

## **PART B MANAGEMENT OF CASUARINA COASTAL RESERVE VALUES**

This Part of the Plan focuses on the special characteristics of Casuarina Coastal Reserve, and specifies a number of management actions and programs designed to protect the natural and social values of the Reserve and to address the key management issues. These actions/programs, specific to Casuarina Coastal Reserve, are in addition to those of a more general nature outlined in Part A.

### **7. MANAGEMENT OF RECREATION VALUES**

This Section deals with all those issues associated with the recreational use of the Reserve. It is primarily concerned with ensuring that visitors to the Reserve have a pleasant and enjoyable experience. In order to achieve this, it is necessary to impose a degree of regulation to ensure that conflict between the various user groups is minimised and that antisocial behaviour does not spoil the enjoyment of others. The Section consists of a Zoning Scheme and a series of tables based on the values and issues that have been identified for the Reserve during the planning process, including the public meeting and consultations with stakeholders. The tables culminate in a number of proposed Management Actions designed to address the issues and ensure that Casuarina Coastal Reserve continues to provide a high quality visitor experience.

#### **7.1 Zoning Scheme**

A Visitor Use Zoning Scheme for the Reserve is presented in Figure 2. The main objective of zoning is to allocate activities to specific areas in order to limit conflicts that may arise through use of the Reserve and to promote activities and developments that are compatible with the overall need to conserve the natural and cultural values of the area.

The Reserve has been divided into five visitor use zones consistent with the management objectives and strategies prescribed in this Plan:

- Intensive Use Zone
- Dispersed Use Zone
- Fore-dune Protection Zone
- Marine Zone
- Free Beach Zone

##### **7.1.1 Intensive Use Zone**

The Intensive Use Zone covers access to the Reserve and areas where the majority of visitor facilities are concentrated.

There are three areas zoned as Intensive Use within the Reserve, including a large area extending from Rapid Creek carpark to the Free Beach car park and two smaller areas at Lee Point and Buffalo Creek. The Intensive Use Zone provides for recreational use with appropriate infrastructure and management to keep impacts at acceptable levels.

Public access to the Intensive Use Zone will be by roads suitable for conventional vehicle use, including cars, buses and motorbikes. Facilities to be provided in this zone include picnic

tables, barbecues, toilets, basic showers and electric lighting in selected areas. Facilities will be designed to cater for the requirements of 'special needs' groups.

### **7.1.2 Dispersed Use Zone**

This zone contains the majority of the Management Area and the Reserve's land and estuarine-based natural fauna and flora and has the dual purpose of protecting these natural values and providing for appropriate recreational and educational pursuits.

Public access in this zone will be by foot or bicycle along designated tracks or watercraft along Buffalo Creek. Other than boats along Buffalo Creek, motorised vehicles will not be permitted in this zone except for management and emergency purposes or by permit. This may include authorised contractors and concessions, staff from the surf life saving club, emergency services or other Government departments on official duty.

Tracks within this zone will be located to avoid sensitive areas (such as areas where the orange-footed scrubfowl, *Megapodius reinwardt* have active nesting mounds). Facilities such as interpretive materials, walking tracks and trail markers will be provided within this zone.

### **7.1.3 Foredune Protection Zone**

This zone extends along the seaward side of the dune system of the Reserve. The aim of this zone is to protect the dune system, which in turn protects the areas behind the dunes.

Members of the public will be discouraged from using this zone except for access to and from the beach along designated beach access tracks. Fencing of some areas will be necessary as a temporary or permanent protective measure. Domestic animals will be permitted to cross the Foredune Protection Zone along designated tracks subject to the regulations outlined in section 7.3 of this Plan. No facilities will be provided or vehicular access permitted in this zone, except for management purposes and emergency situations where persons on official duty may traverse the dunes. This may include staff from the surf life saving club on official duty using designated vehicle access points.

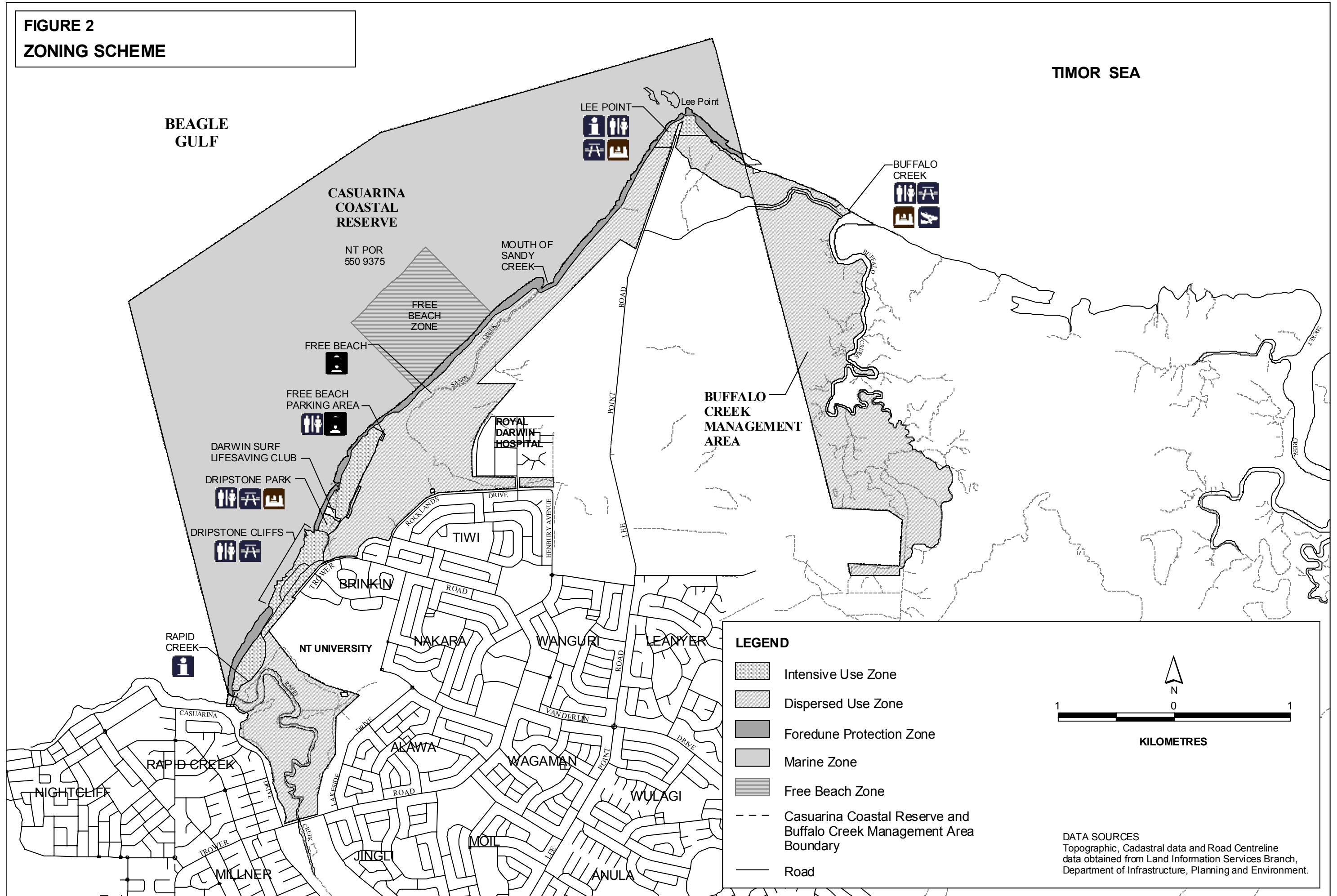
### **7.1.4 Marine Zone**

This zone extends along the full length of the Reserve between the high tide mark to the seaward boundary. It provides a focus for beach and water-based recreation including fishing, walking, jogging, swimming and ball sports. Public access will be by foot, bicycle or watercraft only. Motorised vehicles will not be permitted in this zone (except for management and/or emergency purposes). No facilities other than signs and possibly safety equipment will be provided in this zone.

### **7.1.5 Free Beach Zone**

The Free Beach Zone begins 500 metres from the car park at the end of Daribah Road and extends for 1000 metres along the beach in a northeasterly direction and for approximately 800 metres seaward of the beach (from the high water mark). Public access to this zone is by foot, bicycle or watercraft only. People using the Free Beach are permitted to remove their clothes once actually on the beach (not at the car park or along walking paths). Facilities provided in this zone include an outdoor shower, signs and/or markers indicating the boundaries of the Free Beach. Consideration will be given to the provision of a toilet and rubbish bins.

**FIGURE 2  
ZONING SCHEME**







## 7.2 General Recreational Use

<b>Value</b>	The Reserve provides opportunities for a large percentage of Darwin's population to participate in a broad range of recreational activities.
<b>Background</b>	<p><b>Access</b>  Vehicular access within the Reserve is along Daribah, Lee Point and Buffalo Creek Roads. Within the Reserve sealed access is provided to Dripstone Cliffs and the Free Beach Carpark. An unsealed road provides access to the open area adjacent to Rapid Creek. There are also a number of service tracks, some of which double as walking tracks or cycling tracks within the Coastal Reserve (see Figure 1).</p> <p>Off-road driving occurs in the open area adjacent to Rapid Creek. Off-road driving causes damage to the open area and is a concern to local residents who have complained about noise, dust and speeding.</p> <p>Pedestrian and cycling access to the Coastal Reserve is via the pedestrian bridge over Rapid Creek, off Rocklands Drive and from the Darwin Hospital. Pedestrian access to Buffalo Creek Management Area is usually along the beach between Lee Point and Buffalo Creek. During high tides access along the beach may be difficult.</p> <p>The Reserve provides a venue for a wide range of recreational pursuits including the following:</p> <p><b>Beach/Water Activities:</b> Casuarina Beach provides a focus for a wide range of recreational use including swimming, strolling, dog walking, ball games and relaxing. Canoeing and sailing occurs in the creeks and near shore areas. Buffalo, Sandy and Rapid Creek, Casuarina and Lee Point Beach and the offshore reefs are popular fishing sites. Recreational fisher persons must comply with NT Recreational Fishing Regulations including bag limits. The Fisheries Division of the Department of Business Industry and Resource Development are responsible for the management of fisheries in the NT and the enforcement of the <i>Fisheries Act</i>. The Buffalo Creek boat ramp is popular because of its convenient location close to the northern suburbs of Darwin. The Darwin Surf Lifesaving Club has a clubhouse within the Coastal Reserve and runs lifesaving activities on Casuarina Beach including patrolling the beach area in front of the clubhouse each Sunday during the dry season. Casuarina Beach was used as a venue for the beach volleyball competition during the 2001 Arafura Games.</p> <p><b>Barbecues and Picnics:</b> These activities are concentrated in the Dripstone Park and Lee Point areas where facilities have been provided, however, casual picnicking occurs throughout the Reserve. A large number of group and club functions are held at Dripstone Park and other areas of the Coastal Reserve each year.</p> <p><b>Walking and jogging:</b> Walkers and joggers regularly use the beach and walking tracks for exercise. Fitness clubs such as Hash House Harriers, Orienteering Club and the Darwin Athletic Club train and hold events in the Reserve. There is a need to rationalise the walking paths within some areas of the Reserve and identify shared paths for pedestrians and cyclists.</p> <p><b>Cycling:</b> Recreational cycling is a popular activity within the Reserve. A bicycle track runs from a pedestrian bridge over the mouth of Rapid Creek to Trower Road. Cyclists are permitted to use the service track, which leads from the car park at the end of Daribah Road to the mouth of Sandy Creek. There is a need to rationalise the cycling paths within some areas of the Reserve and identify shared paths for pedestrians and cyclists.</p> <p><b>Flying model aircraft and kites:</b> The open areas adjacent to Rapid Creek and Dripstone Cliffs are used occasionally for these activities.</p>

	<p><b>Sightseeing and nature study:</b> The Dripstone Cliffs area is used for viewing seascapes and sunsets. The prolific and varied bird life and interesting coastal vegetation attract naturalists. Opportunities for nature study are enhanced by the close proximity of the area to the University and other educational facilities.</p> <p><b>Free Beach and Nudity:</b> Public access to the free beach is via a short walking track from the car park at the end of Daribah Road.</p> <p>The Free Beach Zone was declared under the <i>Nudity Ordinance 1976</i> (NT Government Gazette 18.08.76). The “Free area” is designated under the Schedule (Regulation 2) of the <i>Nudity Act 1980</i>. The Act states that “A person is not guilty of an offence against a law in force in the Territory by reason only that he was nude in, or whilst swimming at, a free area.” The Act also states that “A person in, or in the waters or in the view of, a free area shall not behave in a manner that is sexually lewd or obscene.”</p> <p>During the review of the first Management Plan for Casuarina Coastal Reserve and the preparation of this Management Plan a number of people made representations supporting the free beach. No significant objections were received however, a number of issues related to people behaving in obscene and sexually lewd manner were identified. This issue is discussed in section 7.4.</p> <p><b>Visitor Facilities</b> The main visitor facilities within the Reserve include:</p> <ul style="list-style-type: none"> <li>• <b>Dripstone Park:</b> parking area, lawned picnic area with tables, barbecues, children’s play equipment, toilet, open showers, beach access and visitor information shelter.</li> <li>• <b>Dripstone Cliffs:</b> carpark, stairway and ramp, toilet and picnic tables.</li> <li>• <b>Free Beach:</b> carpark, toilet and open shower.</li> <li>• <b>Lee Point:</b> two car parks, lawned picnic area with barbecues, picnic tables, two ablution block and visitor information shelter.</li> <li>• <b>Buffalo Creek:</b> boat ramp, car and trailer parking area, toilet, picnic area with barbecues and picnic tables.</li> <li>• <b>Rapid Creek:</b> cycle path and visitor information shelter.</li> </ul> <p>Additionally, there are cycling and walking tracks and management and directional signs throughout the Coastal Reserve.</p> <p>The parking area near Dripstone Park and the beach access often overflows on weekends and when large functions are held in the park. Traffic entering and exiting the parking area is a safety concern especially for cyclists on the path leading down from Dripstone Cliffs. Opportunities exist to develop alternative carpark facilities and improve safety for cyclists and drivers.</p> <p>The open area adjacent to Rapid Creek lacks amenity. The first management plan identified opportunities to upgrade access in this area and improve the general amenity however, financial resources have not allowed its completion.</p>
<b>Requirement/s</b>	<p>Safe and enjoyable visitor experiences Access to facilities and services Clean and safe visitor facilities</p>
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To minimise the effect of recreational use on the Reserve's natural and cultural values.</li> <li>2. To manage recreational activities in a manner that minimises conflict between user groups.</li> <li>3. To manage recreational and visitor activities in a manner that promotes visitor safety.</li> </ol>

