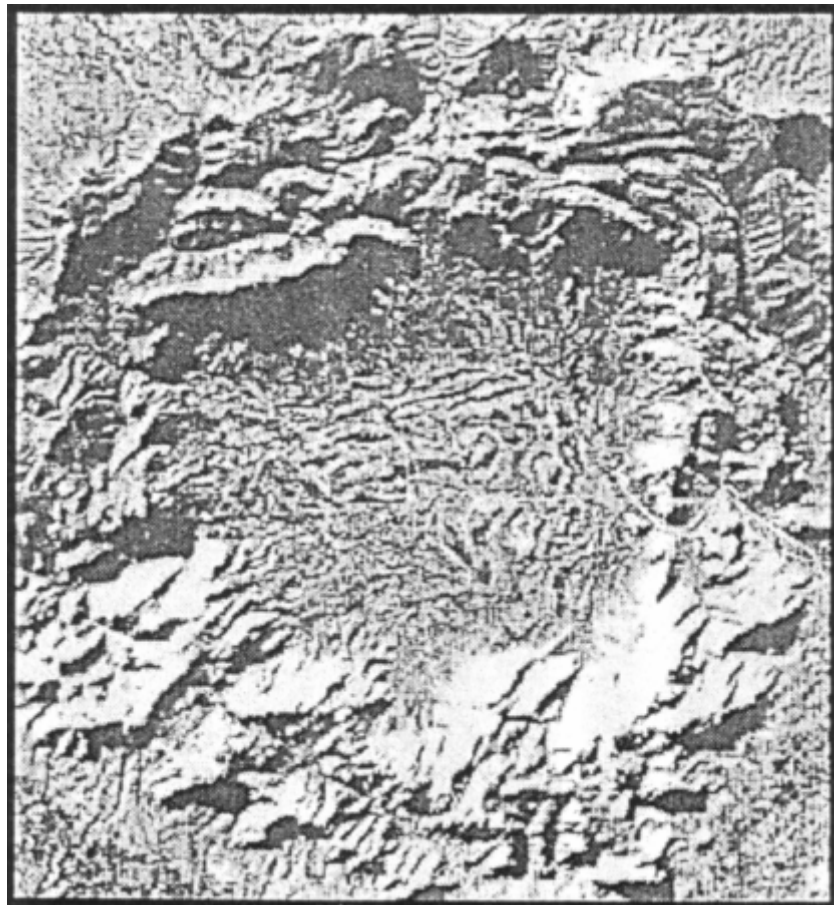


# **TNORALA CONSERVATION RESERVE (GOSSE BLUFF)**

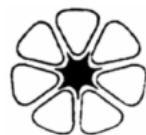


## **PLAN OF MANAGEMENT**

**MARCH 1997  
AMENDED MAY 2007**



**PARKS AND WILDLIFE COMMISSION OF THE NORTHERN TERRITORY**

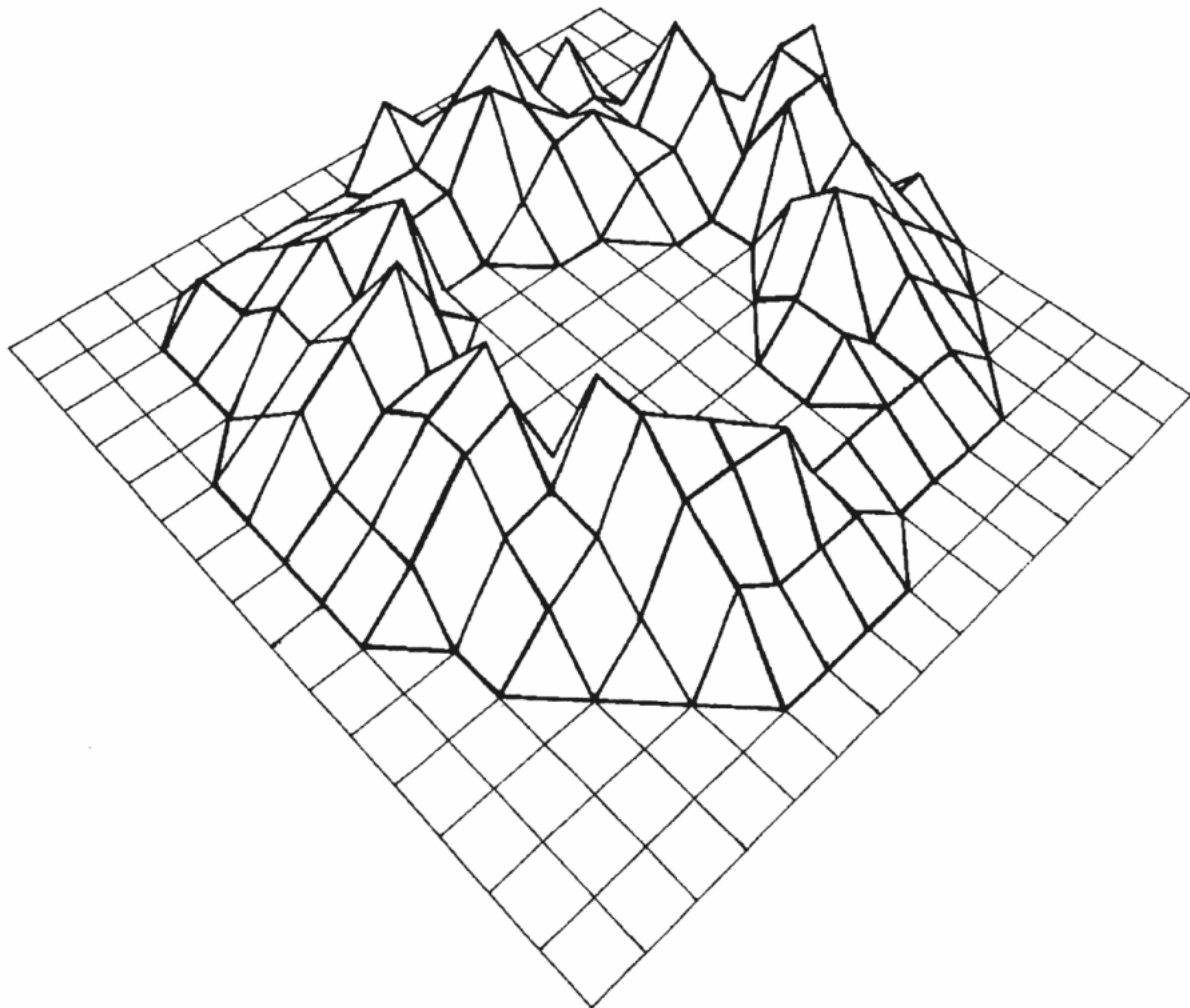


Northern Territory Government

# TNORALA CONSERVATION RESERVE

(GOSSE BLUFF)

## PLAN OF MANAGEMENT



PARKS AND WILDLIFE COMMISSION OF THE NORTHERN TERRITORY  
ALICE SPRINGS N.T.

MARCH 1997  
AMENDED MAY 2007

Parks and Wildlife Commission of the Northern Territory  
PO, Box 1046  
Alice Springs N.T. 0871

Tnorala Conservation Reserve (Gosse Bluff)  
Plan of Management

March 1997  
AMENDED MAY 2007

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## Foreword

The Tnorala Conservation Reserve (Gosse Bluff), 160 kilometres west of Alice Springs on the Missionary Plain between the West MacDonnell and Krichauff Ranges, protects a geological formation of international significance.

The Reserve features an impact crater formed 130 million years ago when a comet crashed into the Earth with a force one million times more powerful than the Hiroshima atom bomb.

The area is deeply significant to the Western Aranda Aboriginal people and now the Reserve is owned by its Aboriginal traditional custodians, represented by the Tnorala Aboriginal Corporation. The Reserve is leased to the Conservation Land Corporation and managed by the Parks and Wildlife Commission of the Northern Territory under the guidance of a Local Management Committee and in accordance with the lease conditions and accompanying management agreement.

This Management Plan expresses the wishes and aspirations of the traditional custodians for the future management and development of the Reserve with input from PWCNT officers.

The commitment and cooperation of the Reserve's traditional custodians is gratefully acknowledged.

This 2007 plan is an amendment of the March 1997 Plan of Management. Section 6.7 has been added to allow the Conservation Land Corporation to sublease the land subject to the oil pipeline easement to the pipeline's owners so that rent may be paid to the Tnorala Aboriginal Corporation.

