in the existing program. These key aspects must be considered as priorities for further training activities. Therefore, the first step in establishing a training program should be to carry out a training needs analysis;
- the target audience. There is a huge difference between educational and awareness programs and professional training. Generally, it can be said that while the general public and senior policy makers should be made aware of ecological, cultural, social and economical values of wetland ecosystems, training should be provided for those who are directly involved in administering and practising wetland management. training sessions should focus on the most up-to-date methods for implementing wise use. Such sessions need also to be organised for judicial authorities and other law enforcement officials;
- the subject. Training should furnish wetland managers and administrators with the professional knowledge needed for establishing, defending, and implementing the concept of wise use of wetlands.

2. Three broad types of training appear to be of particular relevance for wetland professionals:

- courses on integrated management. Training should seek to bring together specialists from different fields to generate a common understanding and a common approach to wetland management and planning;
- courses on wetland management techniques. Training should seek to provide the participants with the most up-to-date and effective techniques of inventory, planning, monitoring, environmental impact assessment and restoration;

- courses for field staff. wardens and rangers need to have a very basic understanding of the concept of wise use and to be able to deal with day-to-day situations such as enforcement of legislation and public awareness. The development of training manuals and other resource materials should be an important long-term goal for any training program.

3. Training methods and resources:

Training activities and transfer of appropriate knowledge should be an integrated component of all wise use projects. Those activities should be as catalytic as possible, and seek to train potential trainers at regional level who can then pass on their expertise to lower levels, and involve the cooperation of governmental and non-governmental organisations, using local resources and institutions whenever possible.

2.5 Education and public awareness

Education and public awareness (EPA) are fundamentally different from the training required by professional staff in order to manage wetlands wisely. Education is the deeper and longer-term process of change in individuals, and their development of longer-term skills and values; awareness is an individual's state of knowledge, which often precedes and stimulates more interest, and leads to further learning and action.

The values of wetlands have not yet been communicated effectively to the public at large through EPA programs. Most people do not know what wetlands are and, even if they do, they tend to see them as wastelands, which do not generate the public support that has been generated for tropical forests. Improving EPA for wetlands is fundamental to achieving wise use. The following activities are required:

- definition of the target audiences. Awareness programs should be designed for management authorities, landowners, local government officials, communities depending on wetland resources for their livelihood, and the general public.
- market research. This should identify the most appropriate techniques for increasing awareness of the values of wetlands in different regions of the world.
- EPA campaigns. EPA will only work though a bottom-up approach. However, a great deal could be achieved through globally or nationally coordinated campaigns, which would enable sharing of materials and expertise, as well as generation the necessary momentum to raise the global profile of wetlands.

3. ACTION AT PARTICULAR WETLAND SITES

3.1 Ecological aspects

Wetland management should be an integrated process, taking into account the criteria of time and space. It needs to incorporate long term sustainable goals. It also needs to take into account the catchment approach. As an integrated process, it needs to incorporate different uses and activities that are compatible with sustainability.

This management also needs to incorporate an inter-disciplinary approach that reflects the wide variety of human endeavours, drawing inter alia upon principles of biology, economics, policy and social sciences. In many cases, it also needs to respond to global concerns, especially as they relate to shared species, shared water systems, and to the issue of global change.

3.2 Human activities

In order to achieve wise use of wetlands, it is necessary to attain a balance that ensures the maintenance of all wetland types through activities that can range from strict protection all the way to active intervention, including restoration.

Wise use activities therefore can be varied in nature, ranging from very little or no resource exploitation, to active resource exploitation as long as it is sustainable. It must be recognised, however, that there are very few wetlands not currently being utilised by local populations in some way.

Wetland management should be adapted to specific local circumstances, sensitive to local cultures and respectful of traditional uses. Management therefore is not a universal concept that can be broadly applied; rather, it needs to be adapted to suit local conditions.

3.3 Integrated management planning

Wetland management may be implemented by the development of management plans or strategies for a specific area or region. Workshop C of the Kushiro Conference reviewed draft 'Guidelines on management planning for Ramsar sites and other wetlands', later adopted in plenary session (see Annex to Resolution RES. C.5.7.).

these guidelines emphasise that management planning applies not just to wetland reserves but to all wetlands, and that it is a process subject to constant review and revision. Management plan should therefore be regarded as flexible, dynamic documents.

1. In general, a management plan is organised as a four-part unit:

- Description (this provides the factual basis on which management decisions can be taken, and may be revised in the light of improved knowledge of a site);
- Recognition of the past modifications of the sites and of the possible threats;
- Evaluation and objectives (from the description, the goals of management can be defined, in terms of both long term objectives and of immediate operational objectives for the short term);

- Action plan (definition of work to be done in order to achieve the objectives; activities to be considered include: habitat management ; species management; usage; access; education, interpretation and communication; and research).

Monitoring is an integral part of the planning process. Annual and longer term reviews of the plan need to be undertaken, and may lead to amendment of the description, objectives and action plan.

2. A management authority charged with the implementation of the management process should be appointed; this may be particularly relevant in large wetlands where planning must take account of all interests, uses and pressures. Strong cooperation and participation from governmental and non-governmental agencies, as well as from local people, needs to be achieved.

3. When appropriate, management plans should incorporate both traditional and modern technologies. The plan must reflect the overall carrying capacity of the system. Implementation should optimise the sustainable use of existing resources.

Wetland management needs to be incorporated into overall national policies, as already indicated in the Montreux guidelines. These policies should reflect the best technical information available. Specific technical information can be obtained through the Ramsar Bureau and its partner organisations.

3.4 Technical issues

For many regions of the world, wise use is not a new concept. Humans have been building civilisations around wetlands for thousands of years, and have developed technologies of utilisation.

Many of these technologies are sustainable, and should therefore be identified, studied and promoted as a matter of urgency. In the cases where these technologies are not sustainable, they should be refined and adapted to optimise their sustainability.

APPENDIX 3 – LIST OF FLORA RECORDED FROM THE SITE

The following list is compiled from the records of the WA Herbarium and collections of regional and district staff. The asterisk identifies introduced species. The note W.A. Herb. indicates that voucher specimens are held at the Western Australian Herbarium.

The earliest records from the WA Herbarium date back to 1906. During August to November of that year W. V. Fitzgerald collected from a number of locations within the vicinity of Wyndham. Nine of his collections give the location as Goose Hill, E Kimberley. In 1921 and 1922 D McVicar made a number of collections several of which were in participation with C. A. Gardner. C. A. Gardner also undertook collections in the mid 1940's and in 1951.

Further work is required on the inclusion of *Terminalia bursarina* into *T. canescens*. *T. bursarina* is found in the bed of creeklines where it is often flooded whereas *T. canescens* occupies a far different position in the landscape with it being found in higher country often in skeletal soils. Whilst it also occupies sites which are prone to water ponding in the wet season the conditions it must tolerate are different to *T. bursarina.*

Sorghum australiense is mentioned in 'A directory of Important Wetlands in Australia' though it does not appear in the primary publication used in compiling this list - 'Flora of the Kimberley Region'.

Anitgonon spp. was recorded by Chris Done at Parry Creek on 13 February 1997 adjacent to the old police hole track causeway. The plants have been removed and the situation will be monitored.

Psilotaceae	*Psilotum nudum*	**Skeleton Fork Fern**	W.A. Herb.
Selaginellaceae	*Selaginella ciliaris*		W.A. Herb.
Platyzomataceae	*Platyzoma microphyllum*	**Braid Fern**	W.A. Herb.
Adiantaceae	*Cheilanthes brownii*	**Woolly Cloak Fern**	W.A. Herb. Previously *C. vellea*
	C. pumilio		W.A. Herb.
Pteridaceae	*Acrostichum speciosum*	**Mangrove Fern**	
Thelypteridaceae	*Cyclosorus interruptus*		W.A. Herb.
Marsileaceae	*Marsilea spp.*		
	M. mutica	**Nardoo**	W.A. Herb.
Lauraceae	*Cassytha spp.*		
	C. filiformis	**Dodder Laurel**	
Hernandiaceae	*Gyrocarpus americanus*	**Helicopter Tree**	W.A. Herb.
Nymphaeaceae	*Nymphaea gigantea*	**Giant Waterlily**	W.A. Herb.

