NSW GOVERNMENT
Environment, Climate Change & Water
National Parks & Wildlife Service

Clarence Estuary Nature Reserve

Plan of Management

CLARENCE ESTUARY NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment, Climate Change and Water

February 2011

This plan of management was adopted by the Minister for Climate Change and the Environment on 21st February 2011.

Acknowledgments

This plan of management is based on a draft plan prepared by staff of the North Coast Region of NPWS.

Valuable information and comments were provided by NPWS specialists, the North Coast Regional Advisory Committee and members of the public.

Cover photographs, of part of the reserve and of a pied oyster catcher, by Steve Hodgson, NPWS.

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FOREWORD

Clarence Estuary Nature Reserve is located adjacent to the town of Yamba on the NSW North Coast and has an area of 130 hectares.

Clarence Estuary Nature Reserve protects a small remnant of the Clarence estuary foreshore. It contains a high diversity of plant species, including an area of saltmarsh, which provides significant habitat for a range of native animals. These include at least 30 listed migratory species, some of which are also listed as threatened under the *Threatened Species Conservation Act 1995*.

Clarence Estuary Nature Reserve also contains areas that are of significance to the Yaegl Aboriginal people who have had a continuing connection to the land since pre-European times.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A draft plan of management for Clarence Estuary Nature Reserve was placed on public exhibition from 5th October 2007 until 21st January 2008. The submissions received were carefully considered before adopting this plan.

The plan contains a number of actions to achieve the State Plan priority to "Protect native vegetation, biodiversity, land, rivers and coastal waterways", including undertaking surveys for threatened plant and animal species, preparation of a pest species management strategy for the reserve, and rehabilitation of cleared and disturbed areas, particularly disturbed riverbanks.

This plan of management establishes the scheme of operations for Clarence Estuary Nature Reserve. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Frank Sartor MP
Minister for Climate Change and the Environment

1 CLARENCE ESTUARY NATURE RESERVE

1.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Clarence Estuary Nature Reserve (referred to as "the reserve") was gazetted on 5th March 1999. It is located adjacent to the town of Yamba (29°26.4'S, 153°21'E) on the NSW North Coast. It lies within the Clarence Valley Local Government Area and the boundaries of the Northern Rivers Catchment Management Authority.

The reserve comprises five separate areas of land, all formerly Crown land, on the foreshores of the estuary of the Clarence River, covering a combined total area of approximately 130 hectares (see map, centre pages).

The northern four sections of the reserve (see inset in map) include two parts adjacent to residential areas (referred to as the Shores Drive section and the Melaleuca Drive section in this plan) as well as Rabbit Island and part of Dart Island. The southern section is in a rural setting and borders an inactive prawn farm, the Micalo Channel and Wooloweyah Lagoon (referred to as the Micalo Island section in this plan).

In the original sections of the reserve (namely the Micalo Island, Melaleuca Drive and Shores Drive sections), the gazetted area includes the intertidal zone to mean low water mark. The 2005 additions to the reserve on Rabbit Island and Dart Island are to mean high water mark.

The reserve has been set aside to protect a small remnant of the Clarence estuary foreshore in a landscape that has largely been modified for urban development. The reserve contains a high diversity of plant species, which provides significant habitat for a range of native animals. Coastal wetland environments in the reserve are of particular significance with each section of the reserve supporting wetland areas. The tidal mudflats in the Clarence River estuary constitute one of the major foraging habitats for migratory waders in NSW. Coastal wetland environments also provide important breeding habitat for fish species.

The Clarence estuary is listed on the Register of National Estate and on the National Directory of Important Wetlands (Environment Australia 2001).

The reserve also includes areas that are of immense significance to the Yaegl Aboriginal people who have had a continuing connection to the land since pre-European times.

This management plan is consistent with the NSW Coastal Policy (DUAP 1997), which seeks to facilitate and promote better management of the NSW coastal zone. It is also consistent with actions in the Clarence Estuary Management Plan (Umwelt 2003).

2 MANAGEMENT CONTEXT

2.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). The policies arise from the legislative background, the NPW Regulations and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

Other legislation, international agreements and charters may also apply to the management of the area. In particular, the *Environmental Planning and Assessment Act 1979* (EPA Act) may require the assessment and mitigation of environmental impacts of works proposed in this plan. In addition, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) relates to the protection of matters of National Environmental Significance, such as the protection of migratory species listed under international agreements. These include three specifically for the protection of migratory birds:

- The Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA);
- The Agreement between the Government of Australia and the People's Republic of China for the Protection of Migratory Birds and their Environment (CAMBA); and
- The Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds (ROKAMBA).

A plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within Clarence Estuary Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to the reserve. Where management strategies or works are proposed for the reserve or any additions that are not consistent with the plan, an amendment to the plan will be required.

2.2 MANAGEMENT PURPOSES AND PRINCIPLES

Nature reserves are reserved under the NPW Act to protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena.

Under the Act, nature reserves are managed to:

- conserve biodiversity, maintain ecosystem functions, and protect geological and geomorphological features and natural phenomena;
- conserve places, objects, features and landscapes of cultural value;
- promote public appreciation, enjoyment and understanding of the reserve's natural and cultural values; and
- provide for appropriate research and monitoring.

2.3 LANDSCAPE CONTEXT

Natural and cultural heritage and previous and existing landuse are often strongly inter-related and together form the landscape of an area. Much of the Australian

environment has been influenced by past land use practices. Human activities continue to influence the landscape through development, recreational use, cultural practices, introduction of non-native plants and animals and in some cases the generation of air and water pollution.

The landscape of the planning area and its surrounds has been modified by past and present activities which include building of the river's training walls and dredging, development for agriculture and aquaculture, and more recently development for residential housing, recreation and tourism. For example, it is reported that much of the littoral rainforest around Yamba was cleared for cedar and other rainforest timbers within 20 years of European settlement (Maclean Shire Council 2002). Today only small, isolated remnant patches of native vegetation provide examples of the pre-European environment.