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# 1. INTRODUCTION TO THE PLAN

## 1.1 Location and Values of Tnorala

**Tnorala Conservation Reserve (Gosse Bluff)** is of considerable scientific and Aboriginal cultural importance and thought to be one of the best documented and most significant comet impact craters in the world. The 4,759 hectare Reserve (NIT. Portion 937) is located 160 kilometres west of Alice Springs and 50 kilometres west of Hermannsburg (figure 1). It is bordered by Haasts Bluff Aboriginal Land Trust (NIT. Portion 1635) to the west and the Ljalaltuma Aboriginal Land Trust (N.T. Portion 2075) to the north, east and south.

On 8 September 1872 Ernest Giles in search of a suitable route to Western Australia came across Tnorala. He named the area Gosse's Range after Henry Gosse (the brother of the famous explorer William Christie Gosse). The name was later changed to Gosse's Bluff Range then shortened to Gosse Bluff. The Western Aranda traditional custodians prefer the name Tnorala.

On 23 October 1969 Tnorala was proclaimed a Reserve under the *Crown Lands Act* on account of its scientific importance. The area remained a Reserve until October 1990 when title was transferred to the traditional custodians of the area, the Tnorala Aboriginal Corporation (TAC), as a Grant in Freehold. This transfer resulted in a simultaneous lease back arrangement to the Conservation Land Corporation for a term of 99 years.

The management agreement between the Parks and Wildlife Commission of the Northern Territory (PWCNT) and the Tnorala Aboriginal Corporation established the Tnorala Local Management Committee (LMC) which comprises 4 members nominated by the Tnorala Aboriginal Corporation and 2 members nominated by the PWCNT.

The Reserve is now managed by the PWCNT under the guidance of the LMC and in accordance with the lease conditions and accompanying management agreement.

The Reserve's **cultural values** derive from the Western Aranda people's long standing ties with the area. The land comprising the Reserve is Aboriginal owned and registered as an Aboriginal sacred site with the N.T. Aboriginal Areas Protection Authority (AAPA) under the name "Anurrula".

The Reserve contains at least five identified sites of ceremonial and symbolic importance to Aboriginal people. The Reserve also contains galleries of Aboriginal rock art and archaeological material.

According to Aboriginal belief, Tnorala was formed in the creation time when a group of women danced across the sky as the Milky Way. During this dance, a mother put her baby aside, resting in its wooden baby-carrier. The baby-carrier toppled over the edge of the dancing area and crashed to earth where it was transformed into the circular rock walls of Tnorala.

The **scientific values** of the Reserve are related to the formation of the crater, the unique geology of the area and, to a lesser extent, to the vegetation of the area.

The **tourist and recreational values** of Tnorala are related to its impressive size and significance as a comet impact crater and the Aboriginal belief associated with its formation. The remote location of Tnorala and its attractive setting also adds to its appeal as a tourist destination.

The area contains high **education and interpretation** values. The comet impact crater, its Aboriginal cultural values and the wildlife found in the area are aspects with considerable potential for education and interpretation.

## 1.2 Purposes of Management

Tnorala Conservation Reserve is intended to protect the cultural and natural values of the registered sacred site by way of a management agreement between the area's traditional custodians, represented by the IMC, and the PWCNT.

Management will aim at retaining the area's natural and cultural values whilst providing visitors with the opportunity to explore and enjoy the comet impact crater, its unique scenery and wildlife.

The **principal objectives** for the management of the area include:

- the protection of the area's Aboriginal cultural values including sacred sites and other sites of Aboriginal significance;
- protection of the crater and its associated natural environment including native plants and animals, soils, geological resources and water resources;
- to offer a balanced diversity of tourist and recreational opportunities consistent with the preservation of the areas natural and cultural resources; and
- to enable visitors the opportunity to appreciate and understand the scientific and Aboriginal cultural values of the area and to preserve and maintain those values.

## 1.3 The Intent of the Plan

The intent of the Plan is to provide direction for future management at Tnorala Conservation Reserve consistent with relevant legislation, the Memorandum of Lease, Management Agreement and the wishes of the traditional custodians of the area.