Ceratophylaceae			
	Ceratophyllum demersum	**Hornwort**	W.A. Herb.
Menispermaceae			
	Tinospora smilacina	**Snakevine**	W.A. Herb.
Ulmaceae			
	Celtis philippensis		
Moraceae			
	Fatoua pilosa		
	Ficus coronulata	**Peach-leaf Fig, Crown Fig**	
	F. leucotricha	**Rock Fig**	Subspecies *sessilis* is listed as priority 3
	F. opposita	**Sandpaper Fig**	W.A. Herb.
	F. platypoda	**Rock Fig**	
	F. scobina	**Sandpaper Fig**	W.A. Herb.
	F. virens	**Banyan**	W.A. Herb.
Urticaceae			
	Laportea interrupta		
Nyctaginaceae			
	Boerhavia dominii		
	B. paludosa		
Chenopodiaceae			
	Chenopodium auricomum	**Swamp Bluebush**	W.A. Herb.
	Halosarcia indica	**Samphire**	W.A. Herb.
	*Salsola kali**	**Prickly Saltwort, Roly Poly**	
	Tecticornia verrucosa	**Samphire**	W.A. Herb.
Amaranthaceae			
	Achyranthes aspera	**Chaff Flower**	W.A. Herb.
	*Aerva javanica**	**Kapok Bush**	W.A. Herb.
	Alternanthera nodiflora	**Common Joyweed**	W.A. Herb.
	Amaranthus interruptus	**Native Amaranth**	
	A. pallidiflorus		W.A. Herb.
	Gomphrena spp.		
	G. brachystylis		W.A. Herb.
	G. canescens	**Batchelors Buttons**	W.A. Herb.
	G. conica		W.A. Herb.
	Hemichroa diandra		
	Ptilotus conicus		
	P. exaltatus	**Tall Mulla Mulla**	W.A. Herb.
	P. polystachyus		W.A. Herb.
Portulacaceae			
	Calandrinia strophiolata		

Caryophyllaceae			
	Polycarpaea spp.		
	P. arida		
Plumbaginaceae			
	Aegialitis annulata	**Club Mangrove**	W.A. Herb.
	Plumbago zeylanica		W.A. Herb.
Tiliaceae			
	Corchorus aestuans		W.A. Herb.
	*C. olitorius**	**Jute**	W.A. Herb.
	C. sidoides		W.A. Herb.
	C. tridens		W.A. Herb.
	Grewia breviflora		
	G. retusifolia		
	Triumfetta plumigera		W.A. Herb.
Sterculiaceae			
	Brachychiton spp.		
	B. diversifolius	**Northern Kurrajong**	
	B. fitzgeraldianus		
	B. incanus		Priority 3
	B. viscidulus		W.A. Herb. Previously *Sterculia viscidula*
	Melochia corchorifolia		W.A. Herb.
	Sterculia holtzei		W.A. Herb.
	Waltheria indica		W.A. Herb.
Bombacaceae			
	Adansonia gregorii	**Baobab, Boab**	W.A. Herb.
	Camptostemon shultzii	**Kapok Mangrove**	
Malvaceae			
	Abutilon indicum	**Indian Lantern Flower**	
	Gossypium pilosum		Priority 2
	Hibiscus coatesii		W.A. Herb.
	H. leptocladus		W.A. Herb. Previously *H. microchlaenus*
	H. meraukensis	**Merauke Hibiscus**	W.A. Herb.
	Urena lobata	**Urena Burr, Pinkburr**	W.A. Herb.
Lecythidaceae			
	Barringtonia acutangula	**Freshwater Mangrove**	W.A. Herb.
	Planchonia careya	**Cocky Apple, Mangaloo**	W.A. Herb. Previously *P. australis*
Droseraceae			
	Drosera ordensis		W.A. Herb. Not in 'Flora of the Kimberley', Nuytsia Vol 9, No 3, 1993

Bixaceae	*Cochlospermum fraseri*	**Kapok Tree, Cotton Tree**	W.A. Herb.
Violaceae	*Hybanthus aurantiacus*		W.A. Herb.
Passifloraceae	*Passiflora foetida**	**Stinking Passion Flower, Wild Passionfruit**	W.A. Herb.
Cucurbitaceae	*Cucumis melo*	**Ulcardo Melon**	W.A. Herb.
	Diplocyclos palmatus	**Native Bryony**	W.A. Herb.
	Mukia maderaspatana		W.A. Herb.
	Trichosanthes cucumerina		W.A. Herb.
Capparaceae	*Capparis jacobsii*		W.A. Herb.Previously *C. lucida*
	C. cleomoides		W.A. Herb.
	C. tetrandra	**Mustard Bush, Tickweed**	W.A. Herb.
	C. viscosa		
Myrsinaceae	*Aegiceras corniculatum*	**River Mangrove**	W.A. Herb.
Mimosaceae	*Acacia adoxa*		W.A. Herb.
	A. aulacocarpa	**Brown Salwood, Hickory Wattle**	
	A. colei		Previously *A. holosericea*
	A. dunnii	**Dunn's Wattle, Elephant Ear Wattle**	W.A. Herb.
	*A. farnesiana**	**Mimosa Bush, Sweet Acaia**	W.A. Herb.
	A. lycopodifolia		W.A. Herb.
	A. lysiphloia	**Turpentine Bush**	
	A. platycarpa	**Ghost Wattle**	
	A. plectocarpa		W.A. Herb.
	A. stigmatophylla		W.A. Herb.
	A. translucens	**Poverty Bush**	W.A. Herb.
	A. tumida	**Pindan Wattle**	
	Cathormion umbellatum		W.A. Herb.
	*Leucaena leucocephala**	**Vi Vi, Koa Haole, Lead Tree**	W.A. Herb.
	Neptunia dimorphantha		W.A. Herb.
Caesalpiniaceae	*Erythrophleum chlorostachys*	**Cooktown Ironwood**	W.A. Herb.
	Lysiphyllum cunninghamii	**Beantree, Bauhinia**	
	*Parkinsonia aculeata**	**Jerusalem Thorn**	W.A. Herb.
	Senna goniodes		W.A. Herb.
	S. notabilis	**Cockroach Bush**	
	S. oligoclada		W.A. Herb. Previously *Cassia oligoclada*
	S. venusta		W.A. Herb.

Papilionaceae			
	Abrus precatorius	**Crab's Eye**	
	Aeschynomene indica	**Budda Pea**	W.A. Herb.
	Crotalaria alata		
	C. cunninghamii	**Green Birdflower, Parrot Pea**	
	*C. goreensis**	**Gambia Pea**	W.A. Herb.
	C. medicaginea		
	C. montana		W.A. Herb.
	Desmodium filiforme		
	D. trichostachyum		W.A. Herb.
	Erythrina vespertilio	**Bats' Wing Coral Tree**	W.A. Herb.
	Indigofera colutea	**Sticky Indigo**	W.A. Herb.
	I. hirsuta		
	Jacksonia spp.		
	J. forrestii	**Broombush**	F. Muell. Previously *J. thesioides* Kimb Flora
	*Macroptilium atropurpureum**	**Purple Bean, Siratro**	W.A. Herb.
	Mucuna gigantea		W.A. Herb.
	Psoralea spp.		
	Rhynchosia minima		W.A. Herb.
	Sesbania cannabina	**Sesbania Pea**	W.A. Herb.
	S. erubescens		W.A. Herb.
	S. formosa	**Corkwood, White Dragon Tree**	W.A. Herb.
	Tephrosia rosea	**Flinders River Poison**	W.A. Herb.
	T. sp. F.		W.A. Herb.
Proteaceae			
	Grevillea agrifolia	**Blue Grevillea**	
	G. dryandri		W.A. Herb.
	G. pteridifolia	**Silky Grevillea, Kimberley Christmas Tree**	
	G. pyramidalis	**Caustic Tree**	W.A. Herb. Previously *G. leucadendron*
	G. refracta	**Silverleaf Grevillea**	W.A. Herb.
	G. striata	**Beefwood**	
	G. velutinella		W.A. Herb.
	Hakea arborescens		
	H. suberea	**Corkbark Tree, Longleaf Corkwood**	
	Persoonia falcata		W.A. Herb.
Haloragaceae			
	Gonocarpus implexus		W.A. Herb.
Sonneratiaceae			
	Sonneratia alba	**Pornupan**	

Lythraceae			
	Rotala occutiflora		W.A. Herb.
Myrtaceae			
	Calytrix achaeta		
	C. brownii		Previously *C. brachychaeta*
	C. exstipulata		Previously *C. conferta, C. microphylla*
	Corymbia aspera	**Roughleaf Range Gum**	
	C. bella	**Weeping Ghost Gum**	Previously *E. papuana* and *E. sp E* Kimb Flora. Common name in 'Broome and Beyond'.
	C. byrnesii		Previously *E. foelscheana*
	C. confertiflora	**Roughleaf Cabbage Gum**	
	C. drysdalensis		Previously *E. dichromophloia* and *conophloia.*
	C. ferruginea		
	C. grandifolia	**Largeleaf Cabbage Gum**	
	C. polycarpa	**Longfruit Bloodwood**	
	C. ptychocarpa	**Spring Bloodwood, Swamp Bloodwood**	
	Eucalyptus bigalerita	**Northern Salmon Gum**	
	E. camaldulensis	**River Red Gum**	
	E. chlorophylla	**Greenleaf Box**	Priority 2
	E. leptalea	**Apple Gum**	Previously *E. clavigera* and *E. sp G* Kimb Flora
	E. microtheca	**Flooded Box**	
	E. miniata	**Northern Woollybutt**	
	E. pruinosa	**Silverleaf Box**	
	E. tectifica	**Darwin Box**	
	E. tetrodonta	**Darwin Stringybark**	
	Lophostemon grandiflorus		W.A. Herb. Previously *Tristania grandiflora*
	Melaleuca acacioides		Previously *M. alsophila*
	M. argentea		W.A. Herb.
	M. dealbata		
	M. leucadendra		W.A. Herb.
	M. minutifolia		W.A. Herb.
	M. sericea		Priority 3 refers to subspecies *gracilis*
	M. viridiflora		
	Osbornia octodonta	**Myrtle Mangrove**	
	Verticordia cunninghamii		
	Xanthostemon spp.		
	X. psidioides		
Onagraceae			
	Ludwigia perennis		W.A. Herb. Previously *L. parviflor*