	<ol style="list-style-type: none"> <li>1. Manage recreational use within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 5).</li> <li>2. Regulate access, activities, facilities and developments in accordance with the Zoning Scheme (section 7.1).</li> <li>3. Prepare and implement a site development plan to improve the amenity of the Reserve and address the following issues: <ul style="list-style-type: none"> <li>- Traffic flow into and within the Coastal Reserve,</li> <li>- Safety and security,</li> <li>- Off road driving and speeding, and</li> <li>- Recommendations under the Rapid Creek Access and Signage Masterplan.</li> </ul> </li> <li>4. The site development plan will provide for: <ul style="list-style-type: none"> <li>- Development of alternative car parking facilities in the vicinity of Dripstone Park.</li> <li>- A safety audit and installation of solar lighting in car parks and other security measures.</li> <li>- Upgrading, sealing and realigning the unsealed road leading to the open area adjacent to Rapid Creek and development of car parking facilities.</li> <li>- Upgrading of beach access where appropriate including disabled access.</li> <li>- Upgrading of the walking and cycling path network including identification of shared pathways.</li> <li>- The closure and rehabilitation of vehicle and other tracks not required for visitor use or management purposes.</li> <li>- Barrier fencing to prevent unauthorised vehicular access.</li> <li>- Installation of direction, orientation and management signs.</li> <li>- Provision of facilities such as toilet and rubbish bins near the Free Beach.</li> </ul> </li> <li>5. All facilities will be sited and developed in accordance with the Zoning Scheme (section 7.1) and the Site Development Plan, which will be exhibited for public comment.</li> <li>6. Replace wood burning barbecues with gas barbecues in all areas of the Reserve.</li> <li>7. Camping and off-road driving, except for management and emergency purposes, will not be permitted within the Reserve.</li> <li>8. Walking and cycling in the Reserve will be permitted on designated tracks and service roads only.</li> <li>9. Provide information regarding Surf Lifesaving Patrols in the Reserve.</li> <li>10. Negotiate with the Darwin City Council to link the current bicycle/walking path that leads from Rapid Creek pedestrian bridge through to Trower Road with the Cycling/walking path along Rocklands Drive leading to the Darwin Hospital.</li> <li>11. Place signs on the boundaries of and the approaches to, the Free Beach area indicating that nudity is permitted within that area in accordance with the <i>Nudity Act</i>.</li> <li>12. Liaise with the NT Police to coordinate enforcement of the provisions of the <i>Nudity Act</i>, particularly those provision relating to sexually lewd and obscene behavior.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	In accordance with the Visitor monitoring System: <ol style="list-style-type: none"> <li>1. No. of visitor safety incidents</li> <li>2. Site impact of visitors</li> <li>3. Visitor satisfaction</li> </ol>	Decreasing Decreasing Stable or increasing	Incident reports Survey Visitor surveys

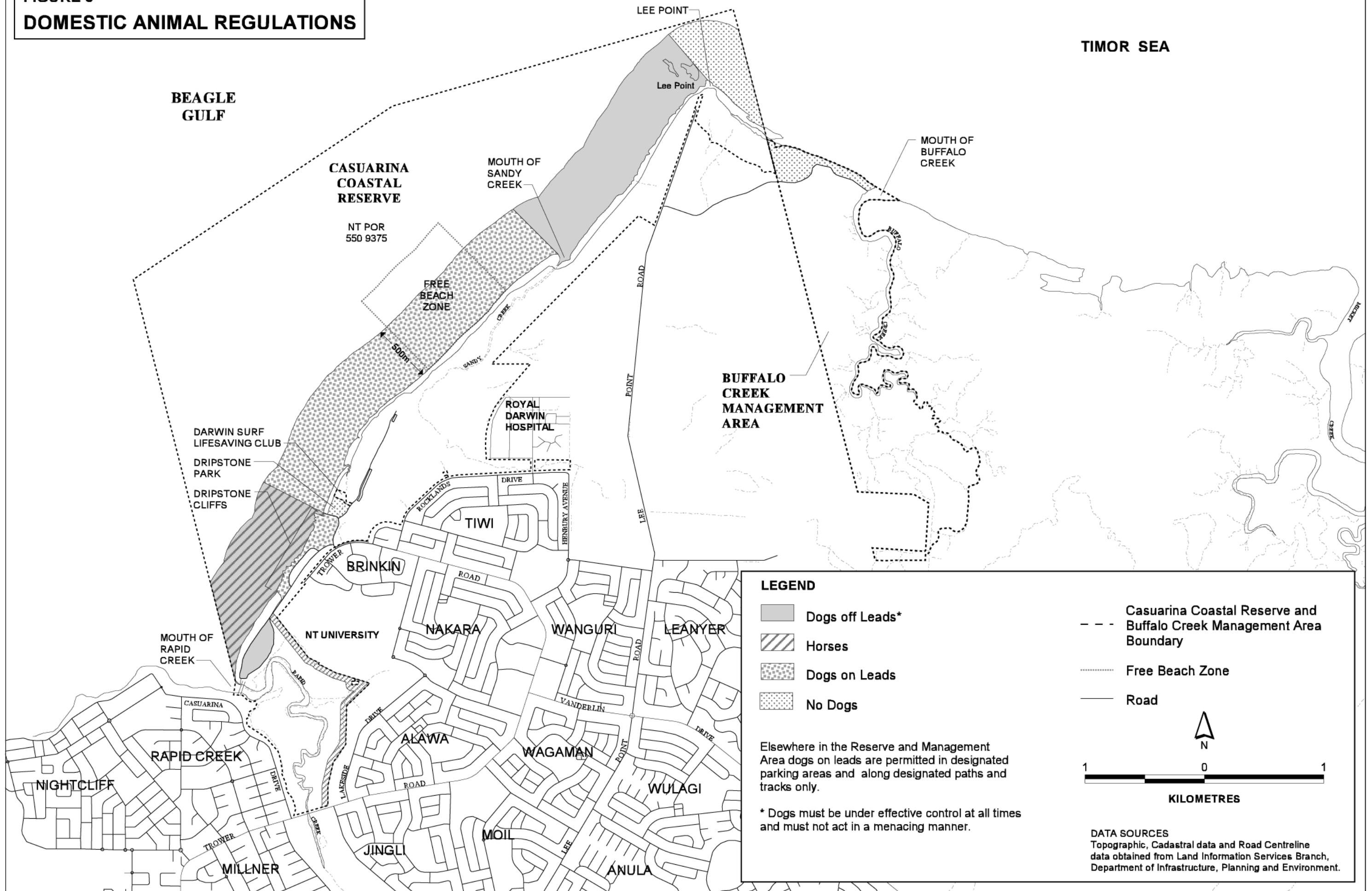
### 7.3 Domestic Animal Regulations

<b>Background</b>	<p>People exercising horses use the beach and sea areas between Rapid Creek and Dripstone Cliffs. As one of the only places in Darwin where dogs are allowed on the beach the Coastal Reserve has always been popular for people exercising dogs. A recent user survey found that 22% of people entered the Coastal Reserve with a dog. 59% of these people had their dogs off the leash for most of the time they were in the Coastal Reserve.</p> <p>Casuarina Coastal Reserve has a long history of use by pet owners as a place to exercise their horses and dogs. The population of Darwin has grown since the preparation of the first management plan and it is likely that the total number of dogs brought into the Coastal Reserve has increased.</p> <p>During the review of the first management plan and the preparation of this management plan a number of issues relating to the domestic animal regulations were identified including</p> <ul style="list-style-type: none"><li>• the need to simplify the regulations and remove time restrictions to improve user understanding and compliance with the regulations,</li><li>• the need to improve information and signs regarding the domestic animal regulations,</li><li>• the need to provide dog free areas on Casuarina Beach, and</li><li>• the need to provide areas on the beach where migratory wading birds can feed undisturbed.</li></ul> <p>Opportunities also exist to improve the amenity of the open area adjacent to Rapid Creek to better cater for people with dogs.</p> <p>The following domestic animal regulations have been developed to address the above mentioned issues.</p> <p><b>Horses</b></p> <p>Horses are permitted along the ‘bridle’ path that follows the eastern boundary of the Reserve adjacent Rapid Creek from Trower Road to the beach and along the beach and in the sea between the northern end of Dripstone Cliffs and the mouth of Rapid Creek.</p> <p><b>Dogs</b></p> <p>Dogs may be exercised and brought into the following areas <b>off a leash</b>, but under effective control:</p> <ul style="list-style-type: none"><li>- on the beach (within 500m below High Water Mark) between Rapid Creek and the northern end of Dripstone Cliffs (Southern Exercise Area),</li><li>- on the beach (within 500m below High Water Mark) between Lee Point and the mouth of Sandy Creek (Northern Exercise Area), and</li><li>- behind the dunes at Rapid Creek (Rapid Creek open area).</li></ul> <p>Dogs may be exercised and brought into the following areas <b>on a leash</b> and under effective control:</p> <ul style="list-style-type: none"><li>- in the area of the Coastal Reserve adjacent to the Dripstone Cliffs carpark,</li><li>- along designated walking paths, tracks and in car parks within the Reserve,</li><li>- the area of beach in front of Dripstone Park up to the mouth of Sandy Creek (500m seaward of High Water Mark) (Central Exercise Area).</li></ul> <p><b>Dog Free Areas</b> within the Reserve include:</p> <ul style="list-style-type: none"><li>- the whole of Dripstone Park,</li><li>- the area between Lee Point and the eastern boundary of the Coastal Reserve, and</li><li>- all other areas not specified in the above regulations as areas where dogs and/or horses are permitted.</li></ul>
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	<p><b>Conditions</b></p> <p>There are no time restrictions on the use of any of the dog exercise areas within the Reserve.</p> <p>Bitches ‘on heat’ must be tethered and accompanied by a person who is competent to restrain the dog at all times within all areas of the Coastal Reserve that dogs are permitted.</p> <p>People who bring dogs into the Reserve must remove and dispose of their pet’s faeces.</p> <p>Dogs must be under “effective control” at all times when in the Reserve.</p> <p>"Effective control" means:</p> <ol style="list-style-type: none"> <li>Dogs must be restrained by a leash, cord, chain or similar device held by a person who is competent to restrain the dog; or</li> <li>Dogs must be enclosed and contained in a vehicle; or</li> <li>Dogs that are in an area where dogs are permitted off a leash in accordance with this Management Plan, must return directly to an owner when called and must not act in a "menacing manner".</li> </ol> <p>"To menace" in relation to the actions of a dog means:  “An action that creates a reasonable apprehension in a person that the dog is likely to attack the person or an animal owned or in the control of the person, and includes reasonable apprehension that the dog may escape, or be released from restraint to attack the person or animal”.</p> <p>Figure 3 shows the regulations governing domestic animals within the Reserve.</p> <p>Serious incidences between dogs and between dogs and other users should be reported to the NT Police or Parks and Wildlife Commission to enable appropriate action to be taken.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>To minimise the level of conflict between pet owners and other users of the Reserve.</li> <li>To minimise the level of conflict between dogs, people and wildlife within the Reserve.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>Dogs and horses may enter the reserve in accordance with the domestic animal regulations outlined above and in Figure 3 in this Management Plan and in accordance with signs erected in the Reserve displaying the regulations.</li> <li>Erect signs in appropriate locations in the Reserve displaying and explaining the domestic animal regulations.</li> <li>Signpost designated car parks and walking/cycling paths where dogs are allowed.</li> <li>Provide information on where to report dangerous animals in signs displaying the domestic animal regulations.</li> <li>Enforce the domestic animal regulations. Visitors found to be in breach of the regulations may be prosecuted or issued with an infringement notice.</li> <li>Remove and/or impound unaccompanied domestic animals found within the Reserve.</li> <li>Review and adjust domestic animal regulations where necessary to ensure visitor safety and minimise any conflicts between users.</li> <li>Consider the feasibility of installing disposal units for dog faeces in the Reserve.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>Number of breaches of Domestic Animal Regulations.</li> <li>Number of reported incidences of ‘menacing’ behavior of dogs.</li> </ol>	Decreasing	Infringement notices and Incident reports.