The Plan sets management objectives, addresses current issues and provides guidelines for future management and development in the Reserve. It has been prepared by the PWCNT and the Tnorala Local Management Committee.

The Plan has been developed in pursuance of Sections 18 and 19 of the *Territory Parks and Wildlife Conservation Act* and in accordance with the Memorandum of Lease and the Management Agreement between the TAO and the PWCNT,

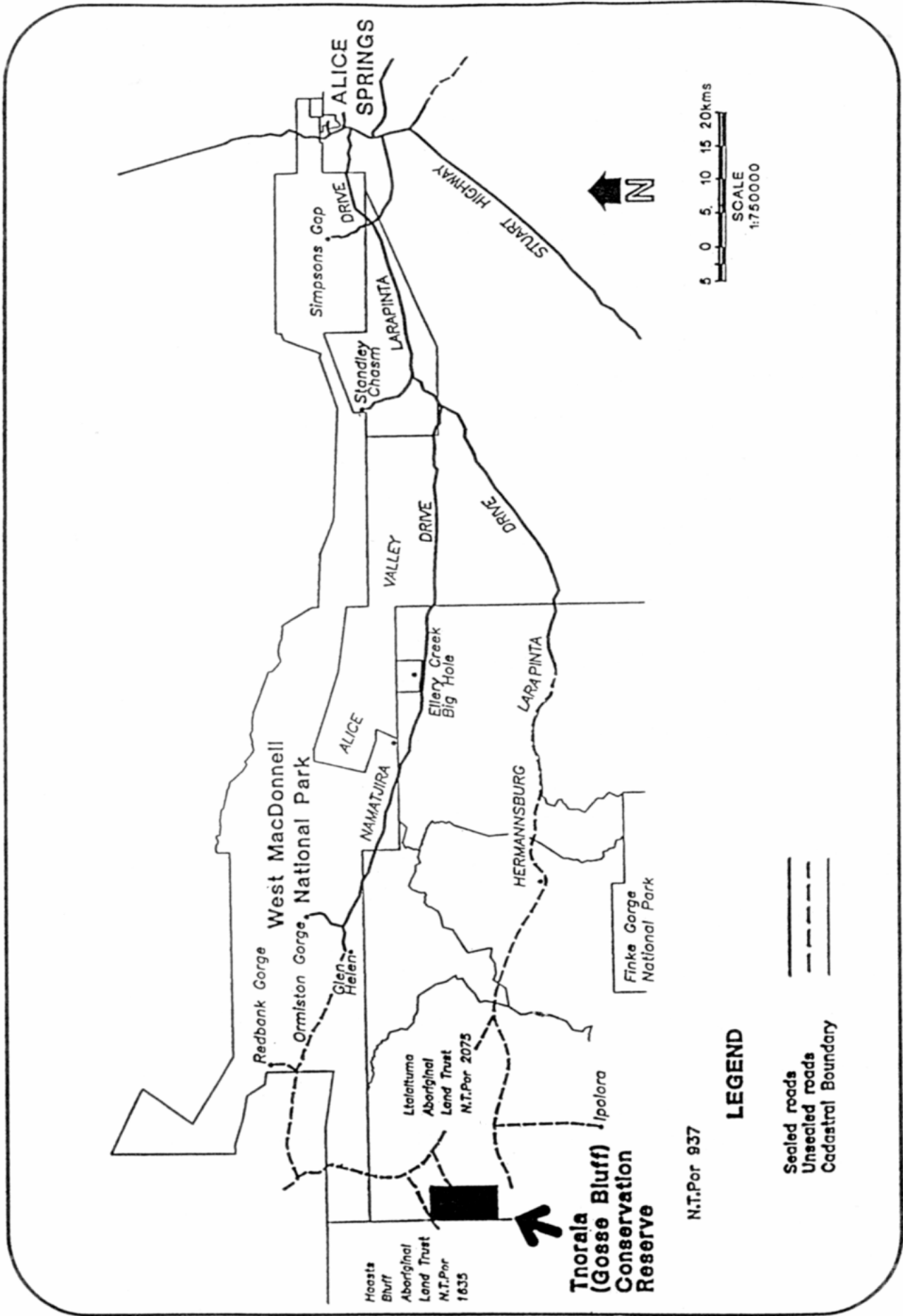
The PWCNT is obliged, under Section 21 of the Act, to manage the Reserve in accordance with this Plan once it has come into operation.