An assessment of Crown land in the Yamba Bay area by the former Department of Land and Water Conservation (DLWC 1998) recommended that suitable uses for the Shores Drive section of Clarence Estuary Nature Reserve included environmental protection, nature conservation and low-intensity natural recreation. The report further recommended that consultation with the local Yaegl tribe was essential when considering future management options. As a result of this report, the area was reserved as a nature reserve.

The former Maclean Shire Council (2002) reported that "celebrations and gatherings on Crown Reserves have been important social and economic events that have been common throughout the history of settlement in Maclean Shire". Both Aboriginal and non-Aboriginal people place cultural values on natural areas, including aesthetic, social, spiritual, recreational and other values. Cultural values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural values. For reasons of clarity and document usefulness natural and cultural heritage, non-human threats and on-going use are dealt with individually, but their inter-relationships are recognised.

2.4 MANAGEMENT DIRECTIONS

The management objectives for the Clarence Estuary Nature Reserve are to:

- manage the reserve as part of a regionally important system of protected areas;
- conserve and rehabilitate the diversity of habitat types occurring naturally within the reserve, with particular emphasis on the protection of littoral rainforest and coastal wetlands, including saltmarsh;
- protect habitat for significant plant and animal species, particularly species and communities that are:
    - listed under the TSC Act or the EPBC Act, or
    - endemic or regionally significant.
- identify, protect and conserve Aboriginal sites and places of cultural significance in partnership with the Aboriginal community;
- provide opportunities for self-reliant, nature-based recreation only;
- restrict further non-NPWS infrastructure in the reserve and remove existing illegal structures; and
- continue to develop and maintain cooperative working relationships with reserve neighbours and stakeholders.

3 DESCRIPTION OF THE RESERVE

3.1 NATURAL AND CULTURAL HERITAGE

3.1.1 Landform, Geology and Soils

The reserve is part of the lower estuary of the Clarence River, a network of extensive fluvial-deltaic plains (DLWC 2003). Located on the southern side of the Clarence River, the reserve is within the larger Clarence Moreton Basin geological formation comprised mainly of unfolded fluvial sediments (DLWC 1998). The southern section (Micalo Island section) of the reserve is an estuarine alluvial flat adjoining Wooloweyah Lagoon.

The dynamics of the estuary have played and continue to play a significant role in shaping the reserve. The alluvial soils of the reserve were formed by the erosion of sedimentary rocks and periods of deposition along the floodplain (DLWC 1998). Vegetation removal in foreshore areas has exposed these alluvial soils to run-off, tide and wave action, and increased erosion (DLWC 1998). The river, however, also deposits sediments on the shores of the reserve.

Tulau (1999) predicts that sedimentation at Wooloweyah Lagoon will continue until a freshwater swamp is formed, which will change the dynamics of the Micalo Island section of the reserve over time. Local activities, such as the dredging of Micalo Channel, manipulation of the Clarence estuary for urban canal development (as has occurred adjacent to the Melaleuca and Shores Drive section of the reserve) and the presence of Middle Wall add to the hydrological changes affecting the reserve.

Acid sulphate soils are found underlying many coastal floodplains, but remain relatively harmless unless disturbed or drained (Tulau 1999). While the greater Clarence estuary is identified as a priority area for acid sulphate soil management by Tulau (1999), the sections of the reserve differ in their potential to contain acid sulphate soils. The Shores Drive and Melaleuca Drive sections, as well as Rabbit and Dart Islands, were identified by DLWC (1998) as low risk as they are located on an elevated alluvial plain dominated by fluvial sediments. The low elevation of the Micalo Island section of the reserve indicates it falls into a higher risk category (Tulau 1999), with Micalo Island identified as containing potential and actual acid sulphate soils.

3.1.2 Native Plants

Umwelt (2002) estimates that only four per cent of the original coastal floodplain wetland or native forest vegetation types remain in the lower Clarence estuary. The reserve protects an important remnant of this vegetation. Of particular significance is the diversity of communities and species present within such a small area, plus the representation of successional stages of plant communities from the estuarine environment, through to swamps, and then to open and closed forest associations (Dodkin 1989).

The alienation of this area by roads and housing development has seen the frequency of fire reduced. The absence of fire most likely explains why the reserve has a well developed structure and high biodiversity values from the ground layer to the canopy. This has also allowed the development of littoral rainforest with individual rainforest elements scattered through the other forest sections (Dodkin 1989).

Over 100 native plant species have been recorded in the reserve. Of the littoral rainforest species, two are recorded at their southern limit. These are *Polyalthia nitidissimi* (a low tree) and the broad-leaved lilly pilly *(Acmena hemilampra)*. Both species are common in Iluka Nature Reserve, but this is the only known record south of

the Clarence River (Dodkin 1989). The reserve contains other species close to their southern limit and two threatened plant species (refer to Table 1). Littoral rainforest is listed as an endangered ecological community under the TSC Act and as a critically endangered ecological community under the EPBC Act.

Intertidal estuarine communities consist of grey mangrove (*Avicennia marina*), river mangrove (*Aegiceras corniculatum*) and saltmarsh. Swamp oak forest (*Casuarina glauca*) and sand cypress (*Callitris columellaris*) adjoin the mangrove community. Swamp sclerophyll forest of paperbark (*Melaleuca quinquenervia)* also occurs within the reserve (NPWS 1989). Coastal saltmarsh on the NSW North Coast, and swamp oak and swamp sclerophyll forests on coastal floodplains on the NSW North Coast are listed as Endangered Ecological Communities under the TSC Act.

Table 1 Threatened and significant plant species known to occur in the reserve

Common Name	Scientific name	Significance
white-flowered wax plant	*Cynanchum elegans*	#Endangered
arrow-head vine	*Tinospora tinosporoides*	#Vulnerable
broad-leaved lilly pilly	*Acmena hemilampra* subsp. *hemilampra*	southern limit
polyalthia	*Polyalthia nitidissima*	southern limit
sand cypress	*Callitris columellaris*	close to southern limit
umbrella cheese tree	*Glochidion sumatranum*	close to southern limit
blunt-leaved passionfruit	*Passiflora aurantia*	close to southern limit
corky milk vine	*Secamone elliptica*	close to southern limit

Listed under both the TSC Act and EPBC Act

3.1.3 Native Animals

The reserve provides important habitat for protected and threatened animal species. Approximately 412 animal species have been recorded within the broader Clarence estuary area. Ten threatened animal species have been recorded from the reserve, and it is likely that others may occur (Table 2).