Combretaceae	*Lumnitzera racemosa*	**White-flowered Black Mangrove**	
	Terminalia arostrata	**Nutwood**	W.A. Herb.
	T. bursarina		Some authors state this is the same *T. canescens* but different habitats are occupied.
	T. canescens		W.A. Herb. Now includes what was *T. bursarina*
Combretaceae	*Terminalia ferdinandiana*	**Gubinge**	Excell In Broome and Beyond. Treated as *T. latipes* in Kimb Flora
	T. hadleyana		
	T. platyphylla		W.A. Herb.
	T. platyptera		
Rhizophoraceae	*Bruguiera exaristata*	**Ribbed-fruited Orange Mangrove**	
	B. parviflora		
	Ceriops tagal	**Yellow-leaved Spurred Mangrove, Yellow Mangrove**	W.A. Herb.
	Rhizophora stylosa	**Spotted-leaved Mangrove, Red Mangrove**	W.A. Herb.
Santalaceae	*Exocarpos latifolius*	**Mistletoe Tree**	W.A. Herb.
	Santalum lanceolatum	**Plumbush, Plumwood**	
Loranthaceae	*Amyema sanguineum*		
	Decaisnina petiolata		
	Dendrophthoe spp.		
	D. acacioides		W.A. Herb.
	Lysiana spathulata		
Euphorbiaceae	*Bridelia tomentosa*		W.A. Herb.
	Euphorbia comans		
	E. hirta		W.A. Herb. Previously *Chamaesyce hirta*
	Excoecaria agallocha	**Blind Your Eye, Milky Mangrove**	
	E. parvifolia	**Guttapercha Tree**	W.A. Herb.
	Flueggea virosa		W.A. Herb. Previously *Securinega melanthesoides*
	*Jatropha gossypiifolia**	**Bellyache Bush, Cottonleaf Physic Nut**	W.A. Herb.
	Petalostigma pubescens	**Quinine Tree, Quinine Berry**	
	Phyllanthus reticulatus		W.A. Herb. Has also been recorded as *P. ciccoides*
	P. virgatus		W.A. Herb. Previously *P. minutiflorus*

Vitaceae			
	Ampelocissus acetosa		
	Cayratia trifolia		W.A. Herb
	Cissus adnata		W.A. Herb.
Sapindaceae			
	Atalaya hemiglauca *A. variifolia*	**Whitewood**	
Sapindaceae			
	*Cardiospermum halicacabum**		W.A. Herb.
	Distichostemon hispidulus		W.A. Herb.
Burseraceae			
	Canarium australianum		
Anacardiaceae			
	Buchanania obovata	**Wild Mango**	W.A. Herb.
Simaroubaceae			
	Brucea javanica		
Meliaceae			
	Melia azedarach	**White Cedar**	W.A. Herb.
	Owenia reticulata	**Desert Walnut**	W.A. Herb.
	O. vernicosa	**Emu Apple**	W.A. Herb.
	Xylocarpus moluccensis	**Cedar Mangrove**	W.A. Herb. Previously *X. australasicus*
Rutaceae			
	Boronia lanuginosa		
Zygophyllaceae			
	Tribulopis angustifolia		W.A. Herb.
Loganiaceae			
	Mitrasacme exserta		
	Strychnos lucida	**Strychnine Bush**	W.A. Herb.
Gentianaceae			
	Canscora diffusa		
Apocynaceae			
	Carissa lanceolata	**Conkerberry, Conkleberry**	
	Wrightia saligna		
Asclepiadaceae			
	*Calotropis procera**	**Caltrope, Rubber Tree, Kings Crown**	
	Cynanchum floribundum		W.A. Herb.
	Gymnanthera spp.		

Solanaceae			
	Physalis minima	**Wild Gooseberry**	W.A. Herb.
	Solanum dioicum		W.A. Herb.
	S. lucani		
Convolvulaceae			
	Cressa cretica		W.A. Herb.
	Ipomoea coptica		
	I. diamantinensis	**Desert Cowvine**	W.A. Herb.
	I. pes-caprae		
Convolvulaceae			
	Operculina aequisepala		W.A. Herb.
	Xenostegia tridentata		W.A. Herb. Previously *Merremia tridenta*
Menyanthaceae			
	Nymphoides aurantiaca		Previously *N. hydrocharoides*
	N. crenata	**Wavy Marshwort**	W.A. Herb.
	N. indica	**Water Snowflake**	
Boraginaceae			
	Coldenia procumbens		W.A. Herb.
	Heliotropium cunninghamii		
	Ehretia saligna	**Coonta, false Cedar**	
	Tournefortia mollis		W.A. Herb.
	Trichodesma zeylanicum	**Camel Bush**	W.A. Herb.
Verbenaceae			
	Premna acuminata		W.A. Herb.
	Vitex glabrata		
Avicenniaceae			
	Avicennia marina	**White Mangrove**	W.A. Herb.
Lamiaceae			
	Anisomeles malabarica		
	Basalicum polystachyon	**Musk Basil**	
	*Hyptis suaveolens**		W.A. Herb.
Oleaceae			
	Jasminum didymum		W.A. Herb.
	J. molle		
Scrophulariaceae			
	Stemodia viscosa		W.A. Herb.

Acanthaceae			
	Dicliptera armata		W.A. Herb. Previously *D. glabra*
	Nelsonia campestris		W.A. Herb.
	Rostellularia adscendens		
Bignoniaceae			
	Dolichandrone filiformis		
	D. heterophylla	**Lemonwood**	
Lentibulariaceae			
	Utricularia spp.		
	U. antennifera		
	U. aurea		W.A. Herb. Priority 2
	U. gibba		W.A. Herb.
	U. stellaris		W.A. Herb.
Stylidiaceae			
	Stylidium spp.		
Goodeniaceae			
	Goodenia sepalosa		W.A. Herb. Subspecies *glandulosa* Priority 2
Goodeniaceae	*G. lamprosperma*		
	Scaevola sericea		W.A. Herb.
Rubiaceae			
	Canthium spp.		W.A. Herb.
	C. sp. A.		
	Gardenia megasperma		W.A. Herb.
	Nauclea orientalis	**Leichhardt Pine, Cheesewood, Soft Leichhardt**	W.A. Herb. Previously *N. coadnata*
	Spermacoce exserta		
Asteraceae			
	*Bidens bipinnata**	**Bipinnate Beggar's Ticks**	
	*B. pilosa**	**Cobbler's Pegs**	
	Blumea axillaris		Previously *B. mollis*
	B. diffusa		
	B. sp. A.		
	Pluchea rubelliflora		
	Pterocaulon spp.		
	P. serrulatum		W.A. Herb. Previously *P. glandulosum*
	P. sphacelatum		W.A. Herb.
	P. sphaeranthoides		W.A. Herb.
	Streptoglossa macrocephala		W.A. Herb.
	*Xanthium occidentale**	**Noogoora Burr**	

Lemnaceae			
	Wolffia angusta		W.A. Herb.
Taccaceae			
	Tacca leontopetaloides		W.A. Herb.
Asparagaceae			
	Protasparagus racemosus	**Asparagus Fern**	Previously *Asparagus racemosus*
Amaryllidaceae			
	Crinum angustifolium	**Field Lily**	W.A. Herb.
Orchidaceae			
	Cymbidium canaliculatum		W.A. Herb.
Ponterderiaceae			
	Monochoria cyanea		
Typhaceae			
	Typha domingensis	**Narrowleaf Cumbungi**	W.A. Herb.
Commelinaceae			
	Cartonema parviflorum		W.A. Herb.
	Commelina ciliata		W.A. Herb.
Eriocaulaceae			
	Eriocaulon cinereum		
Cyperaceae			
	Bulbostylis barbata		W.A. Herb.
	Crosslandia setifolia		W.A. Herb.
	Cyperus spp.		
	C. bulbosus	**Nalgoo**	W.A. Herb.
	C. haspan		W.A. Herb.
	C. microcephalus		W.A. Herb.
	C. squarrosus		W.A. Herb.
	C. zollingeri		W.A. Herb.
	Eleocharis brassii		
	E. dulcis	**Chinese Water Chestnut**	W.A. Herb.
	Fimbristylis spp.		
	F. aff. littoralis		
	F. depauperata		W.A. Herb.
	F. rara		W.A. Herb.
	Scleria polycarpa		W.A. Herb.
	S. rugosa		W.A. Herb.
Poaceae			
	Acrachne racemosa		W.A. Herb.
	Aristida holathera	**Erect Kerosene Grass**	W.A. Herb.
	A. inaequiglumis	**Feathertop Threeawn**	
	A. ingrata		W.A. Herb.