The Plan will be in force for a minimum of five years and a maximum of ten years, unless revoked by a new plan, or amended in accordance with Section 20 of the Act.

The locations of important cultural sites have not been identified in this Plan in order to preserve their cultural and spiritual value in accordance with the wishes of the area's traditional custodians.



Figure 1 – Locality Map



## 2. ZONING SCHEME

The zoning scheme outlined below (figure 2, table 1) has been prepared to help regulate visitor activities and developments within defined areas. This is to ensure that visitor use of an area is compatible with the traditional custodians' wishes of how the area should be managed and the overall need to conserve the Reserve's cultural and natural resources.

Public access within any of the zones may be restricted if it is shown to be having a deleterious effect on the natural values of an area. Access may also be restricted if sites of Aboriginal significance are being adversely affected.

All developments on the Reserve will be low-key and will cause a minimum of interference to the Reserve's cultural values and natural values. All developments will require the approval of the LMC and must comply with the requirements of the Northern Territory Aboriginal Sacred Sites Act, the Environmental Assessment Act, the Meteorites Act, the Heritage Conservation Act and other relevant legislation.

### 2.1 Outline of the Zoning Scheme

Four zones have been identified to regulate the use, development and management of the Reserve (figure 2).

- **Natural Recreation Zone**
- **Special Protection Zone - Aboriginal**
- **Natural Zone**
- **Restricted Zone /**

The purposes of these zones are outlined below .

### 2.2 Natural Recreation Zone

This zone will provide controlled access for visitors so they can appreciate and enjoy a small sample of the Reserve's cultural and natural values.

The zone will also provide an area where developments can be situated in a manner which is unobtrusive and sympathetic with the natural and cultural values of the Reserve.

Low-key recreation and education activities will be permitted provided they have manageable impacts on the area's resources and values. Visitor access will be restricted to designated unsealed roads and a walking track.

Developments such as roads, tracks and day-use facilities including park furniture, shelters (shade/interpretive), a pit toilet and interpretive and information signs will be permitted in this zone. Overnight camping by visitors and the use of fires, wood or gas barbecues will not be permitted.

The loop walking track will traverse only a small portion of this zone. In association with this, interpretive signs will be provided where appropriate for educational, information or management purposes.

### 2.3 Special Protection Zone - Aboriginal

The purpose of this zone is to protect key Aboriginal cultural values of the Reserve including culturally significant sites. Public access to these areas will not be encouraged and facilities will not be provided.

Visitor access to this zone is at the discretion of the LMC.

This zone will be maintained in as natural a state as practicable.

### 2.4 Natural Zone

The main purpose of this zone is to protect the key natural features of the Reserve including a major stand of Grass Trees (*Xanthorrhoea thorntonii*) in the southwest corner of the Reserve and a significant stand of Hill Mulga (*Acacia macdonnelliensis*) on the northern rim of the crater.

Visitor access and facilities will not be provided in this zone. Tracks in the area will be rationalised and only available for service access.

Fire management will assist in maintaining the natural character of this zone (see Section 3, Management of the Reserve's Natural Resources).