**FIGURE 3  
DOMESTIC ANIMAL REGULATIONS**





## 7.4 Visitor Use Management

<b>Background</b>	<p>The large number of people and the diverse nature of activities undertaken in the Reserve will inevitably lead to conflict. The proximity of the Coastal Reserve to a growing urban population also presents challenges for management. Since the preparation of the first management plan a number of issues which compromise the user experience and safety have been identified, including:</p> <p><b>Illegal camping</b> occurs in the Coastal Reserve. Camping is not permitted in the Coastal Reserve and the lighting of fires other than in barbecues provided or by permit is not allowed. Itinerants regularly camp in the Reserve sometimes taking over picnic shelters in Dripstone Park and Lee Point but they also camp in the bush away from public areas or on the beach. In most cases illegal campers are quickly removed from the Reserve. Sometimes the size of the groups and their aggressive behavior makes it difficult and dangerous for Commission staff to remove people. In these cases the Police may assist in removing illegal campers.</p> <p>Campfires that get out of control, rubbish, drunkenness, aggressive behaviour, defecating, and urinating in public are some of the issues associated with illegal camping. The presence of faeces is a health risk and is extremely unpleasant especially in public places and on the beach.</p> <p><b>Public drunkenness</b> is often associated with illegal camping and itinerants. Rubbish, aggressive behavior, fighting, defecating and urinating in public and disturbance and harassment of other users are some of the problems associated with public drunkenness in the Reserve.</p> <p>The whole of the Casuarina Coastal Reserve is covered by an exemption under the <i>Summary Offences Act</i> that allows alcohol to be consumed within a 2-km radius of a licenced premise. Sometimes large groups of drunken people congregate in the Coastal Reserve. Currently, there are no time restrictions or limitations on where people can drink alcohol within the Coastal Reserve. The lack of restrictions on consumption of alcohol has contributed to the increased use of the Coastal Reserve by itinerants and drunks some of whom are moved on from other areas around Darwin. The Night Patrol service and Police assist in removing drunken people from the Coastal Reserve.</p> <p><b>Lewd sexual behavior</b> occurs in some areas of the Reserve but is more often associated with the free beach and the vegetated dune areas and toilets near the Free Beach. Whilst the law allows people to remove clothing on the Free Beach people are not permitted to act in a sexually lewd or obscene manner on the Free Beach or near the Free Beach. Despite being permitted to use the walking tracks and having no objection to nudity on the Free Beach other users of the Reserve (non-nudists) avoid these places as they do not feel comfortable or safe when confronted with this type of behaviour. It is believed that many incidences of obscene and sexually lewd behaviour are unreported.</p> <p><b>Theft</b> is a problem in many public places including the Coastal Reserve. A number of signs warning people to secure their cars and not to leave valuables in view have been erected in parking areas in the Reserve. A safety audit may provide other options for increasing safety and security in the Reserve.</p> <p>Visitor Surveys provide users with an opportunity to inform the Commission about management issues that require addressing and suggest improvements to management and facilities. The Commission also uses information obtained from these surveys to identify management issues, monitor management performance and to plan for future visitor facilities and services. Since the preparation of the first management plan two visitor surveys have been conducted in the Coastal Reserve. To date no visitor survey has been conducted at Buffalo Creek.</p> <p>The 2001 Casuarina Coastal Reserve visitor survey indicates that;</p> <ul style="list-style-type: none"><li>• the majority of travel parties to the Reserve are Territorians (83%), of these 67% are locals and 13% were from other areas of Darwin. Most people (62%) visited the Coastal</li></ul>
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	<p>Reserve more than 7 times within a 3 month period, of these people 41% visited at least 2-3 times a week and 32% visit the Reserve every day.</p> <ul style="list-style-type: none"> <li>• the main mode of travel to the Reserve is by private two-wheel drive vehicle (41%), 21% arrive by bicycle and 15% walk.</li> <li>• 22% of travel parties brought a dog with them and of these 59% had their dog off the leash for most of the time they were in the Reserve. Over the two days of the survey at least 116 unleashed dogs were in the Coastal Reserve.</li> <li>• the main activities undertaken within the Reserve include recreation and exercise (43%), relaxation (29%) and exercising pets (12%).</li> <li>• The main areas visited include Casuarina Beach (67%), Dripstone Cliffs (54%) and Lee Point (49%).</li> </ul> <p>Traffic counters are located at Lee Point and Daribah Road entrances to the Coastal Reserve to record the number of visits to the Reserve. Recording numbers enables the Commission to assess pressures on visitor services and facilities. A traffic counter has only recently been installed at Buffalo Creek.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To provide a safe, relaxing and enjoyable environment for visitors to the Reserve.</li> <li>2. To discourage obnoxious and offensive behaviour amongst visitors to the Reserve.</li> <li>3. To monitor visitor use, expectations and satisfaction in the Coastal Reserve.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Manage of recreational use within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 5).</li> <li>2. The consumption of alcohol within the Reserve will be restricted to the following locations; Dripstone Cliffs, Dripstone Park, Lee Point and Buffalo Creek picnic areas between the hours of 4 pm and 10.30 pm weekdays and 12 noon and 10.30 pm on weekends and public holidays.</li> <li>3. Apply to have the current exemption under the <i>Summary Offences Act</i> removed and to restrict the times and places where alcohol can be consumed in the Reserve.</li> <li>4. Install signs displaying the areas where, and times when, alcohol can be consumed within the Reserve. Consumption of alcohol outside of the prescribed areas or hours of consumption will not be permitted.</li> <li>5. Erect signs warning users about theft in the Reserve.</li> <li>6. Complete a safety audit during preparation of the site development plan for the Reserve including consideration of more regular mowing and maintenance around car parks and access tracks to keep areas shady but maintain good visibility.</li> <li>7. Regularly liaise with the NT Police and Night Patrol to coordinate enforcement in the Reserve particularly removal of drunken individuals and illegal campers.</li> <li>8. Consider installing a public telephone within the Reserve.</li> <li>9. Establish a Visitor Monitoring program for the Reserve in accordance with the Commission's Visitor Monitoring Manual to collect visit numbers and information on visitor use, expectations and satisfaction.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	1. Number of complaints from visitors concerning inappropriate behaviour.	Decreasing	Incident reports
	2. Number of times per month assistance from police is requested	Decreasing	
	3. Visitor satisfaction	Increasing	Visitor Surveys

## 7.5 Education, Information and Interpretation

<p><b>Background</b></p>	<p>To adequately manage visitors and promote safe and enjoyable experiences within the Reserve it is necessary to provide appropriate, high quality information and interpretive services. The interpretation program for the Reserve should orient visitors to the Reserve and provide them with quality information about the Reserve's values. It should also inform visitors of appropriate behavior and regulations in the Reserve.</p> <p>The level of public compliance in relation to management controls will be related to the level of public understanding of the values of the Reserve and the reasons for regulating activities. It is important therefore that recreational users are made aware of the Reserve's Zoning Scheme and in particular, the regulations concerning pets, consumption of alcohol and nudity within the Reserve.</p> <p>The interpretation and education program in the Coastal Reserve includes signs, publications and face to face programs.</p> <p>Publications include fact sheets and tourist brochures which help people plan their visit and to know what to expect when they arrive in the Reserve.</p> <p>The face to face program includes guided walks and talks. Rangers run regular talks in the Coastal Reserve as part of the Parks Alive interpretation and education program. The Commission's Community Education Unit also runs a number of activities in the Coastal Reserve under the Junior Ranger Program.</p> <p>The sign program includes interpretation, directional, orientation and management signs. Shelters with interpretation signs are currently located at Lee Point and adjacent to the cycle/walking path at Rapid Creek. Additionally, a number of management and directional signs are located throughout the Reserve to direct people around the sites, inform people of hazards and regulations.</p> <p>The shelters and signs are often vandalized and they require repair. Directional and management signs are also vandalized on occasion and need to be replaced. Signs need to be updated when there are changes in regulations. It is particularly important to maintain those signs which provide information on safety and regulations.</p> <p>Primary, secondary and tertiary students from many areas of Darwin use the Reserve for education. The Commission has produced a 'Teachers Handbook' for the Coastal Reserve which provides a valuable teaching aid for young students.</p>
<p><b>Management Objective/s</b></p>	<ol style="list-style-type: none"> <li>1. To inform the visiting public about the natural and cultural values of the Reserve.</li> <li>2. To inform visitors of the rules and regulations associated with use of the Reserve, particularly in relation to pets, consumption of alcohol and nudity.</li> <li>3. To encourage visitors to protect the values of the Reserve by minimizing there impacts.</li> </ol>

<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. The management of education, information and interpretation within the Reserve will be in accordance with the actions described in the General Park Management Principles and Directions (section 5).</li> <li>2. Prepare an Interpretive Plan for the Reserve, focussing on the Reserve’s primary natural and cultural values. The interpretive plan will provide for the following programs <ul style="list-style-type: none"> <li>- Management, orientation, information and directional signs,</li> <li>- face to face interpretation,</li> <li>- publications, and</li> <li>- pre-visit and post-visit information.</li> </ul> </li> <li>3. Install signs displaying the zoning scheme and domestic animal regulations within the Reserve.</li> <li>4. Maintain and replace where necessary, signs particularly those displaying safety information or regulations.</li> <li>5. Consider inclusion of Buffalo Creek Management Area in the Parks Alive program.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>1. Visitor awareness of regulations (particularly dogs).</li> <li>2. Visitor satisfaction</li> </ol>	<p>Increasing</p> <p>Stable or increasing</p>	<p>Visitor surveys</p> <p>Visitor surveys</p>

## 8. MANAGEMENT OF CULTURAL VALUES

This Section deals with those issues associated with the management of cultural values in Casuarina Coastal Reserve, including involvement of traditional custodians in the protection of Aboriginal sites and the protection of historic sites associated with World War II. The Section consists of tables based on the values and issues that have been identified for the Reserve during the planning process, including the public meeting and consultations with stakeholders. The tables culminate in a number of proposed Management Actions designed to address the issues and ensure that Casuarina Coastal Reserve's cultural values are fully protected.

### 8.1 Areas of Aboriginal Cultural Significance

Value	The presence of sites of cultural significance to Aboriginal People.
<b>Background</b>	<p>Casuarina Coastal Reserve is culturally important to the Larrakia People who claim traditional responsibility for the area and who are custodians of sacred sites and sites of significance. Larrakia Aboriginal people also have an interest, and are stakeholders, in the management of other Reserve values.</p> <p>There is one registered and five recorded sacred sites under the <i>Northern Territory Sacred Sites Act</i> in the Reserve. These include:</p> <ul style="list-style-type: none"> <li>- A registered sacred site, 'Old Man Rock' located offshore from Dripstone Park. The Larrakia name for 'Old Man Rock' is 'Darraba Nungalinya'. 'Darraba' is the title given to senior ceremonial men of the Larrakia tribe and 'Nungalinya' meaning 'rock'.</li> <li>- A site associated with Darraba Nungalinya known as 'Madjamarraba' which consists of the vegetated zone between Lee Point and a point directly opposite Darraba Nungalinya.</li> <li>- Burial grounds believed to be associated with the Tiwi Islanders.</li> <li>- A large fig tree in the dunes adjacent to the Rapid Creek Open Area, which is the site of an Aboriginal battlefield.</li> <li>- The northern tip of Lee Point, which is an historical lookout point.</li> <li>- A recorded site at Buffalo Creek.</li> </ul> <p><i>The Northern Territory Sacred Sites Act</i> protects sites of significance to Aboriginal people whether or not they are recorded. Archaeological places and objects of Aboriginal origin are protected under the <i>Heritage Conservation Act</i> whether or not they are declared heritage places.</p> <p>The whole of the Coastal Reserve is subject to a claim under the <i>Native Title Act</i>. Marine and intertidal areas are subject to a land claim under the <i>Commonwealth Aboriginal Land Rights (Northern Territory) Act</i>. The issuing of leases and licenses and some developments in the Reserve may have Native Title and/or Land Claim implications.</p>
<b>Requirement/s</b>	<p>Understanding and appreciation of the significance of the Reserve to Aboriginal people.</p> <p>Management of cultural sites in accordance with relevant legislation.</p> <p>Culturally appropriate management of Aboriginal sites.</p> <p>Involvement of custodians in managing and interpreting sites of significance in Aboriginal tradition.</p>
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To protect areas and sites of Aboriginal cultural significance.</li> <li>2. To involve traditional Aboriginal custodians in the management of important sites.</li> </ol>

<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Manage Aboriginal cultural values within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 3).</li> <li>2. Work closely with site custodians, Larrakia Nation Aboriginal Corporation and Aboriginal Areas Protection Authority to ensure that sites of Aboriginal cultural significance in the Reserve are managed in accordance with the wishes of the Aboriginal traditional custodians and the <i>Northern Territory Aboriginal Sacred Sites Act</i>.</li> <li>3. Consult with relevant Aboriginal people, their representative organisations and personnel with relevant archaeological and heritage expertise when managing and interpreting the Aboriginal cultural and archaeological values of the Reserve.</li> <li>4. Include Aboriginal Cultural values in the Reserve’s interpretation program where appropriate.</li> <li>5. Manage prescribed archaeological places and objects in accordance with the provisions of the <i>Heritage Conservation Act</i>.</li> <li>6. Undertake all developments in accordance with the provisions of the <i>Northern Territory Aboriginal Sacred Sites Act</i>, <i>Heritage Conservation Act</i> and the <i>Native Title Act</i>.</li> <li>7. Ensure appropriate Larrakia or their representative organisation is adequately represented in any community advisory committee (section 10.2).</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>1. Extent of degradation of Aboriginal areas and sites as determined by the cultural Management Audit.</li> <li>2. Involvement of Larrakia in management of Reserve values.</li> </ol>	Decreasing  Increasing	Cultural Management Audit  Stakeholder Engagement Audit (when developed)

## 8.2 Areas of Historical Significance

<b>Value</b>	The Reserve contains sites of historical importance associated with World War II.
<b>Background</b>	<p>Casuarina Beach and Dripstone Cliffs were fortified during World War II when observation bunkers, gun emplacements and barbed wire were installed as a front-line against enemy attack. Observation posts were constructed on the beach to direct artillery fire by logging the position of enemy targets and passing the information to the battery of field guns that were established on higher ground behind the beach.</p> <p>A remnant corduroy track occurs within the coastal Reserve in proximity to Rocklands Drive. The physical remains of three observation posts still remain within the Coastal Reserve. These are located at Lee Point, Dripstone Caves and Sandy Creek. A fourth observation post is located at Buffalo Creek and is situated in the Buffalo Creek Management Area. The posts at Lee Point, Dripstone Caves and Buffalo Creek are all included on the <i>Register of National Estate</i>. The observation post at sandy creek is a Declared Heritage Place under the <i>Heritage Conservation Act</i>. Of the remaining posts, it is by far in the best condition, probably because it has been least exposed to the elements.</p> <p>A Conservation Plan for the Sandy Creek Observation Post was developed in 1999 which provides a management plan and maintenance and monitoring schedule for the conservation of this WWII relict. The Plan states that the observation post at Sandy Creek “is the only one that is easily accessible and capable of being successfully conserved”. This observation post was interpreted as part of the WWII Historic Trails Program during the 50<sup>th</sup> anniversary commemoration WWII.</p>
<b>Requirement/s</b>	Understanding and appreciation of historic values Appropriate management and protection of the historic artefacts

<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To conserve the Reserve's historical values, including the physical remains of WWII structures, wherever possible.</li> <li>2. To develop interpretive information concerning WWII and the strategic role of Casuarina Beach and Dripstone Cliffs.</li> </ol>								
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Manage sites of historical significance within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 4).</li> <li>2. Liaise with Heritage Conservation Services regarding the management of the Reserve's historical values.</li> <li>3. Manage the WWII observation post at Sandy Creek in accordance with the Conservation and Management Plan, prepared for the site.</li> <li>4. Monitor the observation posts at Lee Point, Dripstone Caves and Buffalo Creek and where necessary develop a conservation strategy in consultation with Heritage Conservation Services, and in accordance with the Burra Charter.</li> <li>5. Prepare historical records including measurements, line drawings and photographs of all observation posts before modification or demolition works take place.</li> <li>6. Include WWII historical values in the Reserve's interpretation program.</li> <li>7. In consultation with Heritage Conservation Services, assess and nominate sites of historical significance for inclusion on the NT Heritage Register.</li> <li>8. Any work carried out on existing buildings or constructions will be done in consultation with Heritage Conservation Services and in accordance with the Burra Charter and, if successfully nominated for the NT Heritage Register, in accordance with the requirements of the <i>Heritage Conservation Act</i>.</li> </ol>								
<b>Performance Measure/s</b>	<table border="1"> <thead> <tr> <th data-bbox="408 954 944 981">Measure/s</th> <th data-bbox="957 954 1152 981">Desired Trends</th> <th data-bbox="1158 954 1390 981">Monitoring</th> </tr> </thead> <tbody> <tr> <td data-bbox="408 981 944 1075">Extent of degradation of historic sites as determined by the cultural Management Audit</td> <td data-bbox="957 981 1152 1075">Stable or decreasing</td> <td data-bbox="1158 981 1390 1075">Ranger observation and Annual inspections.</td> </tr> </tbody> </table>	Measure/s	Desired Trends	Monitoring	Extent of degradation of historic sites as determined by the cultural Management Audit	Stable or decreasing	Ranger observation and Annual inspections.		
Measure/s	Desired Trends	Monitoring							
Extent of degradation of historic sites as determined by the cultural Management Audit	Stable or decreasing	Ranger observation and Annual inspections.							