Poaceae

Bothriochloa bladhii	**Forest Bluegrass**	
Brachyachne convergens	**Common Native Couch, Kimberley Couch**	
Chloris pumilio		W.A. Herb.
Dactyloctenium radulans	**Button Grass**	W.A. Herb.
Dicanthium fecundum	**Curly Bluegrass**	W.A. Herb.
D. sericeum	**Queensland Bluegrass**	W.A. Herb.
Digitaria papposa		W.A. Herb.
Dimeria ornithopoda		W.A. Herb.
Diplachne parviflora	**Small-flowered Beetle Grass**	W.A. Herb.
Eragrostis tenellula	**Delicate Lovegrass**	W.A. Herb.
Eriachne melicacea		W.A. Herb.
Eriochloa australiensis	**Spring Grass, Cupgrass**	W.A. Herb.
Heteropogon contortus	**Bunch Speargrass, Black Speargrass**	
Iseilema vaginiflorum	**Red Flinders Grass**	
Leptochloa neesii	**Swamp Grass, Umbrella Grass**	W.A. Herb.
Oryza australiensis		W.A. Herb.
Panicum mindanaense		W.A. Herb.
P. trachyrhachis		W.A. Herb.
P. trichoides		W.A. Herb.
Perotis rara	**Comet Grass**	
Phragmites karka		W.A. Herb.
Sehima nervosum	**Rat's Tail Grass**	
Setaria apiculata	**Pigeon Grass**	Previously *S. surgens*
*S. verticillata**	**Whorled Pigeon Grass**	W.A. Herb.
Sorghum spp.		
S. australiense		
*S. bicolor**	**Forage Sorghum, Grain Sorghum, Cultivated Sorghum**	
S. stipoideum	**Native Annual Sorghum**	W.A. Herb.
Spinifex longifolius		
Sporobolus spp.		
S. australasicus	**Australian Dropseed**	W.A. Herb.
S. virginicus	**Sand Couch**	W.A. Herb.
Thaumastochloa major		W.A. Herb.

Poaceae			
	Themeda triandra	**Kangaroo Grass**	Previously *T. australis*
	Triodia spp.		W.A. Herb.
	Urochloa reptans		
	Whiteochloa biciliata	**Mauve Sandgrass**	
	Xerochloa imberbis		W.A. Herb.
	Yakirra majuscula		W.A. Herb.
Arecaceae			
	Livistona spp.		
Pandanaceae			
	Pandanus aquaticus *P. spiralis*	**Water Pandan, River Pandan**	W.A. Herb. Subspecies *flammeus* is declared rare.

APPENDIX 4 – LIST OF FLORA RECORDED ADJACENT TO THE SITE OR LOCATION NOT CLEAR

The following list is compiled from a search of the records of the WA Herbarium for an area from Lacrosse Island at the mouth of the Cambridge Gulf then south to the Great Northern Highway. Also from the King River just east of the town of Wyndham to the town of Kununurra. The plants shown in this list are recorded as being found in the vicinity of the Site or the exact location is unclear. A number of records were not included most notably for locations known to be adjacent to the town of Kununurra. For example there were quite a few records for the Kimberley Research Station which is assumed to be the Frank Wise Institute located on the banks of the Ord River within the Ord River Irrigation Area.

This list can be used as a checklist for additions to the plant list for the Site.

Isoetaceae			
	Isoetes coromandelina		
Lygodiaceae			
	Lygodium microphyllum	**Climbing Maidenhair Fern**	
Cycadaceae			
	Cycas pruinosa		
Lauraceae			
	Cassytha capillaris	**Dodder Laurel**	
Ulmaceae			
	Trema tomentosa	**Poison Peach, Peachleaf Poison Bush**	Previously *T. aspera*
Moraceae			
	Ficus obliqua		Subspecies *puberula* is listed as priority 3
	F. racemosa *F. subpuberula* *F. tinctoria*	**Cluster Fig**	
Urticaceae			
	Pouzolzia zeylanica		
Nyctaginaceae			
	Boerhavia burbidgeana *B. coccinea* *B. gardneri* *B. schomburgkiana*		
Aizoaceae			
	Sesuvium portulacastrum		
	Trianthema patellitecta *T. pilosa* *T. portulacastrum**	**Giant Pigweed, Black Pigweed**	
	T. triquetra	**Red Spinach**	
Chenopodiaceae			
	Dysphania plantaginella	**Crumbweed**	
	Halosarcia halocnemoides	**Samphire**	
	H. pergranulata	**Blackweed Samphire**	

Chenopodiaceae			
	Suaeda arbusculoides	**Kimberley Seablite**	
Amaranthaceae			
	Alternanthera angustifolia		
	*A. pungens**	**Khaki Weed**	
	*Amaranthus tricolor**		
	Gomphrena cunninghamii		
	G. leptoclada		
	Ptilotus corymbosus		
	P. fusiformis		
	*Pupalia lappacea**		
Portulacaceae			
	Calandrinia quadrivalvis		
	Portulaca filifolia		
	P. pilosa		
Molluginaceae			
	Glinus lotoides	**Hairy Carpet Weed**	
	G. oppositifolius		
Caryophyllaceae			
	Polycarpaea longiflora		
Polygonaceae			
	Persicaria attenuata		Previously *Polygonum attenuatum*
	P. subsessilis		
Dilleniaceae			
	Hibbertia oblongata		
Elatinaceae			
	Bergia pedicellaris		
Sterculiaceae			
	Brachychiton tuberculatus	**Largeleaf Kurrajong**	Priority 3
	Helicteres dentata		
	Melhania oblongifolia		
Malvaceae			
	Abelmoshcus ficulneus	**Native Rosella**	First Recorded 1949
	A. moschatus	**Okra**	
		Native Cotton	
	Gossypium australe		
	*G. hirsutum**	**Upland Cotton**	
	Hibiscus panduriformis	**Yellow Hibiscus**	
	H. sabdariffa	**Rosella**	
	*Malvastrum americanum**	**Spiked Malvastrum**	

Malvaceae			
	*Sida acuta**	**Spinyhead Sida**	
	S. cordifolia	**Flannel Weed**	
	S. sp. A.		
Droseraceae			
	Drosera indica		
	D. petiolaris		
Violaceae			
	Hybanthus enneaspermus		
Cucurbitaceae			
	Luffa graveolens		
Capparaceae			
	Capparis sepiaria		
	Cleome oxalidea		
Bataceae			
	Batis argillicola		
Sapotaceae			
	Pouteria sericea		
Ebenaceae			
	Diospyros bundeyana		
Byblidaceae			
	Byblis liniflora		
Mimosaceae			
	Acacia gonoclada		
	A. hemignosta	**Club-leaf Wattle**	
	A. humifusa		
	A. limbata		
	A. orthotricha		
	A. richardsii		Priority 3
	Neptunia monosperma		
Caesalpiniaceae			
	Chamaecrista mimosoides	**Fiveleaf Cassia**	
	Senna planitiicola	**Yellow Pea, Arsenic Bush**	Previously *Cassia venusta*
Papilionaceae			
	*Aeschynomene villosa**		
	Alysicarpus rugosus	**Rough Chainpea**	
			Previously Genus *Atylosia*
	Cajanus latisepalus		
	C. marmoratus		
	C. reticulatus		
	*Crotalaria juncea**	**Sunnhemp**	
	C. medicaginea		
	C. novae-hollandiae	**New Holland Rattlepod**	Previously *C. crassipes*. Also mis-I as *C. trifoliastrum*.

Papilionaceae			
	Desmodium brownii		
	D. filiforme		
	Flemingia pauciflora		
	Galactia tenuiflora		
	Glycine arenaria		
	G. tomentella	**Woolly Glycine**	Previously *G. tomentosa*
	Indigofera hirsuta	**Hairy Indigo**	
	I. trita		
	*Macroptilium lathyroides**	**Phasey Bean**	
	Sesbania simpliciuscula		
	Tephrosia coriacea		
	T. laxa		
	T. leptoclada		
	T. supina		
	T. virens		
	T. sp.A.		
	T. sp. B.		
	Uraria cylindracea		
	*Vigna radiata**	**Mung Bean, Green Gram**	
	Zornia prostrata		
Proteaceae			
	Banksia dentata	**Tropical Banksia**	
	Grevillea dimidiata		
	G. erythroclada	**Needleleaf Grevillea**	
	G. heliosperma	**Rock Grevillea**	
Haloragaceae			
	Gonocarpus leptothecus		
Lythraceae			
	*Ammannia auriculata**		
	A. baccifera		
	A. multiflora		
Thymelaeaceae			
	Thecanthes punicea		
Myrtaceae			
	Corymbia abbreviata	**Scraggy Bloodwood**	K. D. Hill & L. A. S. Johnson
	C. opaca		Previously *Eucalyptus terminalis* K. D. Hill & L. A. S. Johnson
		Tropical Red Box	F. Muell.
	Eucalyptus brachyandra		Brooker
	E. obconica		Previously *E. sp B* Kimb Flora
	Melaleuca nervosa		

Myrtaceae			
	Syzygium eucalyptoides		Previously *Eugenia bleeseri, E. eucalyptoides*
	Xanthostemon paradoxus		
Melastomataceae			
	Osbeckia australiana		
Combretaceae			
	Terminalia fitzgeraldii		
	T. grandiflora	**Plumwood, Nutwood**	
	T. oblongata	**Yellow Wood, Rosewood**	
Opiliaceae			
	Opilia amentacea		
Loranthaceae			
	Amyema bifurcatum		
Euphorbiaceae			
	Antidesma ghaesembilla		
	Croton tomentellus		
	Euphorbia coghlanii		
	E. drummondii	**Caustic Weed**	
	E. heterophylla		
	E. maconochieana		Not in 'Flora of the Kimberley'. Nuytsia Vol 8, No 3, 1992
	E. schizolepis		
	E. vachellii		Previously *Chamaesyce vachellii*
	E. sp. B.		
	Leptopus decaisnei		Previously genus *Andrachne*
	Phyllanthus amarus		
	P. maderaspatensis		
	Sauropus trachyspermus		
	Sebastiania chamaelea		
Vitaceae			
	Ampelocissus acetosa		
Erythroxylaceae			
	Erythroxylum ellipticum		
Sapindaceae			
	Dodonaea lanceolata		
	D. physocarpa		
	D. polyzyga		
Zygophyllaceae			
	Tribulopis sessilis		
	*T. terrestris**	**Caltrop, Bindii**	
	T. sp. A.		
Apiaceae			
	Trachymene didiscoides		

Loganiaceae

Mitrasacme exserta

Asclepiadaceae

Brachystelma glabriflorum

*Cryptostegia madagascariensis**

Cynanchum carnosum
C. pedunculatum

Solanaceae

Nicotiana benthamiana **Natve Tobacco**

Solanum lucani
S. pugiunculiferum

Convolvulaceae

Ipomoea aquatica
I. muelleri
I. nil
I. plebeia
I. polymorpha **Silky Cowvine**

Jacquemontia browniana

Merremia gemella

Cuscutaceae

Cuscuta sp.