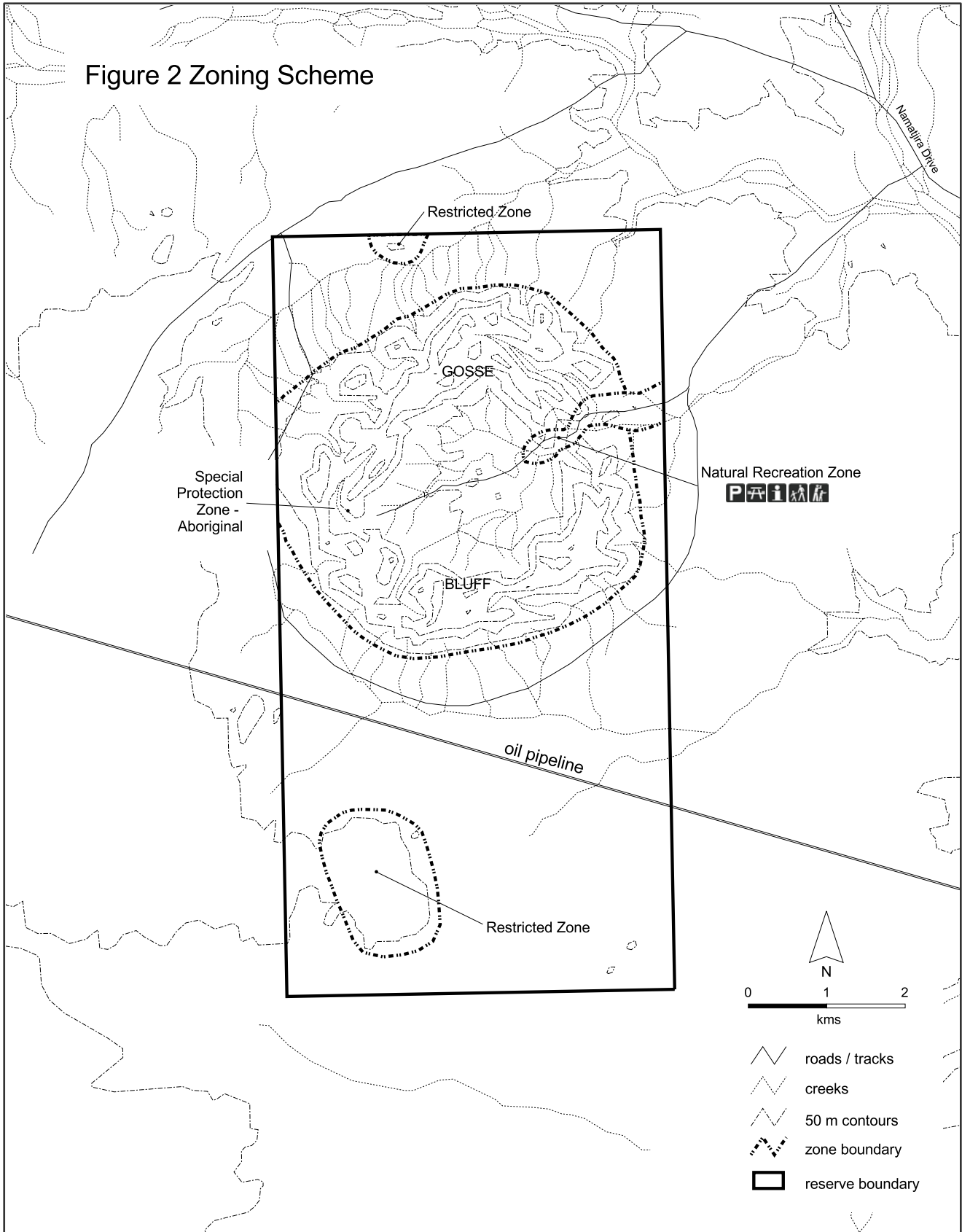
### 2.5 Restricted Zone

The purpose of this zone is to protect sensitive Aboriginal cultural values, sacred sites and prevent access to culturally restricted areas of the Reserve. The areas are Mt Pyroclast in the southwest corner of the Reserve and a similar rocky knoll on the northwest boundary. These areas will be totally out of bounds to visitors and Park Rangers will only have very limited service access.

Park Rangers will be required to gain permission (except in an emergency) for access to these areas through prior consultation with the LMC.