Habitat within the reserve provides foraging, roosting and nesting sites for a variety of birds of prey including the white-bellied sea-eagle (*Haliaeetus leucogaster*), brahminy kite (*Haliastur indus*) and the threatened eastern osprey (*Pandion cristatus*). An artificial roost site has been provided by Country Energy on the edge of the reserve on Shores Drive and is being used by ospreys.

Seven threatened bat species have been recorded in the area surrounding the reserve. The diversity of bat species is most likely due to the rich source of pollen and nectar supplied by nearby coastal heaths and forests, which provide food for nectivorous bats and flying foxes, and also the large numbers of insects which are the prey of insectivorous species, and the proximity of these areas to water (Churchill 1998). Mangroves in the reserve are often a preferred site for flying fox camps.

The area is also of international importance for migratory wading birds (refer section 2.1). The reserve provides habitat for a significant population of at least thirty listed migratory species including some, such as the lesser sand plover (*Charadrius mongolus*) and the Terek sandpiper (*Xenus cinereus*), which are also listed as vulnerable under the TSC Act.

The NSW Wader Study Group undertakes biennial shorebird counts along the coastline of NSW including parts of reserve. The World Wildlife Fund (WWF) has also undertaken a shorebird monitoring project in the Clarence estuary.

Table 2 Threatened animal species known or likely to occur within Clarence Estuary Nature Reserve

Common Name	Scientific Name	Status under TSC Act	Status under EPBC Act
Species known to occur within the reserve			
great knot	*Calidris tenuirostris*	Vulnerable	Migratory
greater sand plover	*Charadrius leschenaultii*	Vulnerable	Migratory
lesser sand plover	*Charadrius mongolus*	Vulnerable	Migratory
beach stone-curlew	*Esacus magnirostris*	Endangered	
pied oystercatcher	*Haematopus longirostris*	Endangered	
broad-billed sandpiper	*Limicola falcinellus*	Vulnerable	Migratory
black-tailed godwit	*Limosa limosa*	Vulnerable	Migratory
eastern osprey	*Pandion cristatus*	Vulnerable	
greater broad-nosed bat	*Scoteanax rueppellii*	Vulnerable	
terek sandpiper	*Xenus cinereus*	Vulnerable	Migratory
Species considered likely to occur within the reserve			
Birds			
sanderling	*Calidris alba*	Vulnerable	Migratory
glossy black-cockatoo	*Calyptorhynchus lathami*	Vulnerable	
barred cuckoo-shrike	*Coracina lineata*	Vulnerable	
black-necked stork	*Ephippiorhynchus asiaticus*	Endangered	
black bittern	*Ixobrychus flavicollis*	Vulnerable	
mangrove honeyeater	*Lichenostomus fasciogularis*	Vulnerable	
square-tailed kite	*Lophoictinia isura*	Vulnerable	Migratory
white-eared monarch	*Carternornis leucotis*	Vulnerable	
powerful owl	*Ninox strenua*	Vulnerable	
eastern ground parrot	*Pezoporus wallicus*	Vulnerable	
red-tailed tropicbird	*Phaethon rubricauda*	Vulnerable	
rose-crowned fruit-dove	*Ptilinopus regina*	Vulnerable	
grass owl	*Tyto longimembris*	Vulnerable	
masked owl	*Tyto novaehollandiae*	Vulnerable	
Mammals			
hoary wattled bat	*Chalinolobus nigrogriseus*	Vulnerable	
little bent-wing bat	*Miniopterus australis*	Vulnerable	
large-footed myotis	*Myotis macropus*	Vulnerable	
eastern long-eared bat	*Nyctophilus bifax*	Vulnerable	
common planigale	*Planigale maculata*	Vulnerable	
grey-headed flying-fox	*Pteropus poliocephalus*	Vulnerable	Vulnerable
common blossom-bat	*Syconycteris australis*	Vulnerable	
Amphibians			
wallum froglet	*Crinia tinnula*	Vulnerable	
wallum sedge frog	*Litoria olongburensis*	Vulnerable	Vulnerable

Source: NPWS fauna modelling database 1998, NPWS Atlas 2007

3.1.4 Aboriginal Heritage

Aboriginal communities have an association and connection to the land. The land and water biodiversity values within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge and strengthening social bonds. Aboriginal heritage and nature are

inseparable from each other and need to be managed in an integrated manner across the landscape.

The reserve falls within the boundaries of the Birrigan Gargle and Yaegl local Aboriginal land councils, which represent the local Yaegl Aboriginal community and the Lower Clarence Aboriginal Elders Committee, Wdjri Myiral.

The abundance of food and other natural resources in the Clarence estuary has contributed to a long history of intensive Aboriginal use in the area. The surrounding locality contains various sites of Aboriginal occupation, including middens, campsites, ceremonial grounds, artefact scatters and burial sites. An interpretative sign has been installed on the council park adjacent to the reserve at the end of Shores Drive, highlighting the importance of the area to Aboriginal people. The Shores Drive section of the reserve includes the site of the Reedy Creek Aboriginal camp, which was established in 1935 when families moved off Ulgundahi Island Aboriginal Mission. Very little of this camp remains now, and the campsite is now overgrown.

No formal cultural heritage study has been undertaken in the reserve. The Clarence Estuary Management Plan recommends surveys in this and other reserves (Umwelt 2003).

3.1.5 Historic Heritage

Prior to European settlement the Clarence estuary was fringed with significant stands of rainforest vegetation. The area around Yamba initially had valuable stands of cedar and by the end of the 1830s there were numerous camps of cedar getters along the river. The cedar industry was only short lived and by the 1860s shipments of cedar ceased. As grazing, agriculture and dairying developed, river traffic increased and the value of the river as a transport route grew in economic significance.

The construction of the training walls, to facilitate safe shipping at the Clarence River entrance, commenced in 1862. Outside the reserve, just off the end of Rabbit Island and at the end of Shores Drive, there are the remains of large wooden piles, remnants of the viaduct that transported rock for the construction of Middle Wall during the 1890s and early 1900s. A tramline also existed along Shores Drive to transport rock and materials from quarries at Angourie for the training walls. No remains of these structures are known to occur in the reserve.