## 9. MANAGEMENT OF NATURAL VALUES

This Section deals with those issues associated with the management of Casuarina Coastal Reserve’s natural values, including its important assemblages of flora and fauna. It consists of a series of tables based on the values and issues that have been identified for the Reserve during the planning process, including the public meeting and consultations with stakeholders. Tables 10.1 – 5.4 focus on geomorphology, native vegetation, native fauna, and the estuarine and marine environment. Tables 10.5.1 – 10.5.4 detail key programs for the management of fire, weeds, exotic animals and mosquitoes. The tables culminate in a number of proposed Management Actions designed to address the issues and ensure the conservation of the Reserve’s natural values.

### 9.1 Geomorphology – Coastal Landforms

<b>Value</b>	Coastal plains, dune systems, estuaries, rocky cliffs, and intertidal sand flats which support coastal flora and fauna.
<b>Background</b>	<p>The most dominant landform in the Coastal Reserve is the <b>intertidal sandflats and off-shore reefs</b>. These landforms provide important habitat for marine invertebrates (mainly molluscs), wading birds, dugongs and marine turtles. Native fauna is discussed in more detail in section 3.3 and 3.4.</p> <p>Reefs occur off Lee Point and north of Rapid Creek (Old Man Rock). At extreme low tides the sandflats and the off-shore reef, Old Man Rock, are exposed. Old Man Rock is a registered sacred site. Sacred sites and sites of significance are discussed in section 5.1.</p> <p>Above high water mark two major landforms, dunes and beach ridges (Land unit 9c), and estuarine fringes (land units 9a and 9b) dominate the Coastal Reserve and Buffalo Creek Management Area (Appendix 1- Land Units).</p> <p>The <b>dunes and beach ridges</b> include extensive areas of foredune and relict dune systems. The dunes and beach ridges are characterized by dune sands often with calcareous hardpan and the presence of coastal monsoon rainforest and vine thicket.</p> <p>The dunes and beach ridges, especially the foredunes, are highly susceptible to disturbance from foot and vehicle traffic, and natural forces such as cyclones and storms. The whole of the Reserve with the exception of the area between Dripstone Cliffs and Dripstone Caves is within the Darwin primary or secondary storm surge zone. The foredunes are the ‘frontline’ in times of storm surge or major storm activity.</p> <p>In the 1960’s some areas of the Coastal Reserve were subject to sand mining which destabilized the dune system and destroyed coastal vegetation. In 1974, Cyclone Tracy caused substantial damage to the foredunes and coastal vegetation. Since then major rehabilitation and stabilisation works have taken place.</p> <p>The Natural Resources Division of the Department of Infrastructure, Planning and Environment has been conducting a long term monitoring program of the foredune system within the Coastal Reserve since 1990. The monitoring program has shown that sand is transported in an northerly direction along the beach, wind and small waves carry sand up the beach and occasional storm events can cause severe erosion to the foredunes. In association with the monitoring program, sand trapping devices (fences and matting) and planting of mainly <i>Casuarina equestifolia</i>, and <i>Spinifex sp</i>, have been used to stabilise the foredunes and assist natural accretion processes.</p> <p>Experience has shown that the best method of managing this dynamic environment is to</p>

	<p>maintain the area in a natural state, promote establishment of native vegetation cover and reduce the impacts of developments, pedestrians or other activities on the foredunes.</p> <p>The Reserve including the subtidal areas ('Old Man Rock' and the Reefs at Lee Point) are protected from mining through a Reservation from Occupation (No. 390) which also covers the Darwin Township Area.</p> <p>The <b>estuarine fringes</b> include the tidally influenced areas around Rapid Creek, Sandy (Sandfly) Creek and Buffalo Creek, and are characterized by saline muds and clays and the presence of mangroves and salt tolerant plant species. In the Coastal Reserve these areas are the focus of the mosquito control program. The mosquito control program is discussed in more detail in section 6.4. The estuarine fringes in Buffalo Creek and Rapid creek are a focus for recreational fishing. Recreational use of the Reserve is discussed in more detail in Section 4.1.</p> <p>The aesthetic values of the Reserve stem largely from the <b>coastal landforms</b> and <b>seascapes</b> particularly the intertidal areas, beach and elevated cliffs. Dripstone cliffs provide an excellent vantagepoint for viewing sunsets over the Arafura Sea. Casuarina beach and intertidal areas provide a natural coastal setting unusual in such close proximity to an urban residential area. The beach also allows expansive views of the largely undeveloped coastline to the east.</p> <p>Interesting geological features of the Reserve include the eroded siltstone cliffs and caves (Dripstone Cliffs and Dripstone Caves), and fossil deposits located within the bedrock of some of the Reserve's offshore reefs.</p> <p>The <b>soil</b> in most areas of the Reserve are potentially highly susceptible to disturbance especially where vegetation cover is removed, along drainage lines and in areas influenced by storm activity such as foredunes. Additional care needs to be taken when designing and siting visitor facilities and providing access to ensure that such developments do not cause erosion or unduly damage other values of the Reserve.</p> <p>A number of disturbed or cleared areas exist within the Coastal Reserve. Most are areas recovering from past disturbance from activities such as sand mining, gravel extraction for urban developments (between Sandy Creek and Lee Point) and vehicle tracks from uncontrolled vehicle access (trail bikes etc).</p>	
<b>Existing and Potential use/s and/or pressure/s</b>	Use/s	Pressure/s
	Recreation use Access Visitor facilities	<u>Current pressures:</u> Erosion, Uncontrolled access to foredunes. <u>Potential pressures:</u> Fossil collecting. Inappropriate visitor developments
<b>Current major pressure/s</b>	Erosion, Uncontrolled access to dunes.	
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To protect the Reserve's landforms, geological resources and fossils deposits.</li> <li>2. To protect the Reserve's dune systems.</li> <li>3. To rehabilitate disturbed landscapes where appropriate.</li> <li>4. To educate and inform the public about geomorphologic values of the area.</li> </ol>	
<b>Management Guidelines and Actions</b>	<ol style="list-style-type: none"> <li>1. Manage the soils and landforms within the Coastal Reserve in accordance with General Park Management Principles and Guidelines (section 2).</li> <li>2. Regulate visitor access, activities and developments in accordance with the Zoning Scheme for the Coastal Reserve (section 7.1).</li> <li>3. Establish a dune stabilization program which includes; <ul style="list-style-type: none"> <li>- the use of sand trapping devices (fences, matting etc.),</li> <li>- revegetation of denuded dune areas with appropriate endemic species, and</li> </ul> </li> </ol>	

	<ul style="list-style-type: none"> <li>- regulated access across the foredunes.</li> <li>4. Continue to liaise with the Natural Resources Division Department of Infrastructure, Planning and Environment (DIPE) regarding the foredune monitoring program and stabilisation of foredunes.</li> <li>5. Include information in the interpretive program regarding protection and management of the Reserve 's coastal geomorphology and landforms.</li> <li>6. Identify areas susceptible to soil erosion and acid sulfate soils to assist in assessing the capabilities of the Reserve for suitable visitor activities, developments and future uses.</li> <li>7. Design, site and construct all future developments <ul style="list-style-type: none"> <li>a) subject to land suitability and capability assessment,</li> <li>b) to minimize the risk of soil erosion,</li> <li>c) to consider likely impacts of storm surge.</li> </ul> </li> <li>8. Identify and rehabilitate areas of active soil erosion.</li> <li>9. Regularly monitor effects of visitor and management activities on soils and close and rehabilitate areas where visitor use and management activities have deleterious effects upon the soils.</li> <li>10. Close and rehabilitate vehicle tracks not used for recreation or management purposes.</li> <li>11. Consult with Natural Resources Division of the DIPE regarding erosion control and rehabilitation of active erosion sites.</li> </ul>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	Number of recorded sites of active soil erosion Number of active soil erosion sites requiring rehabilitation.	Decreasing  Decreasing	Ranger observation

## 9.2 Native Vegetation

<b>Value</b>	The Reserve contains a variety of vegetation communities representative of the 'Top End' coastal environment.
<b>Background</b>	<p>281 species of plants have been recorded in the Coastal Reserve including 56 introduced species, 12 of these are declared weeds under the <i>Weeds Management Act 2001</i>. Introduced species are discussed in section 9.5.2 and Appendix 3 contains a list of flora recorded within the Coastal Reserve.</p> <p>The variety of vegetation communities in the Coastal Reserve provides habitat for a diverse range of coastal fauna. Native fauna is discussed in more detail in section 9.3.</p> <p>A vegetation survey carried out in January 1991, using aerial photographs, described twenty-four vegetation communities and their distribution in the Coastal Reserve. Many of these communities are the result of human activity, such as the <i>Casuarina equisetifolia</i> and <i>Spinifex longifolius</i> planting's to help stabilize the dune system, or weed introductions such as Coffee Bush (<i>Leucaena leucocephala</i>) and Candle Bush (<i>Senna alata</i>).</p> <p>In 1996, Greening Australia carried out a larger survey of remnant vegetation in Darwin Municipality, which included both the Coastal Reserve and Buffalo Creek Management Area. The Greening Australia vegetation survey described 17 vegetation communities. Figure 4 shows the distribution and provides a description of the seventeen vegetation communities present in the Coastal Reserve.</p> <p>The most predominant vegetation communities identified in these surveys include:</p> <p><b>Monsoon Rainforest</b> Monsoon vine forest areas include both deciduous and evergreen tree species as well as many vine species.</p> <p>Mixed species monsoon rainforest with a closed canopy which varies in height from 20 - 25</p>

metres dominated by evergreen species, is associated with permanent moisture. Mixed species Coastal monsoon rainforest with a seasonally closed canopy to 10 m tall is dominated by deciduous species and are associated with seasonally dry habitats. A transition community of *Acacia auriculiformis* open forest to closed forest is also found associated with nearby rainforest. The presence of emergent *Acacia auriculiformis* separates these two distinct vine-forest communities.

A modified coastal rainforest community with naturalized exotic trees are present with some enrichment planting of local native species is associated with the Monsoon Rainforest community. This includes planted and natural groves of *Casuarina equisetifolia* up to 15 metres in height scattered along the foredunes and isolated plants in other areas. The ground layer is composed of *Spinifex longifolius*, *Ipomea pes-caprae* and *Fimbristylis* species. The shrub *Exocarpus latifolius* are found under some *Casuarinas*.

These Monsoon Rainforest communities and *Casuarina* communities are particularly vulnerable to frequent wildfires. Fire Management is discussed further in section 2.2.2 and 9.5.1.

**Mangroves** are another important vegetation community found within the Reserve. Mangroves are discussed in section 9.4 of this Plan.

#### **Eucalyptus Communities**

Common dominants of the upper storey of this community include *Eucalyptus papuana*, *E. tetradonta*, *E. polycarpa*, *Alstonia actinophylla*, *Terminalia ferdinandiana* and *Erythrophleum chlorostachys*. On higher ground *Eucalyptus miniata* and *E. bleeseri* occur. On disturbed sites, *E. tetradonta* regeneration low open forest is found. These communities have evolved in the presence of fire. Fire Management is discussed further in section 6.1.

#### **Paperbark (Melaleuca) Communities**

The dominant overstorey of this community includes *Melaleuca viridiflora*, *Eucalyptus papuana*, *E. polycarpa* and *Erythrophleum chlorostachys*. Other species present include *Petalostigma quadriloculare*, *Grevillea dryandri*, *Calytrix exstipulata* and the grass *Aristida holathera*. This unit also contains areas of *Eucalyptus miniata*/*E. tetradonta* open forest and areas of seasonal swamps. These communities are particularly threatened by frequent wildfires. Fire Management is discussed further in section 2.2.2 and 9.5.1.

#### **Grassland**

*Sorghum intrans*, *Eriachne burkitti*, *Heteropogon contortus* mixed species grassland, with regeneration very low open woodland. This community includes cleared or disturbed areas from Dripstone Cliffs to Rapid Creek.

#### **Pandanus Communities**

Regeneration *Melaleuca viridiflora* low woodland to low open woodland with *Pandanus spirilis* and *Lophostemon lactifluus*. Commonly includes areas of seasonal swamp. A small pocket of this community exists in the Rapid Creek adjacent to the Mangrove communities.

#### **Communities Dominated by Introduced Species**

These communities are discussed in more detail in 9.5.2.