Figure 2 Zoning Scheme



**Table 1 – Summary of Zoning Scheme**

<b>Management Zone</b>	<b>Purpose</b>	<b>Management Strategy</b>	<b>Access</b>	<b>Facilities</b>	<b>Appropriate Uses</b>
<b>Natural Recreation Zone</b>	To provide an area where visitor facilities and any living area can be sited with minimal impact on the environment	To concentrate use in an area which can be managed to keep impacts within acceptable limits	Controlled vehicle access along unsealed track to day-use area. Elsewhere by foot.	Unsealed 2WD track, traffic counter, park furniture, shade/ Interpretations shelter, pit toilet, interpretations and information signs.	Aboriginal cultural appreciation, day-use picnicking, photography, short walks.
<b>Special Protection Zone - Aboriginal</b>	To protect the key Aboriginal values including culturally significant sites.	To control and restrict visitor access in order to minimise impacts to Aboriginal cultural resources.	Visitor access by foot, (preferably with Aboriginal guides).	Unsealed service tracks.	Nature & cultural appreciation, walking (preferably with Aboriginal guides).
<b>Natural Zone</b>	To protect key natural values including stands of Grass Trees and Hill Mulga. To minimise human impact on the environment and maintain the majority of the Reserve in as natural a state as practicable.	To restrict visitor access and rationalise service access. Fire management will assist in maintaining a natural character.	Visitor access will not be promoted. Only necessary vehicular access for management purposes. Tracks to be rationalised and rehabilitated.	Unsealed service tracks.	Limited nature appreciation, walking, photography.
<b>Restricted Zone</b>	To protect very sensitive Aboriginal cultural values and sacred sites.	Prohibit visitor access. Allow limited service access to Park Rangers with approval of the Local Management Committee.	Visitors strictly prohibited. Necessary management access only with prior approval of the Local Management Committee.	None.	Traditional Aboriginal use only.

### 3. MANAGEMENT FOR ABORIGINAL INTERESTS

#### Objectives

- To take fully into account in the management of the Reserve the interests and concerns of the LMC.
- In conjunction with the LMC, to manage and protect sites of spiritual or cultural significance.
- To record document and protect the Reserve's Aboriginal artefacts, cultural resources and tradition according to the wishes of the LMC.
- To enable visitors to appreciate and understand the significance of the Aboriginal cultural resources through appropriate interpretive material and programmes, in accordance with the wishes of the LMC

#### 3.1 Consideration of Aboriginal Interests

Some members of the Western Aranda Aboriginal people are the traditional as well as legal custodians for Tnorala Conservation Reserve, The entire Reserve (N.T. Portion 937) is registered with the Northern Territory Aboriginal Areas Protection Authority (AAPA) as a sacred site under the *Northern Territory Aboriginal Sacred Sites Act* and known as "Anurrula".

A Local Management Committee with Aboriginal representation has been established pursuant to Section 1(a) of the Management Agreement, It is intended that the LMC should ensure that the views of the traditional custodians are represented and they are appropriately involved in the management of the Reserve.

In accordance with the provisions of the Memorandum of Lease and Management Agreement, and as directed by the LMC, the Parks and Wildlife Commission has been entrusted with management of the Reserve's Aboriginal cultural values and resources, in consultation with the LMC.

The PWCNT recognises the right of the traditional custodians of the area, under current legislation, to hunt and forage in the Reserve.

Although little hunting takes place in the Reserve at present, the LMC have expressed the desire to continue using some areas of the Reserve for hunting and gathering activities.

To-date there is no evidence that Aboriginal hunting and gathering practices have had any serious negative effects on the flora, fauna or ecology of the Reserve.

Parts of the Reserve have special significance to the Western Aranda people and are used for ceremonial purposes. On occasions it may be necessary to close all or part of the Reserve to visitors to ensure privacy during ceremony,

#### **Management Guidelines**

- The LMC will be involved in active management of the Reserve, including protection of sacred sites, wildlife research, fire control programmes, feral animal eradication programmes and the control of introduced plants (see 6.2 & 6.5).

- Sites of Aboriginal significance will be afforded special consideration and protection in management operations in accordance with the wishes of the LMC. Special care will be taken not to disturb these sites through the development of visitor or management facilities.
- Known sacred or significant sites within the Special Protection Zone – Aboriginal will not be identified or made accessible to visitors without the consent of the LMC.
- Documentation of sites of significance will be undertaken in accordance with the wishes of the LMC and the resulting information may be used, where the LMC so desire, in the Reserve's Interpretive Programme (see 5,4).
- Aboriginal artefacts found on the Reserve will be left in situ wherever practicable, unless traditional custodians of the area wish to determine alternative arrangements. Artefacts in danger of being damaged or souvenired may be documented and collected for storage or display, with the consent of the LMC,
- Further research into and documentation of the Reserve's Aboriginal cultural and spiritual importance will be encouraged. In accordance with the wishes of the LMC all, or part, of this information may remain confidential.
- All or parts of the Reserve may occasionally have to be closed to visitors to ensure privacy during ceremony.