The Shores Drive section of the reserve contained a night soil depot, which was dedicated as a reserve for sanitary purposes in 1926. It only became a Crown Reserve for Public Recreation in 1982.

3.2 ACCESS AND VISITOR USE

Some of the reserve's boundaries are accessible from public roads while, for other parts, the only access is by boat. At low tide, Dart Island can be accessible by wading from Hickey Island. Except for boundary asset protection zones, which are accessible to management vehicles, there are no roads, trails or recreational facilities within the reserve. Access to the Micalo section of the reserve is by a public Crown road reserve. This road runs through a private property (an inactive prawn farm) and is broken by drains on the reserve boundary.

A number of parks and reserves in close proximity to the reserve provide a range of recreational opportunities, including facilities for camping, picnicking and fishing. The Clarence Valley Council provides picnic facilities on the Clarence River at the end of Shores Drive, which is known as Peninsula Park. There are two other small parks

managed by Clarence Valley Council adjoining the reserve: Reedy Creek Park (on Melaleuca Drive) and Westringia Park (on Westringia Place). Camping is currently available at the caravan park which lies adjacent to the south-eastern boundary of the Shores Drive section (see inset to map). The foreshore in the vicinity of the caravan park forms part of the Yamba Bay Foreshore Reserve, which is managed by Clarence Valley Council as trustee.

The reserve is used for activities such as bird watching and fishing. These activities are considered consistent with the principles of a nature reserve. Given the significance of the reserve's natural attributes and the high level of development in close proximity, the preservation of these natural attributes will take precedence over the development of visitor infrastructure.

3.3 OTHER USES

On the northern foreshore of Dart Island there is a navigational beacon maintained by NSW Maritime. The beacon provides a roosting spot for birds, in particular ospreys.

There are oyster lease markers in the Shores Drive section of the reserve. These mark the boundary of oyster leases between Shores Drive section and Dart Island. The terms of the oyster leases do not permit access through the reserve or storage of equipment or dumping of waste in the reserve. The waters surrounding the reserve are also used for commercial estuary hauling and mesh netting.

All fishing activities in NSW waters are regulated under *Fisheries Management Act 1994*. Both commercial and recreational fishing must be in accordance with licence conditions specified by Industry & Investment NSW. Gazettal of sections of Clarence Estuary Nature Reserve to the mean low water mark has not changed this authority and fishing operations will continue to be managed by Industry & Investment NSW. However, the concurrence of the Minister administering the NPW Act will be required before new oyster leases may be granted in the reserve, or before leases may be transferred.

3.4 THREATS TO RESERVE VALUES

3.4.1 Soil Erosion and Acid Sulphate Soils

The floodplain alluvials are generally considered to be stable except when vegetation has been removed. This has occurred in some areas along the reserve's foreshore, exposing these soils to run-off, tides, boat wash and wave action, all of which have increased the extent of erosion.

At present there are no acid sulphate soils exposed in or next to the reserve. However, as a result of various activities the water table has lowered and acid sulphate soils have been exposed to the air elsewhere in the Clarence estuary. The oxidation of iron pyrite in the soil then produces sulphuric acid, which is washed into the drains and ground water during high rainfall events. This can lead to very acidic conditions with levels as low as pH 2-3; little aquatic life survives such events with the exception perhaps of eels (Sammut 1996).

3.4.2 Introduced Plants and Animals

Introduced plants are generally the result of disturbance to natural ecosystems from past land uses. These plants have the potential to impact on the viability and biodiversity of native vegetation communities.

Significant areas of the reserve are impacted by weed invasion, with the margins of the reserve the most heavily infested. Many weed species have been introduced through the unauthorised dumping of rubbish and garden waste. Lantana (*Lantana camara*), bitou bush (*Chrysanthemoides monilifera*), smooth tree pear (*Opuntia monacantha* (syn. *Opuntia vulgaris*)) and ground asparagus fern (*Asparagus aethiopicus*) are the main weeds found in the reserve and a variety of other weeds, such as exotic vines and garden escapees, also occur. Street plantings of exotic species (e.g. hibiscus (*Hibiscus rosa-sinensis*) and slash pine (*Pinus elliottii*) occur along Melaleuca Drive. Lantana, bitou bush and smooth tree pear are listed as noxious in the Clarence Valley. Invasion of native plant communities by bitou bush, and invasion and establishment of exotic vines and scramblers, have been listed as key threatening processes under the TSC Act. Establishment of escaped exotic garden plants has been proposed to be listed as a key threatening process.

There have been reports of cane toads (*Bufo marinus*) occurring in the reserve. The diet of the cane toad includes insects, principally beetles, but several species of small snakes, lizards, frogs and even small marsupials are also reputedly eaten. Additionally, cane toads are toxic to species preying on them, which may include birds, native lizards and snakes.

The European red fox (*Vulpes vulpes*) has been recorded in the reserve. Feral cats (*Felis catus)* may also be present. These pests prey on native species and can significantly reduce species diversity. Straying pet cats and dogs can similarly have major impacts on the reserve's wildlife populations.

Cattle (*Bos taurus*) occasionally enter the Micalo Island section of the reserve. Extensive pads and ground disturbance are evident in the riparian areas frequented by cattle. Hard-hoofed animals such as cattle impact on park values by trampling vegetation, selectively grazing native plants, fouling springs and waterways, eroding and compacting soils, and spreading weeds.

3.4.3 Urban stormwater and drainage

Urban stormwater is a major transporter of various types of pollutants (including rubbish, animal faeces, soaps, pesticides and oils) from roads, gardens and buildings. There are five stormwater discharge points in the Shores Drive section of the reserve, as well as a channel located along Shores Drive which drains into the reserve. Two stormwater drains flow into the Melaleuca Drive section of the reserve from The Mainbrace and four from Melaleuca Drive.

A drainage channel currently delineates the practical boundary between the caravan park and the Shores Drive section of the reserve. There is another earthen channel on the edge of the reserve along Yamba Road, continuing along Shores Drive. These drains trap litter, especially plastics, which can be flushed out into the estuary and cause a threat to marine and shorebird species.