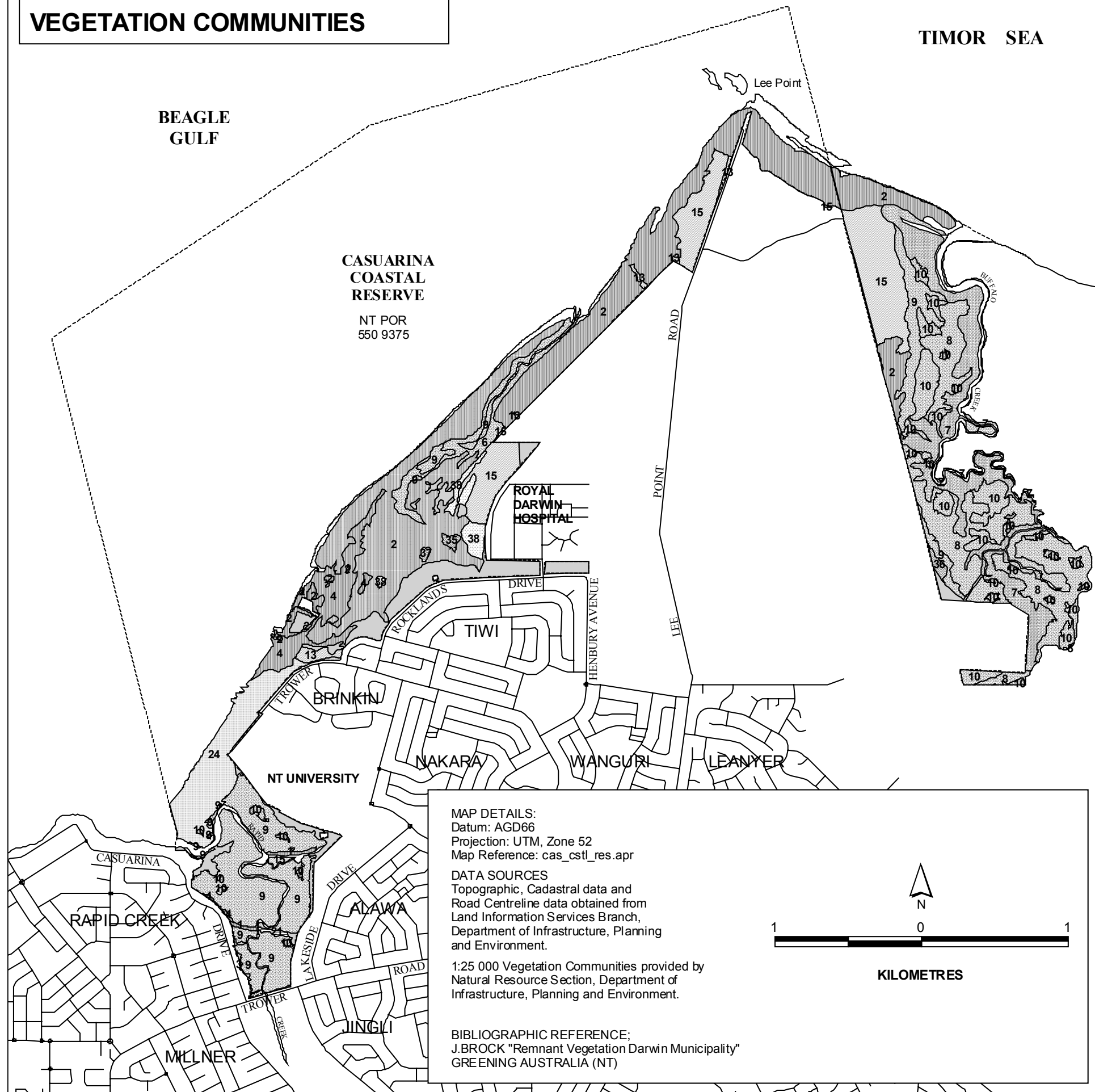
**Marine flora** is not well studied in the Coastal Reserve however, the following species of seagrass have been recorded in the Coastal Reserve; *Halodule pinifolia*, *Halodule uninervis*, *Halophila ovata*.

The Coastal Reserve's vegetation has been significantly altered by both natural events such as Cyclone Tracy and by human activities such as sand mining and indiscriminate recreational use. The native vegetation communities within the Coastal Reserve exist, mostly in a stable or 'recovery' state. Vegetation communities in the Management Area remain relatively unaltered, however indiscriminate recreational use (mainly uncontrolled vehicle access and illegal dumping) has caused damage to vegetation communities.

Wildfire and weed invasion presents the greatest threat to the Coastal Reserve's native vegetation communities. These threats are discussed in more detail in section 9.5. The

	<p>destabilisation of the foredune system from storm surge and cyclones also threatens some vegetation communities (section 9.1). At a regional level fragmentation or isolation presents a threat to native vegetation communities particularly the widely dispersed and patchy monsoon rainforest community. Isolation occurs when geographic and ecological links between natural areas are broken leading to a decline in recruitment of native flora and restricted movement of mobile fauna.</p> <p>A number of Community groups are involved in the management of the Coastal Reserve's vegetation communities. The Rapid Creek Catchment Advisory Committee is interested in the management and preservation of the catchment including the native vegetation communities and the Casuarina Coastal Reserve Landcare Group participates in vegetation management programs in the Reserve. Community involvement is discussed further in section 10.2.</p>		
<b>Existing and Potential use/s and/or pressure/s</b>	Use/s	Pressure/s	
	Recreation Use Management activities	<u>Current pressures:</u> Wildfire, Weed invasion Uncontrolled visitor access, dune erosion <u>Potential pressures:</u> Habitat isolation and fragmentation	
<b>Current major pressure/s</b>	Wildfire and weed invasion		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>To rehabilitate disturbed vegetation communities.</li> <li>To manage deleterious effects on the Reserve's native vegetation, including fire, weeds and erosion.</li> <li>To inform the community about the value of maintaining and promoting the growth of native coastal vegetation.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>Manage native vegetation within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 2).</li> <li>Regulate access, activities and developments in accordance with the Zoning Scheme (section 7.1).</li> <li>Regulate visitor activities, control introduced plants, animals and fire to maintain the natural abundance and diversity of native vegetation communities in the Reserve (sections 7.2, 9.5.1, 9.5.2, and 9.5.3).</li> <li>Rehabilitate disturbed sites where appropriate.</li> <li>Develop and implement a program to record extent, distribution and diversity of native flora in the Reserve.</li> <li>Liaise with relevant government planning authorities to ensure that future development of surrounding land is sympathetic to the protection of vegetation communities in the Reserve.</li> <li>Encourage and facilitate involvement of Landcare groups in management of vegetation in the Reserve including rehabilitation of disturbed sites.</li> <li>Provide information to visitors about the distribution and characteristics of the native vegetation communities and their management.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	In accordance with the Biodiversity and Species Management Audit <ol style="list-style-type: none"> <li>Total number of known native flora species present</li> </ol>	Stable	Vegetation survey Aerial photo's

**FIGURE 4  
VEGETATION COMMUNITIES**



**MAP DETAILS:**  
 Datum: AGD66  
 Projection: UTM, Zone 52  
 Map Reference: cas\_cstl\_res.apr

**DATA SOURCES**  
 Topographic, Cadastral data and Road Centreline data obtained from Land Information Services Branch, Department of Infrastructure, Planning and Environment.

1:25 000 Vegetation Communities provided by Natural Resource Section, Department of Infrastructure, Planning and Environment.

**BIBLIOGRAPHIC REFERENCE:**  
 J.BROCK "Remnant Vegetation Darwin Municipality"  
 GREENING AUSTRALIA (NT)

**VEGETATION COMMUNITIES**

- MONSOON RAINFOREST**
- 1 Mixed species monsoon rainforest associated with permanent moisture. Closed canopy 20-25m tall dominated by evergreen species, including *Acacia auriculiformis*, *Calophyllum soulattri*, *Carpentaria acuminata*, *Horsfieldia australiana* and *Syzygium nervosum*.
- 2 Mixed species coastal monsoon rainforest associated with seasonally dry habitats. Deciduous species including *Peltophorum pterocarpum*, *Terminalia microcarpa* and *Ficus virens* dominate the seasonally closed canopy to 10m tall, with taller emergents.
- 3 *Acacia auriculiformis* open forest to closed forest. A transition community generally associated with nearby rainforest.
- 4 A modified coastal rainforest community allied to community 2. Naturalised exotic trees are present, with some enrichment planting of local native species.
- MANGROVES**
- 6 Coastal *Rhizophora stylosa* closed forest to 16m tall, commonly in pure stands forming shoreline zone.
- 7 *Rhizophora stylosa*, *Bruguiera exaristata*, *Camptostemon schultzei* closed forest to open forest. This community grows along tidal creeks and includes adjacent transitional zones.
- 8 *Ceriops tagal* low closed forest 2-6m tall. Commonly forms pure stands on tidal flats.
- 9 *Ceriops tagal*, *Avicennia marina*, *Lumnitzera racemosa*, *Excoecaria ovalis* low closed forest generally 2-7m tall. Hinterland mangrove zone; the species may occur together or as locally pure stands.
- 10 Salt flats. Hypersaline flats of bare sandy mud, with occasional shrubs such as *Batis argillicola* and *Suaeda arbusculoides*, and scattered stunted mangroves.
- EUCALYPTUS COMMUNITIES**
- 13 *Eucalyptus tetradonta*, *E. miniata* open forest with *Sorghum intrans* and *Heteropogon triticeus* grassland understorey.
- 15 *Eucalyptus tetradonta*, *E. miniata* woodland to low woodland, with mixed species mid stratum and grassland understorey.
- PANDANUS COMMUNITIES**
- 21 *Pandanus spiralis* low woodland to very low open woodland, with *Lophostemon lactifluus* and *Grevillea pteridifolia*. Ground layer dominated by mixed species grasses and sedges.
- GRASSLAND**
- 24 *Sorghum intrans*, *Eriachne burkittii*, *Heteropogon contortus* mixed species grassland, with regeneration very low open woodland. Includes cleared or disturbed areas.
- INTRODUCED SPECIES**
- 35 *Senna alata* tall closed shrubland 3-4 tall with *Senna obtusifolia*, *Crotalaria goreensis* and occasionally *Mimosa pigra*.
- 36 *Pennisetum polystachion* closed grassland with *Pennisetum pedicellatum*. Other species include *Andropogon gayanus*, shrub *Aeschynomene americana* and vines *Calopogonium mucunoides* and *Centrosema pubescens*.
- 37 *Leucaena leucocephala* tall closed shrubland to low closed forest, generally in pure stands to 12m tall.
- PAPERBARK COMMUNITIES**
- 38 Regeneration *Melaleuca viridiflora* low woodland to low open woodland with *Pandanus spiralis* and *Lophostemon lactifluus*. Commonly includes areas of seasonal swamp.
- CLEARED LAND**



### 9.3 Native Fauna

<b>Value</b>	Native Fauna that is representative of the Darwin Coastal bioregion and is relatively abundant despite being in close proximity to urban areas.
<b>Background</b>	<p>The Reserve contains a broad variety of habitats including monsoon vine thickets, tropical woodland, marine, intertidal and estuarine habitats that support native fauna typical of Top End coastal areas. They also support and protect species of conservation significance such as Green and Flatback Turtles, Dugong and migratory wading birds. Native fauna found in the Estuarine and marine areas is discussed in section 9.4. A list of native fauna recorded within the Reserve is provided at Appendix 3.</p> <p><b>Birds</b> 152 species of birds have been recorded in the Reserve including 33 species listed on international treaties for the protection of migratory birds and their habitat with the Governments of China (CAMBA) and Japan (JAMBA). 22 species are listed under the International Convention for the Protection of Migratory Species of Wild Animals (Bonn Convention) of which Australia is a signatory. 28 species are listed on both JAMBA and CAMBA and 20 are listed on all three treaties. 4 species of birds have been listed as near threatened in the Northern Territory i.e. they are close to vulnerable because of limited distribution or declining populations. The Wilson’s storm petrel is considered data deficient in the Territory where little information is available to assess its conservation status.</p> <p>The area between Lee Point and Buffalo Creek is significant for migratory waders. At certain times of the year thousands of migratory waders congregate in the intertidal area feeding and storing energy for their long journeys. Unrestrained dogs can disturb these birds. Disturbance by dogs is a concern particularly because constant disturbance provides less opportunity for the birds to build up fat reserves and they may eventually stop using these areas of the Reserve which would significantly lessen the natural values of the Reserve.</p> <p>Some interesting species include the mound building orange-footed scrubfowl (<i>Megapodius reinwardt</i>) which breeds in the Reserve, the rare Lewin’s Rail (<i>Rallus pectoralis</i>) which has been recorded once within the Coastal Reserve and the rarely seen Chestnut Rail (<i>Eulabeornis castaneiventris</i>).</p> <p>The wide variety of bird species, including flocks of cockatoos, kingfishers, honey eaters and warblers have become an interesting attractions for local, interstate and overseas visitors and are widely distributed across all habitats in the Reserve. The value of the area for birdwatching is enhanced by its close proximity to Darwin.</p> <p><b>Amphibian and Reptiles</b> 27 species of reptile and 13 species of frogs (amphibian) have been recorded in the Reserve. The Mertens water monitor (<i>Varanus mertensi</i>) and Mertons sea snake (<i>Parahyphis mertoni</i>) have limited distributions in the NT. A survey of the Rapid Creek area in 1980 (Dwyer and Associates) recorded the presence of the northern water dragon (<i>Lophognatus temoralis</i>) and Mitchells water monitor (<i>Varanus mitchelli</i>). Frilled neck lizards (<i>Chlamydosaurus kingii</i>) are common and are often seen in Dripstone Park. Goannas occur in areas of woodland and grasslands within the Reserve. Although not commonly encountered or noticed by the general public, a number of frogs species are also present within the Reserve.</p> <p><b>Mammals</b> 7 species of mammal have been recorded in the Reserve. The most common mammals found on the Reserve include Bandicoots (<i>Isodon macrourus</i>), Water rats (<i>Hydromys chrysogaster</i>), grassland melomys (<i>Melomys burtoni</i>) and Agile wallabies (<i>Macropus agilis</i>). The northern brushtail possum (<i>Trichosurus arnhemensis</i>) has also previously been recorded in the Rapid Creek mangroves.</p> <p><b>Invertebrates</b> Over 650 species of molluscs, 22 species of butterfly and 32 species of mosquitoes have been recorded in the Reserve. However, very little is known about other invertebrate populations and this list is unlikely to be complete.</p>