Boraginaceae

Heliotropium conocarpum
H. foliatum
H. paniculatum

Verbenaceae

Clerodendrum floribundum

Vitex velutinifolia

Lamiaceae

Solenostemon scutellarioides Previously *Coleus scutellarioides*

Scrophulariaceae

Peplidium maritimum

Striga curviflora
. squamigera

Acanthaceae

Acanthus ebracteatus

Hygrophila angustifolia

Hypoestes floribunda

Rostellularia adscendens

Pedaliaceae			
	Josephinia eugeniae	**Josephinia Burr**	
Stylidiaceae			
	Stylidium floodii		
Goodeniaceae			
	Goodenia bicolor		
	G. brachypoda		
	G. coronopifolia		
	G. lamprosperma		
	G. malvina		
	G. odonnellii		
Rubiaceae			
	Gardenia resinosa		
	Spermacoce auriculata		Previously *Borreria australiana*
	S. brachystema		
	S. exserta		
	S. laevigata		
	Timonius timon		
Asteraceae			
	*Acanthospermum hispidum**	**Starburr**	
	Blumea integrifolia		
	*Conyza bonariensis**	**Flaxleaf Fleabane**	
	Epaltes australis		
	Pluchea rubelliflora		
	Pterocaulon niveum		
	Sphaeranthus indicus		
	Tridax procumbens		
	Wedelia asperrima		
Hydrocharitaceae			
	Blyxa aubertii		
	Hydrilla verticillata	**Water Thyme, Hydrilla**	
	Ottelia ovalifolia	**Swamp Lily**	
Alismataceae			
	Caldesia oligococca		
Najadaceae			
	Najas tenuifolia	**Water Nymph, Thinleaf Najad**	
Anthericaceae			
	Thysanotus chinensis		

Philydraceae			
	Philydrum lanuginosum	**Frogsmouth, Woolly Waterlily**	
Commelinaceae			
	Commelina ensifolia		
	Cyanotis axillaris		
Xyridaceae			
	Xyris complanata		
Eriocaulaceae			
	Eriocaulon cinereum		
Cyperaceae			
	Cyperus alopecuroides		
	C. compressus		
	C. cunninghamii		
	C. difformis	**Dirty Dora, Rice Sedge**	
	C. javanicus		
	C. macrostachyos		Previously *C. albomarginatus*
	C. pulchellus		
	C. vaginatus	**Stiffleaf Sedge**	
	C. viscidulus		
	Eleocharis sphacelata	**Tall Spikerush**	
	E. spiralis		
	E. sp. B.		
	Fimbristylis denudata		
	F. dichotoma		
	F. littoralis		
	F. microcarya		
	F. phaeoleuca		
	F. polytrichoides		
	F. punctata		
	F. solidifolia		
	F. squarrulosa		
	F. trigastrocarya		
	Fuirena ciliaris		
	Lipocarpha microcephala		
	Schoenoplectus laevis		
Poaceae			
	Alloteropsis semialata	**Cockatoo Grass**	
	Aristida exserta		
	A. hygrometrica	**Northern Kerosene Grass, Corkscrew Grass**	
	A. latifolia	**Feathertop Wiregrass**	
	A. pruinosa	**Gulf Feathertop Wiregrass**	
	Arundinella nepalensis	**Reedgrass**	
	Astrebla elymoides	**Hoop Mitchell Grass**	
	A. squarrosa	**Bull Mitchell Grass**	

Poaceae

Brachyachne tenella	**Slender Native Couch**	
*Cenchrus ciliaris**	**Buffel Grass**	
Chionachne cyathopoda	**River Grass**	
*Chloris barbata**	**Purpletop Chloris**	
Chrysopogon pallidus	**Golden Beard Grass, Ribbon Grass**	
Digitaria bicornis	**Hairy Finger Grass,**	
*Echinochloa colona**	**Awnless Barnyard Grass, Barnyard Grass**	
Echinochloa elliptica *E. schultzii*	**Hare's Foot Grass**	
*Eleusine indica**	**Crowsfoot Grass**	
Enneapogon polyphyllus *E. purpurascens*	**Leafy Nineawn** **Purple Nineawn**	
Eragrostis cumingii *E. speciosa*	**Cuming's Lovegrass** **Handsome Lovegrass**	
Eriachne ciliata *E. festucacea* *E. obtusa* *E. sulcata* *E. triodioides*	**Slender Wanderrie Grass** **Plains Wanderrie Grass** **Northern Wanderrrie Grass** **Wanderrie**	
Eulalia aurea	**Silky Browntop**	Previously *E. fulva*
Iseilema holmesii		
Lepturus xerophilus		
Mnesithea granularis		
Ophiuros exaltatus	**Canegrass**	
Panicum decompositum *P. seminudum*	**Native Millet, Australian Millet**	
Paspalidium rarum		
Pennisetum basedowii	**Asbestos Grass**	
Pseudochaetochloa australiensis		Previously *Pennisetum arnhemicum*
Pseudoraphis abortiva		
Schizachyrium crinizonatum *S. fragile*	**Firegrass, Red Spathe Grass**	
Sorghum halepense *S. timorense*	**Johnson Grass**	

Poaceae

Triodia cunninghamii — **Soft Spinifex, Gummy Spinifex**
T. pungens — **Hairy Armgrass**

Urochloa piligera
U. pubigera

Xerochloa barbata
X. laniflora

APPENDIX 5 - BIRD LIST FOR THE SITE

Records are for all sightings up to June 1998. All records marked with an asterisk (*) indicate species that were recorded for the first time during the period June 1997 to June 1998.

Podiceps cristatus	**Great Crested Grebe**
Poliocephalus poliocephalus	**Hoary-headed Grebe**
Tachybaptus novaehollandiae	**Australasian Grebe**
Pelecanus conspicillatus	**Australian Pelican**
Anhinga melanogaster	**Darter**
Phalacrocorax carbo	**Great Cormorant**
P. varius	**Pied Cormorant**
P. sulcirostris	**Little Black Cormorant**
P. melanoleucos	**Little Pied Cormorant**
Ardea pacifica	**Pacific Heron**
A. novaehollandiae	**White-faced Heron**
A. picata	**Pied Heron**
Ardeola ibis	**Cattle Egret**
Egretta alba	**Great Egret**
E. garzetta	**Little Egret**
E. intermedia	**Intermediate Egret**
Butorides striatus	**Striated Heron ***
Nycticorax caledonicus	**Rufous Night Heron**
Dupetor flavicollis	**Black Bittern**
Xenorhynchus asiaticus	**Black-necked Stork**
Plegadis falcinellus	**Glossy Ibis**
Threskiornis aethiopica	**Sacred Ibis**
T. spinicollis	**Straw-necked Ibis**
Platalea regia	**Royal Spoonbill**
P. flavipes	**Yellow-billed Spoonbill**
Anseranas semipalmata	**Magpie Goose**
Dendrocygna arcuata	**Wandering Whistling-Duck**
D. eytoni	**Plumed Whistling -Duck**
Cygnus atratus	**Black Swan**
Stictonetta naevosa	**Freckled Duck**
Tadorna radjah	**Radjah Shelduck**

Anas superciliosa	**Pacific Black Duck**
A. gibberifrons	**Grey Teal**
A. querquedula	**Garganey**
Malacorhynchus membranaceus	**Pink-eared Duck**
Aythya australis	**Hardhead**
Nettapus pulchellus	**Green Pygmy-Goose**
Pandion haliaetus	**Osprey**
Elanus notatus	**Black-shouldered Kite ***
Aviceda subcristata	**Pacific Baza**
Milvus migrans	**Black Kite**
Hamirostra melanosternon	**Black-breasted Buzzard**
Haliastur indus	**Brahminy Kite**
H. sphenurus	**Whistling Kite**
Accipiter fasciatus	**Brown Goshawk**
A. cirrhocephalus	**Collared Sparrowhawk ***
Haliaeetus leucogaster	**White-bellied Sea-Eagle**
Aquila audax	**Wedge-tailed Eagle**
Hieraaetus morphnoides	**Little Eagle**
Circus assimilis	**Spotted Harrier ***
C. aeruginosus	**Marsh Harrier**
Falco longipennis	**Australian Hobby**
F. berigora	**Brown Falcon**
F. cenchroides	**Australian Kestrel**
Coturnix australis	**Brown Quail ***
Eulabeornis castaneoventris	**Chestnut Rail**
Porzana fluminea	**Australian crake**
Gallinula ventralis	**Black-tailed Native-hen**
Porphyrio porphyrio	**Purple Swamphen**
Fulica atra	**Eurasian Coot**
Grus rubicundus	**Brolga**
Ardeotis australis	**Kori Bustard**
Irediparra gallinacea	**Comb-crested Jacana**