3.4.4 Urban Encroachment

Along the urban interface there are several encroachments from residential properties into the reserve. Several neighbours use the reserve, and adjacent council parks, for vehicular access to their backyards. Sections of the reserve are also used for storage of boats and other equipment, as well as recreation and views.

Several domestic jetty, mooring and seating structures occur within the reserve. These structures were built before the reserve's gazettal. However, most were constructed without an approval or a licence under the *Crown Lands Act 1989* and so do not constitute an existing interest under the NPW Act. Examples of these structures can be seen on the reserve foreshore west of Westringia Park and adjacent to Melaleuca Drive. Unlicensed structures are illegal, often not conforming to building codes and can pose a potential liability to the NPWS. They also compromise reserve values by encouraging boat launching in sensitive mangrove vegetation. Public facilities for boat launching are provided nearby at Witonga Drive, Shores Drive and along Yamba Road.

A small section of the reserve west of Westringia Park (approximately 0.15 ha) has been substantially modified and has limited conservation value. The foreshore of this area is currently receding due to the removal of the native vegetation (primarily mangrove and swamp oak communities). Some adjacent landholders have indicated that they will not support the stabilisation of the foreshore by regeneration of native species. A number of *ad hoc* erosion control measures, such as the construction of concrete tyre walls, have been implemented in this area which pre-date gazettal of the nature reserve. The area has negligible value as a nature reserve and constitutes a significant liability for NPWS.

3.4.5 Inappropriate recreational use

A number of unauthorised recreational activities and uses occur in the reserve. Informal walking tracks have been created in the reserve in the vicinity of the tavern and from Westringia Park across the saltmarsh to the river. Erosion and compaction associated with the track behind Westringia Park, particularly its use by bikes, is causing unacceptable impacts to the saltmarsh which is part of an endangered ecological community. In addition, the collection of bait from the intertidal zone (including the practice of yabby pumping) may impact on the food resources of migratory wading species.

3.4.6 Isolation and Fragmentation

Clearing of vegetation on the Clarence floodplain has resulted in a high loss of biodiversity and fragmentation of habitat. Long term conservation of biodiversity depends upon the protection, enhancement and connection of remaining habitat across the landscape, incorporating vegetation remnants on both public and private lands.

There has been a high degree of isolation and fragmentation of native bushland in the Yamba area. Nearby vegetated areas contribute to the habitat values of the reserve and provide ecological corridors to other surrounding forested areas. Maintaining the integrity of the remaining habitat within the reserve and, where possible, linking this to adjacent areas of bushland to facilitate wildlife corridors is important in ensuring long term viability of the reserve's values.

3.4.7 Fire

The NPWS regards fire as a natural feature of the landscape and recognises that it is essential to the survival of some plant communities. It is one of the continuing physical factors influencing the Australian environment. However, inappropriate fire regimes have been identified as a key threatening process affecting the biological diversity of NSW.

The NPWS is a fire authority under the *Rural Fires Act 1997* and is required to implement the provisions of district fire management plans. Management of NPWS estate is in accordance with the NPWS Strategy for Fire Management (NPWS 2003).

NPWS regards cooperative fire management as essential for the protection of life and surrounding property, as well as for protection of the natural and cultural heritage of the reserve. Important aspects of fire management for the NPWS include participation as a member of the Clarence Valley Bush Fire Management Committee and the preparation of a district bushfire risk management plan for the area covered by this committee. It is considered that the reserve constitutes a very low bushfire risk to community assets and low risk to environmental assets.

The NPWS approach to fire planning is based on the level of complexity involved. In regard to the reserve, the NPWS considers that fire management issues are not complex and that it is appropriate to include the specific fire management strategies for the reserve in this plan of management.

Generally, the vegetation types of the planning area, particularly rainforest and estuarine vegetation communities, are not conducive to supporting wildfire. These communities, which account for a large proportion of the vegetation in the reserve, are largely intolerant of fire and are present as a result of the low fire frequency. In contrast, swamp sclerophyll (mainly paperbark) forest can carry intense fire under hot dry conditions, and this vegetation type may require active management where it occurs in close proximity to residential areas.

Research into fire ecology has established some general principles about fire regimes and the conservation of biodiversity. That is, groups of plants and animals respond similarly to fire according to characteristics of their life history. Therefore it is not necessary to individually specify fire regimes for the conservation of every species. Requirements for most plant species can be summarised on the basis of vegetation communities and there is a threshold in fire regime variability that marks a critical change from high species diversity to low species diversity. For the vegetation types present in the reserve, these thresholds are given in Table 3.

Table 3 Suggested fire regimes for defined vegetation communities

Community	Suggested Fire Regimes
Littoral rainforest	Exclude all fire
Saline wetland (saltmarsh/mangrove)	Exclude all fire
Swamp sclerophyll forest	Min. interval 7 years/ Max. interval 35 years

Source: Bradstock *et al*. 2003.

The suggested fire intervals are used as a guide and are broadly applicable for each vegetation type. Variability of fire interval should occur within them and should be ultimately constrained by the ability of the flora to recover between fires.

Palmers Island
Freeburn Island
Sleeper Island
Thorny Island
ILUKA
Iluka NR
Clarence Estuary NR
Rabbit Island
Clarence River
Middle Wall
Dart Island
Yamba Rd
to Maclean
Hickey Island
Yamba Bay
See Inset Map
Oyster Channel
YAMBA
Carrs Rd
Angourie Rd
to Angourie and Woolweyah ->
Micalo Island
Joss Island
Woolowevah Lagoon
Clarence Estuary NR
Yuraygir NP
0 0.5 1 1.5 2 Kilometres

Inset: Detail of Northern Sections

Rabbit Island
Clarence River
Reedy Creek
Middle Wall
Westringia Pl
Crystal Waters
Melaleuca Dr
The Mainbrace
The Link
Shores Dr
Dart Island
Yamba Rd
Yamba Bay
0 200 400 600 Metres

Locality (not to scale)

Clarence Estuary NR
Iluka
Maclean
Yamba
Clarence River
PACIFIC HWY
Grafton
Coral Sea

Legend

- Clarence Estuary Nature Reserve
- Purchased additions to reserve
- Other national parks/ nature reserves
- Water and shoreline
- Oyster lease
- Major roads
- Other roads
- Drainage lines and creeks
- Caravan Park
- Tavern
- Council park
- Navigation beacon

N W E S

The NPWS uses a system of fire management zones which is compatible with the local district bushfire risk management plan. The reserve is zoned into a series of Asset Protection Zones (APZ) and Land Management Zones (LMZ).