	<p>Five introduced species of invertebrate have been recorded within disturbed areas. These include two land snails (<i>Subulina octona</i> and <i>Lamellaxis gracilis</i>) the big-headed ant (<i>Pheidole megacephala</i>), a striped millipede and a leaf-hopper. It is likely that Cane Toads will invade areas of the Coastal Reserve. Exotic animals are discussed in more detail in section 9.5.3.</p> <p>The major threat to fauna in the Reserve comes from disturbance to habitat. The main disturbances to habitat in the Coastal Reserve are caused by weed invasion, wildfires and erosion of the foredunes during storm activity. Occasionally animals are killed on the roads within the coastal Reserve. Aboriginal people are known to harvest turtle eggs, molluscs, particularly longbums, and other fauna in the Reserve. No study on the impact this harvesting has been carried out.</p> <p>At a regional level, fragmentation or isolation of habitat also presents a threat to native fauna populations. Isolation or fragmentation occurs when ecological and/or geographic links between natural areas are broken. The level of risk of isolation and its impacts has not been studied in the Reserve.</p> <p>The variety of coastal habitats and fauna and the close proximity of the Reserve to the Northern Territory University (NTU) and the Northern Suburbs of Darwin make it a prime location for natural resource study. University and Museum staff, students and community groups such as the NT Field Naturalists Club use the Reserve to conduct studies of native flora and fauna and improve their knowledge of the NT coastal environment. The Reserve is also used for activities under the Parks and Wildlife Community Education Program (Junior Rangers). The studies carried out by the University and observations made by community groups adds to the knowledge base and can assist in management of the Reserve's native flora and fauna.</p>	
<b>Existing and Potential use/s and/or pressure/s</b>	Use/s	Pressure/s
	Recreation Research and study Management activities	<u>Current pressures:</u> Destruction of habitat through weed invasion and fire <u>Potential pressures:</u> Feral animals Habitat fragmentation
<b>Current major pressure/s</b>	Weed invasion Wildfire	
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To maintain areas of natural habitat within the Coastal Reserve in a natural state by managing threatening processes such as fire, introduced species and erosion.</li> <li>2. To minimize impacts on native fauna from pets and introduced animals.</li> <li>3. To encourage research and study into the populations of native animals within the Reserve.</li> </ol>	
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Manage native fauna within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 2).</li> <li>2. Regulate access, activities and developments in accordance with the Zoning Scheme (section 7.1).</li> <li>3. Develop and implement a program to record native fauna species abundance, distribution and diversity in the Reserve.</li> <li>4. Develop and implement a program to record extent, distribution and diversity of faunal habitat in the Reserve.</li> <li>5. Regulate visitor activity, control fire, weeds and introduced fauna, to maintain the natural abundance and ecological diversity of the native animals in the Reserve (see section 7.1, 7.2, 9.5.1, 9.5.2, 9.5.3 and 9.5.4).</li> <li>6. Implement domestic animal regulations to minimise the impact of domestic animals on native fauna.</li> </ol>	

	<p>7. Provide information to dog owners on the impact of their pets on migratory wading birds in the interpretation and education programs for the Reserve.</p> <p>8. Liaise with relevant government planning authorities to ensure that future development of surrounding land is sympathetic to the protection of native fauna in the Reserve.</p> <p>9. Encourage further research into the population of native animals within the Reserve by community groups, staff and students of the Northern Territory University and staff from the Northern Territory Museum.</p>		
<b>Performance Measure/s</b>	Measure	Desired Trends	Monitoring
	<p>In accordance with the Biodiversity and Species Management Audit</p> <p>1. Total number of known native vertebrate species present</p>	Stable or increasing	Faunal surveys

## 9.4 Estuarine and Marine Environment

<b>Value</b>	Casuarina Coastal Reserve is one of the few protected areas in the Northern Territory that includes a substantial marine and intertidal component.
<b>Background</b>	<p>The estuarine, marine and intertidal elements of the Coastal Reserve include the following:</p> <p><b>Mangroves</b>  Relatively large areas of mangroves can be found adjacent to Rapid Creek, Sandy (Sandfly) Creek and Buffalo Creek in the Coastal Reserve. Five communities of Mangroves have been described in the Reserve (see Figure 4). The predominant species of mangroves include <i>Rhizophora stylosa</i>, <i>Avicennia marina</i>, <i>Ceriops tagal</i>, <i>Bruguiera exaristata</i> and <i>Lumnitzera racemosa</i>.</p> <p>Mangrove communities provide a number of important ecological functions in an ecosystem including:</p> <ul style="list-style-type: none"> <li>- trapping pollutants from urban runoff such as rubbish, heavy metals and other contaminants,</li> <li>- providing habitat and nursery grounds for juvenile fish, molluscs, crustaceans, birds and other fauna, and</li> <li>- protection of the natural environment against coastal erosion and storm surge.</li> </ul> <p>Stormwater enters the mangroves in Rapid Creek from a large drain in the vicinity of the Northern Territory University and tidally influenced areas of Sandy (Sandfly) Creek from a drain near the Darwin Hospital. The installation of the hospital drain was completed as part of the mosquito control program.</p> <p>The Northern Territory University plans to construct a lake adjacent to Rapid Creek. The overflow from the lake will drain into Rapid creek via the existing stormwater drain. The installation of pollutant traps and decreases in velocity of water entering the creek from the drain should improve water quality in stormwater entering Rapid Creek. The project also includes the removal of coffee bush from some areas that will assist in the control of weeds in the Coastal Reserve.</p> <p><b>Fish</b>  Sixty species of fish have been recorded in the Coastal Reserve. It is likely that most of the fish species recorded in Darwin Harbour could be found in the marine and estuarine areas of the Coastal Reserve. Most fish pass through the Reserve with the tides, however, reef areas at Lee Point contain resident populations of some marine organisms, particularly, molluscs, crustaceans and reef fish. Some of these creatures could be diminished by over exploitation. Species of fish recorded within the Reserve are provided at Appendix 3.</p> <p><b>Molluscs</b>  The mangroves, mudflats and large sand flats within the estuarine and marine areas provide excellent habitat for molluscs. Approximately 669 species of molluscs have been recorded</p>

within the Reserve by staff of the Department of Arts and Museums. It is thought that Aboriginal traditional harvesting of molluscs, particularly Longbums, may have caused a decline in the number of these species over time, particularly within Rapid Creek. The Larrakia Nation has proposed to develop a restocking program for Longbums within the Rapid Creek area. The list of molluscs recorded within the Reserve is provided at Appendix 3. Other Marine invertebrates are not well recorded in the Coastal Reserve.

**Marine Turtles**

Flat-back (*Chelodina depressa*), Olive Ridley (*Lepidochelys olivacea*) and Green turtles (*Chelodina mydas*) are known to use Casuarina Beach and the waters of the Coastal Reserve. Flat-back and Green turtles nest on Casuarina Beach each year and Olive Ridley turtles nest on the beach infrequently. The hatching of the young provides a valuable opportunity to educate the public about the life cycles, threats and management issues concerning marine turtles. These marine turtle species are listed on the Bonn Convention for the Protection of Migratory Species of Wild Animals.

**Dugongs**

Dugongs (*Dugong dugon*) are occasionally sited in the waters of the Reserve feeding on seagrass which occurs in sparse patches on the western side of 'Old Man Rock'. Dugong are listed as near threatened in the Northern Territory (i.e. close to vulnerable) and vulnerable to extinction internationally. The dugong is also listed on the Bonn Convention for the Protection of Migratory Species of Wild Animals.

**Saltwater Crocodiles**

Saltwater crocodiles *Crocodylus porosus* occasionally occur within the Coastal Reserve, generally within Rapid Creek or Buffalo Creek. The Commission maintains a crocodile management program within Darwin Harbour removing approximately 160 crocodiles (*C. porosus*) each year. A crocodile trap is maintained in Buffalo Creek. Saltwater crocodiles present a safety risk to visitors. The best way to minimize this risk is to inform visitors of appropriate behavior in areas frequented by crocodiles.

**Stingers**

Generally between October and May each year stingers (*Chironex fleckeri*) occur in the waters of the Reserve. Stingers present a safety risk to visitors. The best way to minimize this risk is to inform visitors of appropriate behavior in areas where stingers occur.

Stingrays may also present safety risks to visitors. The best way to minimize this risk is to inform visitors of the risks and appropriate behaviour in areas where they are likely to occur.

The Fisheries Division of the Department of Business, Industry and Resource Development are responsible for the management of fish within the Northern Territory. The Parks and Wildlife Commission is responsible for the management of dugongs, saltwater crocodiles and marine turtles.

Darwin Harbour between Charles Point and Lee Point are managed to maintain the following declared beneficial uses, Aquatic Ecosystem Protection and Recreational Water Quality and Aesthetics.

<p><b>Existing and Potential use/s and/or pressure/s</b></p>	<p>Use/s</p>	<p>Pressure/s</p>
	<p>Fishing Recreation use Management activities</p>	<p><u>Current pressures:</u> Reef walking, Harvesting of Longbums and turtle eggs <u>Potential pressures:</u> Aquarium fishing Harvesting of turtle eggs</p>
<p><b>Current major pressure/s</b></p>	<p>None</p>	

<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To ensure that visitor activities (including harvesting of marine resources) do not cause adverse changes to the Reserve's marine ecology.</li> <li>2. To maintain the Reserve's marine biodiversity values.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Manage native fauna within the Reserve in accordance with the actions described in the General Park Management Principles and Directions (section 2).</li> <li>2. Regulate access, activities and developments in accordance with the Zoning Scheme (section 7.1).</li> <li>3. The Fisheries Division of Department of Business, Industries and Resource Development, will be responsible for issuing licenses and/or permits for activities permitted under the <i>Fisheries Act</i> in consultation with the Parks and Wildlife Commission.</li> <li>4. Liaise with Fisheries Division to monitor the impact of activities permitted under the <i>Fisheries Act</i> on the Reserve.</li> <li>5. Regulate or prohibit activities that impact detrimentally on the values of the Reserve and which are not consistent with the objectives of this Plan in consultation with the Fisheries Division.</li> <li>6. Provide information on the conservation of marine resources, particularly marine turtles in the Reserve's interpretation program.</li> <li>7. Provide information on appropriate behavior in areas frequented by saltwater crocodiles, stingers and stingrays.</li> <li>8. Remove problem saltwater crocodiles from the Reserve.</li> <li>9. Encourage the Northern Territory University (NTU) and the Northern Territory Museum to undertake further research into the Reserve's marine ecology and resources.</li> <li>10. Liaise with Natural Resources Division and the Northern Territory University regarding the quality of water entering the Reserve via storm water drains and as a result of the NTU lake development.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	In accordance with the Biodiversity and Species Management Audit: <ol style="list-style-type: none"> <li>1. Total number of known native vertebrate species present</li> <li>2. Number of turtle nests recorded annually.</li> </ol> In accordance with the Visitor Management Audit: <ol style="list-style-type: none"> <li>3. Number of reported visitor safety incidents</li> </ol>	Stable Stable or increasing  Decreasing	Wildlife Survey Wildlife Survey  Incident Reports

## 9.5 Key Management Programs

### 9.5.1 Fire Management

<p><b>Background</b></p>	<p>Each year areas of the Reserve are burnt by wildfire. Most wildfires are thought to result from arson or unattended campfires which escape and become large wildfires. Whatever the cause, these wildfires threaten the vegetation communities in the Reserve and may also threaten life and property.</p> <p>Vegetation communities such as monsoon vine-thicket, foredune vegetation and Melaleuca communities, which cover a large percentage of the Reserve, can be severely affected by wildfire. The relatively small areas of tropical woodland (communities 13 and 15 – figure 4) which have evolved in the presence of fire and the mangroves communities that are inundated daily are less susceptible to fire. However, large, intense and frequent wildfires have the potential to damage all vegetation communities in the Reserve. Wildfires that remove vegetation cover leave areas susceptible to weed invasion and erosion.</p> <p>A number of weed species are known to increase fuel loads and consequently create fire hazard including Gamba Grass (<i>Andropogon gayanus</i>) and Mission Grass (<i>Pennisetum polystachion</i>). Measures to reduce the fire hazard include the clearing of firebreaks, weed control, slashing or mowing grass to reduce the fuel load and occasional early dry season controlled burning. Controlled burns remain one of the best tools in reducing the potential for larger destructive wildfires in the Reserve.</p> <p>Larrakia Aboriginal people who are the custodians of the Registered Sacred Site, Old Man Rock have indicated that views of Old Man Rock should not be obscured. Smoke from controlled burns can obscure views of the Rock.</p> <p>The Fire and Rescue Service is responsible for issuing permits under the <i>Fire and Emergency Act</i> to light fires for controlled burning operations within the town boundary.</p>
<p><b>Management Objective/s</b></p>	<ol style="list-style-type: none"> <li>1. To significantly reduce the number of non-prescribed fires within the Reserve.</li> <li>2. To manage fire in the Reserve in way that reduces harmful effects of fires on visitors, park assets, neighbouring properties and park values.</li> </ol>
<p><b>Management Actions</b></p>	<ol style="list-style-type: none"> <li>1. Undertake fire management within the Reserve in accordance with the General Park Management Principles and Directions (section 2.2.2).</li> <li>2. A permit from the Director of Parks and Wildlife will be required for the lighting of any open fires within the Reserve, except for management purposes.</li> <li>3. Establish firebreaks around fire sensitive vegetation communities.</li> <li>4. Consult and liaise with relevant Larrakia when preparing and implementing annual fire action plans.</li> <li>5. Consult and liaise with the Northern Territory Fire and Emergency Service when preparing and implementing annual fire action plans.</li> <li>6. Conduct controlled burning in the Reserve in accordance with the <i>Fire and Emergency Act</i> and in consultation with Larrakia Aboriginal people and/or their representative organisation.</li> <li>7. Replace wood burning barbecues with gas barbecues.</li> <li>8. Use of fireworks within the Reserve will not be permitted except by permit for approved and appropriately licensed fireworks displays.</li> </ol>

	Measure/s	Desired Trend/s	Monitoring
<b>Performance Measure/s</b>	In accordance with the fire management audit 1. Area adversely effected by fire 2. Impact of fire on fire sensitive sites 3. Effectiveness of fire management in maintaining the extent and habitat suitability of the major vegetation types	Decreasing Decreasing Increasing	Aerial photo and mapping of fires
<b>Short-term target/s</b>	Establish and maintain firebreaks around fire sensitive vegetation communities within 6 months of operation of the Plan.		
<b>Long-term target/s</b>	Reduce by 10% the area of the Reserve burnt by wildfire over the life of the Plan.		