Burhinus neglectus	**Beach Thick-knee ***
Rostratula benghalensis	**Painted Snipe**
Vanellus miles	**Masked Lapwing**
Pluvialis squatarola	**Grey Plover ***
P. dominica	**Lesser Golden Plover ***
Erythrogonys cinctus	**Red-kneed Dotterel**
Charadrius leschenaultii	**Large Sand Plover ***
C. ruficapillus	**Red-capped Plover**
C. melanops	**Black-fronted Plover**
Himantopus himantopus	**Black-winged Stilt**
Recurvirostra novaehollandiae	**Red-necked Avocet**
Arenaria interpres	**Ruddy Turnstone ***
Numenius madagascariensis	**Eastern Curlew ***
N. phaeopus	**Whimbrel ***
N. minutus	**Little Curlew**
Tringa glareola	**Wood Sandpiper**
T. brevipes	**Grey-tailed Tattler ***
T. incana	**Common Sandpiper ***
T. nebularia	**Greenshank**
T. stagnatilis	**Marsh Sandpiper**
T. terek	**Terek Sandpiper ***
Limosa limosa	**Black-tailed Godwit**
L. lapponica	**Bar-tailed Godwit**
Calidris tenuirostris	**Great Knot ***
C. melanotos	**Pectoral Sandpiper**
C. acuminata	**Sharp-tailed Sandpiper**
C. ruficollis	**Red-necked Stint**
C. subminuta	**Long-toed Stint**
C. ferruginea	**Curlew Sandpiper**
Gallinago megala	**Swinhoe's Snipe**
Glareola maldivarum	**Oriental Pratincole**
Stiltia isabella	**Australian Pratincole**
Larus novaehollandiae	**Silver Gull**
Chlidonias hybrida	**Whiskered Tern**
C. leucoptera	**White-winged Tern**
Gelochelidon nelotica	**Gull-billed Tern**
Hydroprogne caspia	**Caspian Tern**
Ducula spilorrhoa	**Torresian Imperial-Pigeon ***

Geopelia placida	**Peaceful Dove**
G. cuneata	**Diamond Dove**
G. humeralis	**Bar-shouldered Dove**
Ocyphaps lophotes	**Crested Pigeon**
Petrophassa albipennis	**White-quilled Rock-Pigeon**
P. plumifera	**Spinifex Pigeon**
Calyptorhynchus magnificus	**Red-tailed Black-Cockatoo**
Cacatua roseicapilla	**Galah**
C. sanguinea	**Little Corella**
C. galerita	**Sulphur-crested Cockatoo**
Trichoglossus rubritorquis	**Red-collared Lorikeet**
Psitteuteles versicolor	**Varied Lorikeet**
Aprosmictus erythropterus	**Red-winged Parrot**
Nymphicus hollandicus	**Cockatiel**
Melopsittacus undulatus	**Budgerigar**
Platycercus venustus	**Northern Rosella ***
Cuculus saturatus	**Oriental Cuckoo ***
Chrysococcyx osculans	**Black-eared Cuckoo ***
C. basalis	**Horsefield's Bronze-Cuckoo**
Scythrops novaehollandiae	**Channel-billed Cuckoo**
Centropus phasianinus	**Pheasant Coucal ***
Ninox novaeseelandiae	**Southern Boobook ***
Podargus strigoides	**Tawny Frogmouth ***
Aegotheles cristatus	**Australian Owlet-nightjar ***
Caprimulgus guttatus	**Spotted Nightjar ***
Ceyx azurea	**Azure Kingfisher**
Dacelo leachii	**Blue-winged Kookaburra**
Halcyon pyrrhopygia	**Red-backed Kingfisher**
H. sancta	**Sacred Kingfisher**
H. chloris	**Collared Kingfisher**
Merops ornatus	**Rainbow Bee-eater**
Eurystomus orientalis	**Dollarbird**
Mirafra javanica	**Singing Bushlark**

Cecropis nigricans	**Tree Martin**
C. ariel	**Fairy Martin**
Anthus novaeseelandiae	**Richard's Pipit**
Motacilla flava	**Yellow Wagtail**
Coracina novaehollandiae	**Black-faced Cuckoo-shrike**
C. papuensis	**White-bellied Cuckoo-shrike**
Lalage sueurii	**White-winged Triller**
Eopsaltria pulverulenta	**Mangrove Robin ***
Microeca flavigaster	**Lemon-bellied Flycatcher**
M. leucophaea	**Jacky Winter ***
Poecilodryas superciliosa	**White-browed Robin ***
Pachycephala rufiventris	**Rufous Whistler ***
Myiagra alecto	**Shining Flycatcher**
M. inquieta	**Restless flycatcher**
Rhipidura rufiventris	**Northern Fantail ***
R. leucophrys	**Willie Wagtail**
Pomatostomus temporalis	**Grey-crowned Babbler**
Acrocephalus stentoreus	**Clamorous Reed-Warbler**
Megalurus timoriensis	**Tawny Grassbird**
Cisticola juncidis	**Zitting Cisticola**
C. exilis	**Golden-headed Cisticola ***
Cinclorhamphus cruralis	**Brown Songlark ***
Malurus lamberti	**Variegated Fairy-wren ***
M. melanocephalus	**Red-backed Fairy-wren**
Smicrornis brevirostris	**Weebill ***
Gerygone laevigaster	**Mangrove Gerygone ***
G. olivacea	**White-throated Gerygone ***
Daphoenositta chrysoptera	**Varied Sittella**
Climacteris melanura	**Black-tailed Treecreeper ***
Philemon argenticeps	**Silver-crowned Friarbird ***
P. citreogularis	**Little Friarbird**
Entomyzon cyanotis	**Blue-faced Honeyeater**
Manorina flavigula	**Yellow-throated Miner**

Lichenostomus unicolor	**White-gaped Honeyeater**
L. plumulus	**Grey-fronted Honeyeater**
L. flavescens	**Yellow-tinted Honeyeater**
Melithreptus albogularis	**White-throated Honeyeater ***
Lichmera indistincta	**Brown Honeyeater**
Ramsayornis fasciatus	**Bar-breasted Honeyeater**
Conopophila rufogularis	**Rufous-throated Honeyeater ***
Myzomela erythrocephala	**Red-headed Honeyeater ***
Ephthianura crocea	**Yellow Chat**
Dicaeum hirundinaceum	**Mistletoebird ***
Pardalotus striatus	**Striated Pardalote**
Zosterops lutea	**Yellow White-eye**
Neochmia ruficauda	**Star Finch**
N. phaeton	**Crimson Finch**
Poephila guttata	**Zebra Finch**
P. bichenovii	**Double-barred Finch**
P. personata	**Masked Finch**
P. acuticauda	**Long-tailed Finch**
Lonchura pectoralis	**Pictorella Mannikin ***
L. castaneothorax	**Chestnut-breasted Mannikin ***
Oriolus flavocinctus	**Yellow Oriole ***
Chlamydera nuchalis	**Great Bowerbird**
Grallina cyanoleuca	**Australian Magpie-lark**
Artamus leucorhynchus	**White-breasted Woodswallow**
A. personatus	**Masked Woodswallow ***
A. cinereus	**Black-faced Woodswallow**
A. minor	**Little Woodswallow**
Cracticus nigrogularis	**Pied Butcherbird ***
C. quoyi	**Black Butcherbird**
Gymnorhina tibicen	**Australian Magpie ***
Corvus orru	**Torresian Crow**

APPENDIX 6 – REPTILES AND FROGS RECORDED ON OR IN THE VICINITY OF THE SITE

The following list was provided by a search of the Western Australian Museum database. No collections were made during the course of this project. As is indicated by the title these records are for animals either on or near the site.