The primary fire management objectives for APZ are to protect human life and to protect identified high-risk assets such as residential areas. Where possible, the width of the APZ and the standard for fuel maintenance should be consistent with the publication '*Planning for Bushfire Protection*' (RFS 2001). Recognising that the protection of life and property is of paramount importance, APZs are in place on the northern boundary of the Caravan Park, along Shores Drive and Melaleuca Drive, and behind housing on Melaleuca Drive, The Mainbrace and Westringia Place. In some places, these APZs overlap other tenures, being on the reserve and neighbouring Crown and Council reserves.

The primary fire management objectives of LMZ are to promote fire regimes which meet the ecological requirements of species that are known to occur naturally within the reserve, and to protect culturally significant sites. Given the small size of the reserve and significance of the vegetation types present, plus the low bushfire risk to community assets, the majority of the reserve is zoned LMZ.

3.4.8 Climate Change

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. Anthropogenic climate change has been listed as a key threatening process under the TSC Act.

Sea-level rise is one of the projected outcomes of climate change. A sea-level rise of more than 90cm by 2100 is expected (DECC 2009). This will result in: increased intensity and frequency of storm surges; increased shore erosion; impacts on coastal ecosystems (including the loss of important coastal wetlands and mangroves); and impacts on human settlements and infrastructure (CSIRO 2004). These impacts will be exacerbated by the expected increased frequency of extreme storm events.

While the potential impact of climate change is difficult to assess, since it depends on the compounding effects of other pressures, for the reserve the most direct impact would be a loss of coastal wetlands, including saltmarsh and swamp forests, affecting the whole vegetation complex of the reserve. These wetland communities are already under threat from a range of pressures and are listed as endangered ecological communities under the TSC Act.

4 MANAGEMENT STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
4.1 Soil and water conservation Stormwater drains flow into the Melaleuca Drive and Shores Drive sections of the reserve. These transport rubbish and pollutants into the reserve, which may impact on habitat and water quality. There is no significant erosion in the reserve except for bank erosion from wave action where vegetation has been cleared west of Westringia Park. There has been an unauthorised attempt to stabilise this in part using a concrete tyre wall, which was constructed before the reserve's gazettal. Potential acid sulphate soils occur in and around the reserve. If exposed to air, acid sulphate soils may have detrimental impacts on aquatic animals and habitats. The dynamics of the estuary continue to shape the shoreline of the reserve. With the deposition of silt, new land areas are formed outside the gazetted boundaries of the reserve, providing habitat for a range of migratory and threatened bird species.	Water quality in the reserve (including the tidal zone) is improved. Riverbanks are stabilised to minimise soil erosion using non-engineering based techniques. Potential acid sulphate soils in the reserve remain undisturbed. Gazetted reserve boundaries are practical, reflect the reality of a dynamic landscape and conserve the habitat of threatened species.	4.1.1 Liaise with Clarence Valley Council to install and maintain rubbish traps on stormwater drains that enter the reserve. 4.1.2 Undertake and use existing campaigns within the local community (e.g. Clean Up Australia Day) to raise awareness of impacts of stormwater drainage and rubbish on native habitat and water quality. 4.1.3 Liaise with NSW Maritime to identify and establish no-wash zones adjacent to reserve boundaries to protect sensitive vegetation and eroding banks. 4.1.4 Work with the appropriate authorities and park neighbours to implement suitable measures to control bank erosion. 4.1.5 Ensure soils in the reserve, particularly in the southern section are not disturbed, or any disturbance is subject to environmental assessment and mitigation measures. 4.1.6 Liaise with Clarence Valley Council and other authorities to ensure that development adjacent to the reserve is undertaken in accordance with acid sulphate soil management principles. 4.1.7 Seek the gazettal of adjacent accreted lands as additions to the reserve.	High Medium High High High High Medium

Current Situation	Desired Outcomes	Strategies	Priority
4.2 Native plant and animal conservation A vegetation survey has been undertaken and two threatened plant species are known to occur in the reserve. The reserve is important for a number of migratory bird species and the NSW Wader Group undertakes annual shorebird counts in parts of the reserve. In contrast there have been limited mammal and reptile surveys. Although ten threatened animal species have been recorded, many others are predicted to occur. Threatened species and communities in the reserve may be adversely affected by frequent fires, feral animals, weeds, rising sea levels and urban encroachments. Vegetation on adjoining lands is fragmented and in many instances modified or degraded. The long term ecological viability of the reserve would be enhanced if the estuarine vegetation communities on nearby tenures are managed to provide corridors for native plants and animals.	Understanding and knowledge of the ecological functions and characteristics of the reserve are improved. Endangered ecological communities and populations of significant native plants and animals are maintained. Adjoining native vegetation is protected to maintain wildlife corridors and enhance ecological viability of the reserve. Cleared and disturbed areas not required for management purposes are rehabilitated to maximise conservation values and reserve area.	4.2.1 Undertake or encourage surveys for threatened plant and animal species. 4.2.2 Support continued monitoring of shorebird populations. 4.2.3 Implement other relevant measures included in the Priorities Action Statement for threatened species occurring in the reserve. 4.2.4 Work with neighbours and Clarence Valley Council to encourage conservation of remnant native vegetation adjacent to the reserve. 4.2.5 Rehabilitate cleared and disturbed areas (in particular disturbed riverbanks) with native vegetation, in cooperation with neighbours and others, such as Landcare groups.	Medium Medium Medium Medium High