### 9.5.2 Weed Management

<b>Background</b>	<p>There are many exotic plants in the Reserve including species used for beautification, shade and dune stabilization. 52 species of weed have been recorded in the Coastal Reserve including 12 species which are declared weeds under the <i>Weeds Management Act 2001</i>. Class A declared weeds must be eradicated and the growth and spread of Class B weeds must be controlled. The close proximity of the Reserve to major urban environments and the effects of run-off from these areas over many years have most likely contributed to the infestation of introduced plants. A list of the weed species identified within the Reserve is provided at Appendix 3.</p> <p>Some of the more conspicuous weed communities include:</p> <p><b><i>Senna alata</i> (Candlebush) tall closed shrubland</b> <i>Senna alata</i> forms pure stands to 3 metres height along the watercourse. Ground layer is absent. The vine species <i>Centrosema pubescens</i> and <i>Passiflora foetida</i> are entwined in the shrub canopy. Emergent native species include <i>Livistona benthamii</i> and <i>Carpentaria acuminata</i>. <i>Senna alata</i> is a Class B declared weed.</p> <p><b><i>Leucaena leucocephala</i> (Coffee Bush) tall closed shrubland</b> <i>Leucaena leucocephala</i> forms a dense stand up to 12 metres in height. Species in the ground layer include <i>Hyptis suaveolens</i>, <i>Cynodon arcuatus</i>, <i>Lantana camara</i> and <i>Stachytarpheta cayennensis</i>.</p> <p><b>Prickly grasses and ground covers in open areas</b> <i>Pennisetum polystachion</i> (Mission grass) and <i>Andropogon gayanus</i> (Gamba grass) occur in dense stands up to 3 metres high in open woodland areas. They represent a major dry-season fire hazard due to their high fuel load. Gamba grass and mission grass are particularly insidious because they invade undisturbed sites.</p> <p>Twining pasture legumes such as Calopo (<i>Calopogonium mucunoides</i>), Siratro (<i>Macroptilium atropurpureim</i>) and Centro (<i>Centrosema pubescens</i>) help to carry flames into the canopy of rainforest patches and woodland trees.</p> <p><i>Alternanthera pungens</i> (Khaki weed), <i>Tribulus cistoides</i> (Caltrop) and <i>Cenchrus echinatus</i> (Mossman River grass) are other invasive ground weeds which are particularly annoying to visitors because of their prickly or spiky fruits or seed pods. Caltrop seeds have spikes strong enough to puncture bicycle tyres and are a major problem in recreation areas.</p> <p>Caltrop, mission grass, mossman river grass and khaki weed are Class B declared weeds.</p> <p>The proximity of the Reserve to major urban centres and storm water drains will require constant vigilance of both park staff and community groups in order to control new weed</p>
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	<p>outbreaks. Care also needs to be taken to ensure that weeds are not spread in the Reserve on machinery such as slashers and mowers.</p> <p>A good outcome would be to contain the spread of weeds within the Reserve and reduce the extent of major infestations of some weed species. With community support, it may be possible to remove weeds from some areas and rehabilitate these areas with native species. Involvement of the Community in management of the Reserve is discussed in more detail in section 9.5.2.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To minimize the impact of introduced plants on the Reserve.</li> <li>2. To develop a strategic approach to the management of weeds within the Reserve.</li> <li>3. To generate public awareness and support for the control of weeds within the Reserve.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Undertake weeds management within the Reserve in accordance with the General Park Management Principles and Directions (section 2.2.4).</li> <li>2. Control all declared weeds in accordance with the <i>Weeds Management Act 2001</i>.</li> <li>3. Identify and eradicate new exotic species found within the Reserve.</li> <li>4. Remove all Gamba Grass from the Reserve.</li> <li>5. Remove and rehabilitate areas of major infestations of candle bush.</li> <li>6. Remove and rehabilitate areas of major infestations of coffee bush.</li> <li>7. Where possible, maintain the main visitor use areas free of weeds, particularly picnic areas at Lee Point and Dripstone Park.</li> <li>8. Encourage cooperation of neighbouring property owners in controlling weeds and preventing them from entering the Reserve.</li> <li>9. Encourage and facilitate the involvement of the local community in the Reserve's weed management program including rehabilitation of disturbed sites.</li> </ol>		
<b>Performance Measure/s</b>	<b>Measure/s</b>	<b>Desired Trends</b>	<b>Monitoring</b>
	<ol style="list-style-type: none"> <li>1. Extent and severity of weeds.</li> <li>2. % of park area subject to dense infestation.</li> <li>3. % of park area essentially weed-free</li> <li>4. Areas of effected by weeds successfully rehabilitated.</li> </ol>	<p>Decreasing</p> <p>Decreasing</p> <p>Increasing</p> <p>Increasing</p>	<p>Weed Audit</p>
<b>Short-term target/s</b>	<ol style="list-style-type: none"> <li>1. Contain the spread of Calthrop within the Reserve within 2 years of operation of this Plan.</li> <li>2. Reduce the <i>Senna alata</i> infestation between the Free beach and the Darwin Hospital by 90% within 5 years of operation of this Plan.</li> <li>3. Reduce the Coffee Bush infestation along creeks and watercourses within the Reserve by 90% within 6 years of operation of this Plan.</li> <li>4. Remove all Poinciana, Coconut Palms and Gamba Grass from the Reserve within 5 years of operation of this Plan</li> </ol>		
<b>Long-term target/s</b>	<ol style="list-style-type: none"> <li>1. Increase by 20% the area of the Reserve which is weed free by expiration of this Plan.</li> </ol>		

### 9.5.3 Exotic Animal Species Management

<b>Background</b>	<p>The most predominant feral animals within the Coastal Reserve are wild dogs (<i>Canis familiaris</i>), cats (<i>Felis catus</i>), the house mouse (<i>Mus musculus</i>) and rats (<i>Rattus rattus</i>). Rats and mice compete with native species and cats and dogs may kill native species.</p> <p>Five introduced species of invertebrate have been recorded within the Coastal Reserve. These include two land snails (<i>Subulina octona</i> and <i>Lamellaxis gracilis</i>) the Big-headed ant (<i>Pheidole megacephala</i>), a striped millipede and a leaf-hopper. The big headed ant out competes many native ant species and poses a serious threat to other invertebrate species. The Big headed ant is now widespread throughout the northern suburbs of Darwin and it will be difficult if not impossible to prevent new infestations from occurring even if populations within the Reserve were controlled.</p> <p>It is likely that cane toads (<i>Bufo marinus</i>) will invade areas of the Reserve. Based on the current rate of natural spread, cane toads are expected to reach Darwin within 2-5 years. They may however arrive earlier as undetected stowaways on vehicles and in goods arriving from areas where they are prevalent. No biological or physical control method has been successful in halting the spread of the cane toad. It is unclear what impacts they will have on the native fauna in the Reserve, however there is evidence to suggest that most native animal populations adjust over time.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To control feral animals within the Reserve.</li> <li>2. To reduce the impacts of feral animals on native wildlife.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. Undertake exotic animals management within the Reserve in accordance with the General Park Management Principles and Directions (section 2.2.3).</li> <li>2. Set traps for wild dogs and cats within the Reserve on a periodic basis.</li> <li>3. Park staff will remain vigilant towards the detection of any new exotic animals within the Reserve particularly cane toads.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	1. Impact of exotic animals on park values	Decreasing	Feral Animal Audit
<b>Short-term Target/s</b>	Implement a program to assess changes over time to the extent and distribution of exotic species within 12 months of operation of Plan.		
<b>Long-term Target/s</b>	No change in the impact of feral animals on Reserve Values in the life of the Plan.		

### 9.5.4 Mosquito Control

<b>Background</b>	<p>Much of the land area of the Reserve is regularly inundated by salt, brackish or fresh water. As long as the water flows or has a stable population of fish or insects such as water beetles that eat mosquito larvae, mosquito populations are kept under control. Where water ponds as a result of interruption to the flow, for example, a situation can arise where mosquitoes breed in large numbers especially when there are no natural predators. Naturally occurring depressions and depressions created by vehicle tracks, gullying and construction work also provide mosquito breeding sites.</p> <p>The major cause for concern is breeding of saltmarsh mosquitoes (<i>Aedes vigilax</i>). The saltmarsh mosquito is a vector of Ross River virus and other human arboviral diseases and canine heartworm. Breeding sites for <i>Aedes vigilax</i> occur in areas where tidal water or rainwater pools for a period of over five days, including creek lines, storm water drains, mangrove margins, and depressions in the upper tidal zone (above 7.4m ACD).</p>
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	<p>Much work has been carried out in the Reserve to eliminate mosquito breeding sites including filling of naturally occurring depressions and depressions left after sand mining and the installation of a low-flow drain near the hospital. However, despite these works increased run off from urban development does cause problems and requires constant monitoring to maintain effective mosquito control.</p> <p>It is important to ensure that any engineering works carried out under the mosquito control program do not destabilise the foredunes or cause erosion.</p> <p>Reserve staff, in conjunction with staff from Department of Health, monitor the presence of mosquito larvae in the Reserve. If larvae are detected in areas where no natural predators exist, spraying with environmentally friendly larvicides is carried out.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>To control mosquito breeding within the Reserve.</li> <li>To ensure that mosquito control works do not unduly damage Reserve values.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>In co-operation with Medical Entomology Branch of the Territory Health Services continue to implement measures for the control of mosquito breeding in the Reserve including; <ul style="list-style-type: none"> <li>Removal of debris from the low-flow drain during the wet season.</li> <li>Maintenance of sufficient flow and drainage of water from the mouth of the small creek that breaches the foredunes to the north of the Surf Life Saving Club and the adjacent depression.</li> <li>Leveling of depressions, vehicle ruts and removal of obstructions from drainage lines.</li> <li>Assessment of areas subject to waterlogging and ponding of tidal waters to identify potential mosquito breeding sites and determine appropriate measures for control.</li> <li>Monitoring numbers of mosquito larvae.</li> </ul> </li> <li>Carry out all mosquito control works in consultation with the Medical Entomology, Natural Resources Division and the Office of Environment and Heritage.</li> <li>Use larvicides when it is not practicable to dispose of ponded water, or until such time as other control works can be carried out.</li> <li>Ensure that larvicides or insecticides are target specific and non-destructive of habitat and non-target organisms (e.g. fish, Crustacea, aquatic insect predators of mosquito larvae) will be used.</li> <li>Negotiate with neighbouring landholders, particularly the Department of Defence to reduce run-off from disturbed areas on surrounding land.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trends	Monitoring
	1. Number of sites requiring treatment.	Stable or Decreasing	Weekly inspections
<b>Short-term target/s</b>	Reduce by 50% number of mosquito breeding sites requiring treatment within 3 years of operation of this Plan.		
<b>Long-term target/s</b>	No new sites requiring treatment within the life of the Plan.		

## 10. PARK ADMINISTRATION

This Section deals with those issues associated with park administration, including the administrative framework, stakeholder engagement and commercial operations. The Section consists of tables based on issues that have been identified for the Reserve during the planning process, including the public meeting and consultations with stakeholders. The tables culminate in a number of proposed Management Actions designed to address the issues and ensure that administration of the Reserve is efficient and effective within the limitations of available resources.

### 10.1 General Park Administration

<b>Background</b>	<p>Casuarina Coastal Reserve is administered by the Commission's Darwin District Parks operation based at Berrimah. Contractors collect and remove rubbish from bins in the Reserve. Ranger time is also spent picking up litter, repairing vandalism and mowing grassed areas.</p> <p>For proper management of the Park, and the safety of persons and property, it is essential that by-laws and regulations are in place and properly enforced. Ranger staff spend considerable time on enforcement in the Reserve and it is important that they receive appropriate training and support from other enforcement agencies such as the Police.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>1. To provide an appropriate framework and necessary administrative safeguards to ensure the smooth and efficient operation of the Reserve.</li> <li>2. To provide sufficient resources to manage the Reserve in an efficient and effective manner.</li> <li>3. To ensure that management practices achieve the objectives of this Plan by following the Plan's actions.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>1. General administration of the Reserve will be in accordance with the General Park Management Principles and Directions (section 6.2.1).</li> <li>2. The Commission will examine ways of outsourcing some duties to private contractors.</li> <li>3. Provide law enforcement training for all Rangers.</li> <li>4. Liaise with the NT Police to coordinate enforcement activities in the Reserve.</li> <li>5. Conservation Officers will enforce the provisions of the <i>Territory Parks and Wildlife Conservation Act</i>, including its By-laws and regulations, and other legislation where applicable.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>1. Project Milestones met</li> <li>2. Staff competency levels</li> <li>3. Number of safety incidents</li> </ol>	<p>Increasing</p> <p>Increasing</p> <p>Decreasing</p>	<p>Project Statements</p> <p>Training records</p> <p>Incident reports</p>
<b>Short-term target/s</b>	All District Rangers undertake enforcement training within 12 months of operation of this Plan.		
<b>Long-term target/s</b>	Provisions of Plan fully implemented by expiration of this Plan.		