FAMILY	SPECIES	COMMON NAME
Typhlopidae	*Ramphotyphlops guentheri*	
Boidae	*Aspidites melanocephalus*	**Black-headed Python**
	Morelia childreni	**Children's Python**
	M. olivacea	**Olive Python**
	M. spilota	**Carpet Python**
Homalopsidae	*Fordonia leucobalia*	**White-bellied Mangrove Snake**
	Myron richardsonii	**Richardson's Mangrove Snake**
Colubridae	*Boiga fusca*	**Banded Cat-snake**
Elapidae	*Demansia atra*	**Lesser Black Whipsnake**
	Furina ornata	**Moon Snake**
	Pseudonaja modesta	**Ringed Brown Snake**
Scincidae	*Carlia amax*	
	C. triacantha	
	Cryptoblepharus plagiocephalus	
	Ctenotus inornatus	
	C. militaris	
	Lerista borealis	
Agamidae	*Chlamydosaurus kingii*	**Frilled Lizard**
	Ctenophorus inermis	
	Diporiphora arnhemica	
	D. bennettii	
	D. magna	
	Gemmatophora gilberti	
Varanidae	*Varanus acanthurus*	
	V. panoptes	
	V. storri	
	V. tristis	

Geckonidae	*Gehyra australis*	
	G. nana	
	Oedura rhombifera	
	Pseudothecadactylus cavaticus	
	Rhynchoedura ornata	**Bird-billed Gecko**
Pygopodidae	*Delma tincta*	
Hylidae	*Cyclorana australis*	**Giant Frog**
	C. longipes	**Long-footed Frog**
	Litoria caerulea	**Green Tree Frog**
	L. rothii	**Roth's Tree Frog**
Leptodactylidae	*Limnodynastes ornatus*	**Ornate Frog**
	L. tasmaniensis	**Spotted Grass Frog**

Also found are the two crocodiles;

Crocodylus porosus	**Estuarine Crocodile**
Crocodylus johnstoni	**Freshwater Crocodile**

APPENDIX 7 - MAMMALS RECORDED ON OR IN THE VICINITY OF THE SITE

The majority of the records were obtained from the Western Australian Museum. Only those marked with an asterisk (*) were recorded since June 1997.

Tachyglossus aculeatus	**Echidna**
Dasyurus hallucatus	**Northern Quoll**
Pseudantechinus ningbing	**Ningbing Pseudantechinus**
Planigale ingrami	**Long-tailed Planigale**
Isoodon macrourus	**Northern Brown Bandicoot**
Petaurus breviceps	**Sugar Glider**
Macropus agilis	**Agile Wallaby***
M. antilopinus	**Antilopine Wallaroo**
M. robustus	**Common Wallaroo**
Onychogalea unguifera	**Northern nailtail Wallaby**
Petrogale brachyotis	**Short-eared Rock-wallaby**
Pteropus alecto	**Black Flying-fox**
P. scapulatus	**Little Red Flying-fox**
Macroderma gigas	**Ghost Bat**
Hipposideros ater	**Dusky Leafnosed-bat**
Rhinonicteris aurantius	**Orange Leafnosed-bat**
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat***
Taphozous georgianus	**Common Sheathtail-bat**
Miniopterus schreibersii	**Common Bentwing-bat**
Nyctophilus arnhemensis	**Northern Long-eared Bat**
N. geoffroyi	**Lesser Long-eared Bat**
Chalinolobus gouldii	**Gould's Wattled Bat**
C. nigrogriseus	**Hoary Wattled Bat**
Myotis adversus	**Large-footed Myotis**
Scotorepens greyii	**Little Broad-nosed Bat**
S. sanborni	**Northern Broad-nosed Bat**
Vespadelus caurinus	**Western Cave Bat**

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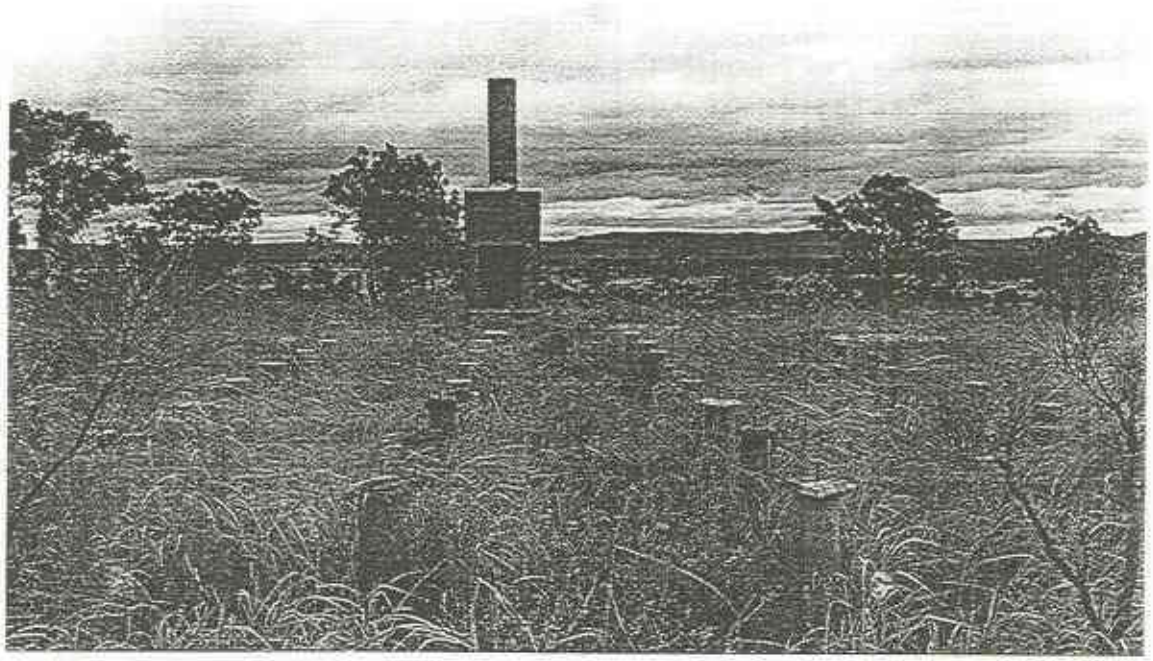
S. sanborni	**Northern Broad-nosed Bat**
Vespadelus caurinus	**Western Cave Bat**

V. douglasorum	**Yellow-lipped Bat**
Leggadina lakedownensis	**Lakeland Downs Mouse**
Pseudomys delicatulus	**Delicate Mouse**
P. nanus	**Western Chestnut Mouse**
Zyzomys argurus	**Common Rock-rat**
Z. woodwardi	**Kimberley Rock-rat**
Hydromys chrysogaster	**Water-rat**
Rattus rattus	**Black Rat**
R. tunneyi	**Pale Field-rat**
R. villosissimus	**Long-haired Rat**
Canis lupus	**Dingo***
Felis catus	**Cat***
Equus caballus	**Brumby***
E. asinus	**Donkey***
Bos taurus	**Cattle***

APPENDIX 8

WORK REQUIREMENTS AND RECOMMENDATIONS OF ARCHAEOLOGICAL CONSULTANTS

LOWER ORD RAMSAR SITE, KUNUNURRA – SURVEY OF NON-ABORIGINAL CULTURAL HERITAGE SITES.



Prepared by
Gaye Nayton BSc (Hons), AACAI

for

Department of Contract and Management Services

&

Department of Conservation and Land Management
February 1998

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ACKNOWLEDGEMENTS

The authors would like to acknowledge the co-operation and support of the staff of CALM – Kununurra Office, particularly Mr Gordon Graham and Mr David Grosse for all their assistance in the field. Thanks also to Dr Leigh Edmonds for his comments concerning the cobblestone construction of the Old Hall's Creek Road.

Front Cover: Site of former residence for Wireless Station, Telegraph Hill

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EXECUTIVE SUMMARY

This report details the results of an archaeological survey carried out for CAMS and CALM in the Parry Lagoons Nature Reserve in the Lower Ord Ramsar site. The survey area is located south east of the Town of Wyndham in the East Kimberley District. The survey was undertaken in late January 1998.

Prior to the commencement of the survey CALM had generated a list of potential heritage sites within the study area which the archaeologist was to inspect during the course of the survey. Owing to inclement weather not all sites were able to be inspected with the archaeologist only visiting five main sites: the 2nd Hall's Creek Road; the Wireless Station located at Telegraph Hill; Goose Hill Station; Goose Hill Ruins; and 20 Mile Pool. The position, visible structures and visible artefacts found at each site were recorded.

The vegetation located throughout the survey area was lush and tall (grass over 1m in height). Consequently much of the material perceived to be at these sites was obscured and only the most visible features could be recorded. Indeed, the site at 20 Mile Pool, previously found by CALM officers after a dry season burn, could not be relocated.

From the information that has been compiled from this survey assessments of significance have been made resulting in the following recommendations. It is noted that further archaeological research needs to take place so that a fuller understanding of the history of the area can to be achieved.

Recommendations

Recommendation 1a. It is recommended that in areas where the cobblestone surface of the 2nd Hall's Creek Road is present any planned works that may affect examples of this construction (realigning or upgrading, resurfacing, installation of drainage) be aligned around these areas.

Recommendation 1b. It is recommended that a survey of the entire 2nd Hall's Creek Road course through the study area be undertaken to further determine the road's condition and to plot associated artefacts or features.

Recommendation 1c. It is recommended that historical research is undertaken to determine when the road was built and by whom. This research should also more thoroughly compare the road with other surviving roads of its era to determine how rare an example it is.

Recommendation 2. It is recommended that a Conservation Plan of the Wireless Station, Telegraph Hill be commissioned to ensure the long-term survival of this site.

Recommendation 3a. It is recommended that the Goose Hill Station is left undisturbed while further historical research aimed at determining its historical heritage significance is carried out. There is the potential for this research to encompass both documentary and oral history.

Recommendation 3b. It is recommended that a historical archaeological survey be carried out at a more appropriate time of year to more fully document the Goose Hill Station.