Current Situation	Desired Outcomes	Strategies	Priority
4.3 Cultural heritage The reserve is known to contain an important former campsite. No other heritage items have been recorded in the reserve, although some are known immediately outside the reserve boundaries. The lack of detailed Aboriginal cultural heritage surveys has been highlighted as an issue in the Clarence Estuary Management Plan (Umwelt 2003). It is important that the local Aboriginal community is involved in the protection of the cultural values in the reserve. Members of the local Aboriginal community have an interest in management of the reserve and the NPWS aims to support this interest.	Cultural heritage features are identified, conserved and managed in accordance with their significance. Understanding of the cultural heritage significance of the reserve is improved. Aboriginal heritage values are protected in partnership with the local Aboriginal community.	4.3.1 Consult and involve the Birrigan Gargle and Yaegl Local Aboriginal Land Councils, the Wdjri Myiral Elders group and other relevant Aboriginal community members in relation to understanding past use of the area, and interpretation and management of Aboriginal sites, places and values. 4.3.2 Undertake further research into the cultural heritage values of the reserve.	High Medium

Current Situation	Desired Outcomes	Strategies	Priority
4.4 Introduced species The most prevalent weeds found in the reserve are lantana, bitou bush, ground asparagus fern and smooth tree pear. Most of these have probably been introduced by illegal dumping of waste and garden refuse. Weed control has been undertaken in the Shores Drive section of the reserve by NPWS and the Yamba Landcare group. The Port of Yamba Yacht Club Landcare Group is controlling bitou bush and other weeds on Dart Island. While not identified as a priority site for bitou control under the Threat Abatement Plan, there is a need for ongoing bitou control on Dart Island. Fox populations are present in the reserve. Given the significance of the reserve as an important habitat for waders and shorebird species, the area has been identified as a key area for the implementation of the Fox Threat Abatement Plan (NPWS 2001). Fox control work commenced on Dart Island in 2003 and will continue to be a management focus in cooperation with other authorities. Straying pets are a continuing problem in the reserve; legislation prohibits dog walking in the reserve. There have been reports of cane toads in the reserve. Cattle are occasionally found grazing in the Micalo Island section of the reserve. Extensive pads, ground disturbance and associated soil erosion is evident in the riparian areas frequented by cattle. NPWS has prepared a Regional Pest Management Strategy for the North Coast Region (DECC 2008).	Pest management is consistent with the NPWS North Coast Region Pest Management Strategy. The impact of introduced species on native species within the reserve and neighbouring lands is minimised. The control of introduced species has minimal impact on native species. The potential for introduction of environmental weeds to the reserve is reduced. Cattle are excluded from the reserve.	4.4.1 Prepare and implement a pest species management strategy for the reserve. Current priorities for control are lantana, bitou bush and fox populations. 4.4.2 Monitor the results of pest species management and regularly inspect the reserve for outbreaks of any new pest species. 4.4.3 Liaise with Clarence Valley Council to promote public awareness on appropriate methods of garden refuse disposal and responsible domestic animal control. 4.4.4 Support and encourage local volunteer groups, neighbours and other authorities to undertake weed and pest animal control in partnership with NPWS. 4.4.5 Continue to undertake monitoring for cane toads in the reserve. 4.4.6 In accordance with the NPWS fencing policy, encourage maintenance and erection of effective fencing with adjoining private properties to prevent domestic stock entering the reserve.	High Medium High High Medium High

Current Situation	Desired Outcomes	Strategies	Priority
4.5 Fire management Urban development, such as sealed roads and housing development, and the Clarence River bound the majority of reserve. The reserve is considered to have a very low risk of bushfire. Fire history prior to gazettal is unknown, but it is likely that the isolation of parts of the reserve by roads and housing development has seen the frequency of fire reduced. Vegetation communities in the reserve are littoral rainforest, saline wetlands and swamp sclerophyll forest. Fire intervals for the swamp sclerophyll forest should generally be within 7 to 35 years, whilst fire should be excluded from the saline wetlands and the littoral rainforest. The proximity of the reserve to urban areas may increase the potential for arson and unscheduled fire within the reserve. However, the reserve is also located close to emergency services such as the NSW Fire Brigade and the NPWS Saltwater depot, and so fire suppression response can be rapid. Asset Protection Zones (APZs) on NPWS and council tenure are in place. No fire management trails exist within the reserve, however it is intended to maintain the APZs so they are accessible by management vehicles. A mound along the length of the Caravan Park APZ requires levelling to allow access for fire and emergency vehicles.	Life, property and natural and cultural values in and adjacent to the reserve are protected from bushfire. The potential for spread of bushfires on, from, or into the reserve is limited. Fire regimes are appropriate for the conservation of native plant and animal species and the endangered ecological communities.	4.5.1 Continue to participate in the Clarence Valley Bush Fire Management Committee. Maintain coordination and cooperation with the Rural Fire Service's brigades and fire control officers, as well as neighbours with regard to fuel management and fire suppression. 4.5.2 Subject to environmental impact assessment, improve emergency vehicle access along the existing Caravan Park APZ by levelling the mound of spoil next to the drain, and undertake slashing in the APZ to minimise fuel loads. 4.5.3 Liaise and work with Clarence Valley Council to continue existing arrangements to maintain the APZs within and adjacent to the reserve. 4.5.4 Where possible, exclude fire from fire-sensitive vegetation. Manage other vegetation types in accordance with the fire regime guidelines shown in Table 3 and vary burn patterns to protect biodiversity values. 4.5.5 Suppress all unplanned fires in the reserve. 4.5.6 Avoid the use of heavy machinery for fire suppression in the reserve. 4.5.7 If a fire occurs, initiate a monitoring program to assess the effects of fire and the recovery ecosystems.	High High High High High Medium Low