## 10.2 Stakeholder Engagement

<p><b>Background</b></p>	<p>Ultimate responsibility for management of the Reserve rests with the Commission however there are a number of stakeholders with interests in the management of the Reserve. The largest of these is the users of the Reserve. The 2001 visitor survey indicated that the majority of users (67%) are local residents predominantly from Darwin's northern suburbs.</p> <p>Community involvement covers a broad spectrum of activities. It can include passive involvement, which may include "keeping an eye out" for untoward activities within the Reserve and reporting activities to the Commission or other authorities. At the other end of the spectrum individuals can become involved in organized management programs such as weed control, tree planting, and dune stabilisation.</p> <p>The involvement of the local community in management of the Reserve provides benefits for both the community and the Commission. Some benefits include increased community support, additional resources, opportunities for individuals and groups to serve the community and increased knowledge and skills. Whilst many Reserve users will not become involved in management programs they will want to remain informed about management of the Reserve. There is a need to engage all stakeholders if the Commission wishes to maintain support.</p> <p>A number of community groups already undertake work within the Reserve including the Casuarina Coastal Reserve Land Care Group. There is scope to expand their role in implementing management programs subject to financial and personnel resources. Other community groups such as Greening Australia have assisted in planting trees on sand dunes in the Rapid Creek area and have offered assistance to rehabilitate disturbed areas between Dripstone Cliffs and Trower Road. Other community groups who operate in the Reserve include the Darwin Surf Life Saving Club who patrol the beach in front of their premises on Sundays during the dry season.</p> <p>As well as interest in management of sites of Aboriginal cultural significance, Larrakia Aboriginal people also have an interest in management of other Reserve values. The existence of a Native Title claim over the Reserve makes Larrakia involvement important.</p> <p>A number of government agencies are also stakeholders in the management of the Reserve including;</p> <ul style="list-style-type: none"> <li>• the Land Administration Division, Planning Division, Natural Resources Division and Office of Environment and Heritage in the Department of Infrastructure, Planning and Environment,</li> <li>• Police Fire and Emergency Services, and</li> <li>• Medical Entomology Branch of the Department of Health and Community Services.</li> </ul> <p>Another group which has an interest in management of the Reserve is the Rapid Creek Catchment Advisory Committee. The Committee is a statutory body established under the <i>Water Act</i> to implement the Rapid Creek Catchment Management Plan. A number of provisions of the Catchment Management Plan affect the lower reaches of Rapid Creek, within the boundary of the Coastal Reserve. The Committee includes representatives from the community, Darwin City Council, Larrakia, and Territory government agencies.</p> <p>There is a great need to improve coordination, consultation and involvement of these groups in managing the Reserve.</p>
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<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>To promote involvement of the community and stakeholders in the management of the Reserve.</li> <li>To coordinate activities and programs for local community involvement.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>Develop a strategy for the involvement of the local community in the management of the Reserve. The Strategy will provide details of community based projects, priorities and actions under Reserve management programs.</li> <li>Establish a Community Advisory Committee to facilitate community participation in the management of the Reserve.</li> <li>Liaise closely with the Rapid Creek Catchment Advisory Committee regarding the implementation of the Catchment Management Plan to ensure the Commission has adequate input into implementation of the Plan.</li> <li>Liaise and involve relevant government agencies in management of the Reserve and its values.</li> <li>Site development plans and other development proposals will be released for public comment and exhibition.</li> <li>Encourage and facilitate participation of Larrakia and their representative organisation in management of Reserve values.</li> <li>Consult regularly with Larrakia and their representative organisation about management of Reserve values and other matters of mutual concern and interest.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>Number of active volunteers.</li> <li>Number of joint projects with Land Care groups</li> <li>No. of volunteer hours</li> </ol>	<p>Increasing</p> <p>Increasing</p> <p>Increasing</p>	<p>Volunteer records</p>
<b>Short-term target/s</b>	Establish Community Advisory Committee within 12 months of operation of management plan.		
<b>Long-term target/s</b>	Increase by 15% number of successful (audited) projects involving community groups or stakeholders in the life of the Plan.		

### 10.3 Concessions

<b>Background</b>	<p>Commercial operations within the Park can provide visitor services and amenities that can enhance the visitor experience. Commercial operations can also be an important tool for managing visitor activities and in assisting staff with maintenance requirements.</p> <p>Leases and licenses may need to be issued to allow for services and facilities to be provided by outside interests. Issuing of leases and licenses has native title and land claim implications.</p> <p>A guided sunset tour operates under a by-law 13 permit within the Coastal Reserve. No other permits, licenses or leases have been issued for commercial operations.</p> <p>Opportunity exists within the Reserve for a variety of concessions to be undertaken, these may include guided tours, a mobile kiosk, bike hire or a variety of other activities. Each concession proposal will be assessed on its individual merit. However, the overriding factor considered will be the potential impact on the Reserve values and the likely public demand for the service.</p>		
<b>Management Objective/s</b>	<ol style="list-style-type: none"> <li>To provide for appropriate commercial activities which enhance the visitor experience and or supplement management resources.</li> <li>To ensure that any commercial activity are of a high standard and compatible with the character of the Coastal Reserve.</li> </ol>		
<b>Management Actions</b>	<ol style="list-style-type: none"> <li>Manage concessions within the Reserve in accordance with the General Park Management Principles and Directions (section 6.2.3).</li> <li>All commercial operations within the Reserve will be required to operate under a concession lease or license agreement in accordance with the Parks and Wildlife Commission's concession policy.</li> <li>Monitor all operations to ensure they conform to required standards and to evaluate the application for lease/license renewal.</li> <li>Ensure that the type and number of operations does not compromise the character and/or visitor experience in the Reserve.</li> <li>Ensure all leases and licenses include conditions that ensure the protection of the Reserve's values in accordance with the Parks and Wildlife Commission's concession policy.</li> <li>Ensure leases and licences for commercial operations within the Buffalo Creek Management Area are only issued by agreement with the Commonwealth Department of Defence (the landholder).</li> <li>Any commercial food and beverage operation must comply with relevant provisions of the <i>Public Health Act, Food Act</i> and Building Code of Australia.</li> <li>Assess land claim and native title claim implications before issuing any lease or license.</li> <li>No concession activity will be allowed that has the potential to impact deleteriously upon the Reserve's values.</li> </ol>		
<b>Performance Measure/s</b>	Measure/s	Desired Trend/s	Monitoring
	<ol style="list-style-type: none"> <li>Level of satisfaction of visitors with commercial services.</li> <li>Contribution of commercial services to Reserve management</li> </ol>	<p>Stable or increasing</p> <p>Stable or increasing</p>	<p>Visitor Survey</p> <p>Lease or Licence review</p>
<b>Short-term target/s</b>	Assess the opportunity for other commercial operations within the Park within 2 years of operation of Plan.		
<b>Long-term target/s</b>	All commercial operations in the Reserve will operate under a licence by expiration of this Plan.		





VALUE	MANAGEMENT ACTIONS	YEAR										
		1	2	3	4	5	6	7	8	9	10	
<b>Management of Cultural Values</b>												
<b>Areas of Aboriginal Cultural Significance</b>	<ul style="list-style-type: none"> <li>Consult with relevant Aboriginal people, their representative organisations and personnel with relevant archaeological and heritage expertise when managing and interpreting the Aboriginal archaeological values of the Reserve.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Where appropriate include Aboriginal Cultural values in the Reserve's interpretation program.</li> </ul>			▶								
	<ul style="list-style-type: none"> <li>Manage prescribed archaeological places and objects in accordance with the provisions of the <i>Heritage Conservation Act</i>.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Undertake All developments in accordance with the provisions of the <i>Sacred Sites Act</i>, <i>Heritage Conservation Act</i> and the <i>Native Title Act</i>.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Ensure appropriate Larrakia or their representative organisation is adequately represented in any community advisory committee (section 10.2).</li> </ul>	▶										
<b>Areas of Historical Significance</b>	<ul style="list-style-type: none"> <li>Liaise with the Office of Environment and Heritage regarding management of the Reserve's historical values.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Manage WWII observation post between Lee Point and Sandy Creek in accordance with the Conservation Plan prepared for the site.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Monitor observation posts at Lee Point, Dripstone Caves and Buffalo Creek and where appropriate prepare conservation plans in accordance with the Burra Charter and <i>Heritage Conservation Act</i>.</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Include WWII historical values in the Reserve's interpretation program.</li> </ul>	▶										
	<ul style="list-style-type: none"> <li>In consultation with the Office of Environment and Heritage, assess and nominate sites of historical significance for inclusion on the NT Heritage Register.</li> </ul>			▶								

VALUE	MANAGEMENT ACTIONS	YEAR											
		1	2	3	4	5	6	7	8	9	10		
<b>Management of Natural Values</b>													
<b>Geomorphology – Coastal Landforms</b>	<ul style="list-style-type: none"> <li>• Establish a dune stabilization program.</li> <li>• Liaise with the Natural Resources Division regarding the foredune monitoring program and stabilisation of foredunes.</li> <li>• Include information in the interpretive program regarding protection and management of the Reserve’s coastal geomorphology and landforms.</li> <li>• Identify areas susceptible to soil erosion and acid sulphate soils to assist in assessing the capabilities of the Reserve for suitable visitor activities, developments and future uses.</li> <li>• Identify and rehabilitate areas of active soil erosion.</li> <li>• Regularly monitor effects of visitor and management activities on soils and close and rehabilitate areas where visitor use and management activities have deleterious effects upon the soils.</li> <li>• Close and rehabilitate vehicle tracks not used for recreation or management purposes.</li> <li>• Consult with natural resources division of the Department of Infrastructure, Planning and Environment regarding erosion control and rehabilitation of active erosion sites.</li> </ul>		→										
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VALUE	MANAGEMENT ACTIONS	YEAR										
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<b>Native Flora</b>	<ul style="list-style-type: none"> <li>Regulate visitor activities, control introduced plants, animals and fire to maintain the natural abundance and diversity of native vegetation communities in the Reserve (sections 7.2, 9.5.1, 9.5.2, and 9.5.3).</li> </ul>											▶
	<ul style="list-style-type: none"> <li>Develop and implement a program to record extent, distribution and diversity of native flora in the Reserve.</li> </ul>		▶	-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Liaise with relevant government planning authorities to ensure that future development of surrounding land is sympathetic to the protection of vegetation communities in the Reserve.</li> </ul>			-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Provide information to visitors about the distribution and characteristics of the native vegetation communities and their management.</li> </ul>			▶								
<b>Native Fauna</b>	<ul style="list-style-type: none"> <li>Develop and implement a program to record native fauna species abundance, distribution and diversity in the Reserve.</li> </ul>		▶	-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Develop and implement a program to record extent, distribution and diversity of fauna habitat in the Reserve.</li> </ul>		▶	-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Regulate visitor activities, control fire, weeds and introduced fauna, to maintain the natural abundance and ecological diversity of the native animals in the Reserve (see section 7.1, 7.2, 9.5.1, 9.5.2, 9.5.3 and 9.5.4).</li> </ul>			-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Implement domestic animal regulations to minimise the impact of domestic animals on native fauna.</li> </ul>	▶										
	<ul style="list-style-type: none"> <li>Provide information on the impact of dogs on migratory wading birds in interpretation and education programs.</li> </ul>		▶	-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Liaise with relevant government planning authorities to ensure that future development of surrounding land is sympathetic to the protection of native fauna in the Reserve.</li> </ul>			-----	-----	-----	-----	-----	-----	-----	-----	▶
	<ul style="list-style-type: none"> <li>Encourage further research into the population of native animals within the Reserve by community groups, staff and students of the Northern Territory University and staff from the Northern Territory Museum.</li> </ul>			-----	-----	-----	-----	-----	-----	-----	-----	▶

VALUE	MANAGEMENT ACTIONS	YEAR											
		1	2	3	4	5	6	7	8	9	10		
<b>Estuarine and Marine Environment</b>	<ul style="list-style-type: none"> <li>• Liaise with Fisheries Division to monitor the impact of activities permitted under the <i>Fisheries Act</i> on the Reserve.</li> <li>• Provide information on the conservation of marine resources, particularly marine turtles in the Reserve's interpretation program.</li> <li>• Provide information on appropriate behavior in areas frequented by saltwater crocodiles, stingers and stingrays.</li> <li>• Remove problem saltwater crocodiles from the Reserve.</li> <li>• Encourage the Northern Territory University (NTU) and the Northern Territory Museum to undertake further research into the Reserve's marine ecology and resources.</li> <li>• Liaise with Natural Resources Division and the Northern Territory University regarding the quality of water entering the Reserve via storm water drains and as a result of the NTU lake development.</li> </ul>											▶	
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<b>Fire Management</b>	<ul style="list-style-type: none"> <li>• Establish firebreaks around fire sensitive vegetation communities.</li> <li>• Conduct controlled burning in the Reserve.</li> <li>• Replace wood burning barbecues with gas barbecues.</li> </ul>	▶											
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<b>Weed Management</b>	<ul style="list-style-type: none"> <li>• Control all declared weeds in accordance with the <i>Weeds Management Act 2001</i>.</li> <li>• Remove all Gamba Grass from the Reserve.</li> <li>• Remove and rehabilitate major infestations of candle bush.</li> <li>• Remove and rehabilitate major infestations of coffee bush.</li> <li>• Encourage and facilitate involvement of Landcare groups in management of vegetation in the Reserve.</li> </ul>											▶	
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VALUE	MANAGEMENT ACTIONS	YEAR									
		1	2	3	4	5	6	7	8	9	10
<b>Exotic Animal Species Management</b>	<ul style="list-style-type: none"> <li>Set traps for wild dogs and cats within the Reserve on a periodic basis.</li> </ul>										
<b>Mosquito Control Program</b>	<ul style="list-style-type: none"> <li>In co-operation with Medical Entomology Branch of the Territory Health Services continue to implement measures for the control of mosquito breeding in the Reserve.</li> <li>Negotiate with neighbouring landholders, particularly the Department of Defence to reduce run-off from disturbed areas on surrounding land.</li> </ul>										
<b>Park Administration</b>											
<b>General Administration</b>	<ul style="list-style-type: none"> <li>Provide law enforcement training for all Rangers.</li> </ul>	→									→
<b>Stakeholder Engagement</b>	<ul style="list-style-type: none"> <li>Develop a strategy for the involvement of the local community in the management of the Reserve. The Strategy will provide details of community based projects, priorities and actions under Reserve management programs.</li> <li>Establish a Community Advisory Committee to facilitate community participation in the management of the Reserve.</li> </ul>	→									
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<b>Concessions</b>	<ul style="list-style-type: none"> <li>Monitor all operations to ensure they conform to required standards and to evaluate the application for lease/license renewal.</li> <li>Assess land claim and native title claim implications before issuing any lease or license.</li> </ul>										→