Recommendation 4a. It is recommended that the area surrounding the chimney and dipping yards, located near Goose Hill, be protected from further ground disturbance activities, and that no road building materials be removed from the site.

Recommendation 4b. It is further recommended that a follow up archaeological survey be conducted at an appropriate time of year to identify and plot such remains if they exist.

As this site is not part of the CALM estate it is recommended that CALM notify the appropriate management authority of recommendations 4a and 4b.

Recommendation 5.
It is recommended that the 1st Hall's Creek Road be surveyed to identify and record any surviving associated camping and hotel sites. This survey would include both the western and eastern forks that led to Parry Lagoons and Wild Goose Lagoon respectively.

Recommendation 6. It is recommended the CALM prioritise assessment of sites unable to be inspected during this project in order of suspected importance and/or vulnerability.

LOWER ORD RAMSAR SITE, KUNUNURRA – SURVEY OF NON-ABORIGINAL CULTURAL HERITAGE SITES.

1.0 BRIEF

The Lower Ord Ramsar Site is a world heritage wetlands area. The Department of Conservation and Land Management (CALM) with funding assistance from Environment Australia are in the process of preparing a Draft Management Report for the Lower Ord Ramsar Site, Kununurra. In conjunction with that report a historical archaeological survey has been commissioned to provide a preliminary heritage assessment of, and management guidelines for, the Non-Aboriginal sites within the area. The project was intended to give a preliminary indication of heritage significance to prevent removal of culturally important sites as part of the environmental management guidelines for the area.

The brief required the archaeologist to:

1) Examine readily available historical information.
2) Identify sites of potential cultural heritage significance.
3) Photographically record sites.
4) Confirm site location on detailed maps/aerial photographs of the area (compiled by CALM).
5) Liase with CALM's Project Supervisor.
6) Recommend future heritage procedures/strategies.

The survey and report was required urgently so that it could be included in the Draft Management Report. This required fieldwork to be undertaken in the wet season when access was difficult and ground visibility was poor. Under these conditions not all the potential sites identified by historical research and aerial photography analysis could be visited.

2.0 STUDY AREA

The study area is located in the Parry Lagoons Nature Reserve within the southern portion of the Lower Ord Ramsar Project Area (Fig. 1). The northern part of the survey area is low wetlands surrounding Parry Lagoons and Marglu Lagoon, contrasted by rocky hills to the south. The survey area contains three main creek systems (Parry Creek; Abercorne Creek; and Wild Goose Creek). Many minor tributaries drain into these creek systems causing them to swell during periods of heavy rainfall.

The Great Northern highway forms the western boundary of the survey area, with the only other southern access route being the 2nd Hall's Creek Road. To the north the main vehicle access is via the Parry Creek Road which crosses the survey area. This

APPENDIX 9

WORK REQUIREMENTS AND RECOMMENDATIONS OF 'A PRELIMINARY SURVEY OF ABORIGINAL INTEREST AND ASSOCIATION WITH THE LOWER ORD RAMSAR SITE'

A Preliminary Survey of Aboriginal Interest and Association with the Lower Ord Ramsar site

Specialist Eco Guides and Wildlife Consultants
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Kununurra, Western Australia
Phone: (08) 91 682116
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October 2, 1997

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ABORIGINAL LANGUAGES OF THE EAST KIMBERLEY

REF: BANGGAIYERRI - THE STORY OFJACK SULLIVAN BRUCE SHAW 1983

view themselves as having a legitimate traditional interest in the land, even though their tradition is viewed as *recent.*

Similarly, within the Aboriginal customs of the area, people would normally claim association and responsibility towards an area based on but not limited to 3 main criteria.

- Mothers Country
- Fathers Country
- Where they were born

(Ref: "Aborigines of the West , Their Past and Present", RM + CH Berndt 1980)

As a result of the history of the region many Aboriginal people who do not have interest in the site area according to traditional law as above, do regard themselves as having interest in the area, particularly the Parry's Lagoon area and the waters of the Cambridge Gulf and Joseph Bonaparte Gulf, as a result of being born and raised in Wyndham and / or on the surrounding stations, particularly Carlton Hill Station, as well as living in the area for many years.

2. EXECUTIVE SUMMARY

This report has been prepared in response to tasks 1 - 3 of the scope of work undertaken by **Northern Habitat** as part of work associated with the Lower Ord Management Report being prepared by the Department of Conservation and Land Management.

The identified tasks covered by this report are:

1. Compile a list of those Aboriginal people who are or might have an interest in the site. The site is comprised of the Parry's Lagoon Nature reserve, the Ord River Nature Reserve (which includes the False Mouths of the Ord) and the proposed Marine Park.

2. As part of 1, contact the Aboriginal Affairs Department (AAD) and the Aboriginal and Torres Strait Islander Commission (ATSIC) to ask them the same question.

3. Undertake a brief analysis of information which might be available on traditional Aboriginal use of the site.

The scope of work clearly details that this work is to be regarded as a *preliminary survey* of existing information only and it is not to be seen as a definitive report on Aboriginal interests and associations with the site.

It is recommended that the contents of this report be used by the Project Manager in the development of an appropriate strategy to ensure the involvement and consultation of the local Aboriginal community in the preparation of the Lower Ord Management Report.
Some recommendations relating to this process are included with this report at *Part 10. Recommendations.*

3. INTRODUCTION

There are 2 main claims which impact on the site area. These are Native Title claims lodged on behalf of:

- The Miriuwung and Gajerrong peoples, lodged by Miriuwung and Gajerrong Families Land Council, known as the Miriuwung Gajerrong Claims 1 and 2, represented by both the Aboriginal Legal Service(ALS) and the Kimberley Land Council(KLC). (Due to a dispute between some of the claimants and the ALS, the Kimberley Land Council represents these claimants)

- The Gwini, Walmbi and Wunnubal peoples, lodged by the Balangarra Aboriginal Corporation, known as the Balangarra Claims 1 and 2 and represented by the Kimberley Land Council.

(See Appendices 4 a-d, Extracts from National Native Title Tribunal Search)

In broad terms the Miriuwung Gajerrong claims impact the land and waters on the eastern side of the Cambridge Gulf and also encompasses the Parry's Lagoon Nature Reserve. The Balangarra claims impact on the land and waters on the western side of the Gulf. There is some overlap between the claims in the waters of the Cambridge Gulf with both claimants including areas such as Lacrosse Island.

4. Identification of Aboriginal People with Known or Possible Interest in the Site. (Task 1 and Task 2)

4.1 Criteria

In collating the list of Aboriginal people thought to have an interest in the site the following criteria was used:

- Those people currently associated with Native Title Claim activity in the site area. ***(referred to in the report as Native Title Claimants)***

- Those people known by "common knowledge" and through literature surveys to hold a traditional interest in the area, regardless of their involvement in any Native Title activity. ***(referred to in this report as Acknowledged Traditional Interest Holders)***

- Those people who may not be known to hold traditional association with the report area, but have been resident in the report area for a significant time and regard themselves as stakeholders.
  (referred to in this report as Recent Traditional Interest holders)

4.2 Native Title Claimants

The following list at *Figure.2* provides details of the registered claimants for these Native Title Claims. It should be understood that the claimants are those people who claim to hold the appropriate traditional authority to speak for the claim area, and that they do so on behalf of their peoples. For this reason this list is only an indication of some of the people who claim to hold traditional interest in the site - there may well be many others who for a variety of reasons are not represented by this claim and are not listed as claimants.

Also, the claims cover a wide area of country which far exceeds the area of interest of this report. Some, but not all of the registered claimants will have relevant interest in the site area. Those names marked with ** are believed to hold some level of interest relevant to the Lower Ord Ramsar site.
Without access to detailed anthropological survey information specific to the site, it is not possible to determine accurately which claimants are associated with the site area or the extent of each claimants interest in the site area. ***(Refer Part 6. Summary Tasks 1 and 2)***

APPENDIX 10

WORK REQUIREMENTS AND RECOMMENDATIONS OF 'A SCOPING STUDY TO IDENTIFY PRESENT AND FUTURE TOURISM POTENTIAL FOR THE LOWER ORD RAMSAR SITE'

Lower Ord Management Report

A Scoping Study to Identify Present and Future Tourism Potential for the Lower Ord Ramsar site.

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number of agencies, individuals and groups including affected pastoralists, tour operators, local community representatives, professional fishermen and Aboriginal groups from whom input may need to be sought prior to developing or implementing a management plan for the site.

Progression of a future management plan will require continued input from these diverse interests.

2. SUMARY of TASKS

The Department of Conservation and Land Management identified a number of tasks associated with the Lower Ord Management report which have been addressed in this document. These tasks required that a number of questions be answered to assist with the development of a future management plan for the site;

- Undertake a scoping study of recreational and tourism opportunities for the site.
- Compilation of a list of those Aboriginal people who are claiming or who may claim an interest in the site.
- As part of the preceding question the above information was also requested from the Aboriginal Affairs department and the appropriate Aboriginal and Torres Strait Islander Commission.
- Undertaking a brief analysis of information which may be available on traditional Aboriginal use of the site.

3. INTRODUCTION

It is considered essential that the future development of an appropriate management plan for the Lower Ord Ramsar site include components which identify the Aboriginal parties who may be involved with negotiation concerning various aspects of ongoing management of the site. It is also essential to identify the present and future tourism and