Current Situation	Desired Outcomes	Strategies	Priority
4.6 Visitor use Visitor use of the reserve must be carefully managed given its small size and significant values. There are no visitor facilities within the reserve. It is considered that adequate visitor facilities are provided on other tenures in the local area. Recreational activities have the potential to damage reserve values. Community understanding and appreciation of the conservation values of the reserve are not widespread. There is a need for interpretative signs on the edge of the reserve. Inappropriate uses that may degrade the reserve's values, such as walking domestic pets and the dumping of garden waste and rubbish, occur in the reserve. An informal track extends from Westringia Park across the saltmarsh to the Clarence estuary foreshore. This is causing unacceptable impacts on saltmarsh (an endangered ecological community) through erosion and compaction. While fishing and most other activities permitted under the Fisheries Management Act do not pose an impact on the nature reserve's values, the collection of bait from the intertidal zone may impact on the food resources of migratory wading species.	Recreational use of the reserve is limited to appropriate nature-based activities. Visitor use is ecologically sustainable. Educational opportunities are provided, consistent with reserve values and access limitations. The local community is aware of the reserve's significance and management programs.	4.6.1 Permit low-key self-reliant activities such as bird watching and fishing in the reserve. Visitation will not be promoted. 4.6.2 No recreational facilities will be provided within the reserve. 4.6.3 Public vehicle access, horse riding, bicycle riding, camping and campfires will not be permitted in the reserve. 4.6.4 Monitor impacts of visitor use through regular patrols in the reserve and undertake measures to reduce impacts where they are found to be unacceptable. 4.6.5 Where necessary, install signage, fencing and/ or bollards to manage visitor access and activities. In particular, close the informal walking track behind Westringia Park by signage and installation of chain and bollards. 4.6.6 Organise media releases, educational material and contact with neighbours and community organisations promoting values of the reserve. 4.6.7 In cooperation with Clarence Valley Council, install an interpretive display in Peninsula Park on Shores Drive, focusing on: – the role of nature reserves, – the significant species and communities occurring within the reserve, and – the significance of the area to Aboriginal people.	Medium High High Medium High Medium Medium

Current Situation	Desired Outcomes	Strategies	Priority
		4.6.8 Allow group educational activities that are consistent with the values of the reserve, subject to conditions on group size (<20), activities and location to protect reserve values and minimise conflict with neighbours. 4.6.9 Liaise with Industry & Investment NSW to encourage research into the potential impacts of bait collection in the Clarence estuary with a view to managing any impacts to an acceptable level.	Medium High
4.7 Research Further research will improve the understanding of the reserve's natural and cultural heritage, the processes that affect them and the management requirements of particular species. Ongoing research and monitoring in the area includes the Clarence Shorebird Conservation Project and the biennial NSW Waders Study Group shorebird count.	Research enhances the management information base and assists in best management practice.	4.7.1 Encourage appropriate research to improve knowledge and management of natural and cultural heritage, with a focus on the following topics: – population dynamics of significant species; – fire management; – threatened species management; and – pest species management.	Medium

Current Situation	Desired Outcomes	Strategies	Priority
4.8 Urban encroachment Several domestic structures, including moorings, jetties and seating structures, have been illegally built within the reserve. These structures pose a liability risk to the NPWS and compromise reserve values. Parts of the reserve are also used for car parking and storage of boats and other private equipment. In places, unauthorised vehicle access to the reserve is occurring through neighbouring council parks. A small section of the reserve (0.15ha) west of Westringia Park has been substantially modified, and is used by reserve neighbours as part of their backyards and for foreshore access. It has limited conservation value and capability for revegetation. NPWS considers the inclusion of this area within the reserve as a reserve boundary error. If retained in the reserve, the lawns, gardens and other improvements will need to be removed.	Encroachments on the reserve do not impact on reserve values.	4.8.1 Remove illegal mooring and other private structures located within the reserve, and any equipment stored in the reserve. Liaise with reserve neighbours and others to prevent future encroachments and clearing of vegetation. 4.8.2 Work with Clarence Valley Council to prevent unauthorised off-road vehicle access to the reserve. 4.8.3 Investigate all options for managing the small, degraded section of reserve west of Westringia Park, including the possible revegetation of the riverbank to assist with bank stabilisation. 4.8.4 Investigate rationalisation of the reserve's boundaries to maximise conservation outcomes.	High High Medium Medium

Current Situation	Desired Outcomes	Strategies	Priority
4.9 Management operations and other uses Signage identifying the boundary of the nature reserve is located on Shores and Melaleuca Drives. The location of some parts of the reserve boundary, particularly in the vicinity of Westringia Place and Melaleuca Drive, is not clear. There is good access to the boundary of the reserve except for the Micalo Island section. The only practical vehicle access to the Micalo Island section of the nature reserve is on management trails through the inactive prawn farm; drainage lines cut the public road reserve accessing this section of the reserve. There are no management trails on the reserve, although the APZs can be used for access in fire emergencies (see section 4.5). A small parcel of Crown land, managed by the Clarence Valley Reserve Trust, is landlocked between the reserve and private property behind Westringia Place. Oyster leases adjoin the Shores Drive section of the reserve and there are lease markers on the reserve. The leases are managed under the Fisheries Management Act and do not impact upon the reserve. The waters surrounding the reserve are also used for commercial estuary hauling and mesh netting. A navigational beacon located on the northern foreshore of Dart Island is maintained by NSW Maritime.	Reserve boundaries are clearly defined and identified. Appropriate access is maintained for management activities. Activities and operations on adjoining areas do not impact on the reserve. Management and maintenance of the navigational beacon does not impact on the reserve's values.	4.9.1 Survey the boundary of the Melaleuca Drive and Shores Drive sections of the reserve. 4.9.2 Undertake the following management activities: • remove rubbish and unauthorised structures from the reserve, • control unauthorised vehicle access within the reserve; and • revegetate cleared areas within the reserve's boundaries that are not required for management purposes. 4.9.3 Allow access by workcrews and others authorised by the Clarence Valley Reserve Trust and the Land and Property Management Authority to the Crown land behind Westringia Place. 4.9.4 Negotiate access to the reserve for management purposes with the owners of the prawn farm. 4.9.5 Liaise with Industry & Investment NSW and the holders of the oyster leases to ensure there is compliance with lease conditions to minimise impacts on the reserve. 4.9.6 Liaise with NSW Maritime regarding the beacon on Dart Island to ensure that its management and maintenance do not impact on the reserve's values.	Medium High High High High

GUIDE TO PRIORITIES

High priority activities are those imperative to achievement of the objectives and desired outcomes. They must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.

Medium priority activities are those that are necessary to achieve the objectives and desired outcomes but are not urgent.

Low priority activities are desirable to achieve management objectives and desired outcomes but can wait until resources become available.

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