### **3.2 Interpretation**

It is important that the cultural heritage of Aboriginal people is not lost to future generations. Aspects of Aboriginal culture and lifestyle are of considerable interest to the visiting public, Tnorala Conservation Reserve presents a unique opportunity to communicate to visitors aspects of Aboriginal lifestyle and culture in a personal manner,

#### ***Management Guidelines***

- The LMC will determine the content of educational and Interpretive Programmes in relation to the Reserve. All interpretive, orientation and advisory signs will require approval of the LMC (see 5,4),
- The Interpretive Programme will aim to increase visitors' awareness and appreciation of Aboriginal culture (see 5,4).
- Provision will be made for the traditional custodians to communicate to visitors aspects of Aboriginal lifestyle and culture, this may include guided tours of the Reserve,

### **3.3 living Area**

It may be that the traditional custodians will want to establish a living area within the Reserve at some future time.

#### ***Management Guidelines***

- The establishment and management of any living area will have to be arranged in consultation with the LMC. Management of a living area will have to be compatible with the Reserve's principal objectives,

## 4. MANAGEMENT OF THE RESERVE'S NATURAL RESOURCES



### Objectives

- to protect the natural environment including geological resources, native plants and animals, soils and water resources.
- To protect the natural landscape and scenic resources of the area.
- To give special protection to rare and endangered species of plants and animals as well as species which are locally significant.
- To minimise the impact of introduced plants, animals and stock.

### 4.1 landforms and Topography

The ring of hills which comprise Tnorala are all that remain of the original crater. The hills stand about 180 metres above the level of the surrounding plain and 250 metres above the internal Missionary Plain.

It is estimated that the bolide which caused the impact structure was probably a comet of low density (1,3 tonnes/metre<sup>3</sup>) and high velocity (40 kilometres/second) with a diameter of about 600 metres. The energy release on impact has been estimated in the order of 33,000 megatonnes of TNT (about one million times more powerful than the Hiroshima bomb),

The massive compressive forces of the comet upturned sedimentary formations near the focus of impact. Erosion over the past 130 million years has left only the more resistant sandstone formations forming upstanding relics of the crater core. Satellite images of the area indicate that the original crater was some 20 kilometres in diameter,

#### *Management Guidelines*

- Care will be taken in locating and constructing all developments within the Reserve to ensure that they do not detract from the natural landscape, scenic resources, or cultural or ecological integrity of the area,
- Any new developments will be designed, sited and constructed to have minimal visual impact on the landscape. All developments will be sited or aligned to avoid major earthworks, rock cuttings or other disturbances.
- The Interpretive Programme for the Reserve, may focus on aspects of the Reserve's geomorphological history (see 5.4).

### 4.2 Soils

The landforms within the Reserve are comprised of Lithosols, Red earths, Alluvial and Red calcareous soils. Coarse textured red lithosols with a moderate erosion hazard are found in the outer ring of hills that make up the crater. The colluvial fans adjacent to the outer ring of hills are comprised of medium textured gravelly red earths with a low erosion hazard while the old alluvial plains are comprised of Red earthy sands (Red earths) with a moderate erosion hazard, Shallow Red calcareous soils with a moderate to high erosion hazard occur in the central hills within the crater and the alluvial soils with a moderate erosion hazard are found along the creeklines. The variable soil profiles within the Reserve provide a basis for the establishment of a diverse range of vegetation.



### ***Management Guidelines***

- Development projects will be positioned on less erodable soil types and undertaken with the minimum of soil disturbance practicable,
- Measures will be taken to prevent soil erosion as far as practicable through appropriate design, routing and construction techniques along access roads and walking tracks.
- No soil will be removed or disturbed within the Reserve except where necessary for management purposes,
- Erosion control measures will be employed as necessary during the construction phase of any developments and any rehabilitation measures will be carried out as soon as possible following a project's completion,
- All rehabilitation work will be carried out in consultation with the Department of Lands, Planning and Environment's (DLPE) Land Conservation Unit and the LMC (see 6.2).

### **4.3 Geology and Minerals**

The impact structure can be divided into two zones; a lower zone of systematic displacements and an upper zone of more chaotic deformation. Erosion over the past 130 million years has revealed the sandstones of the Larapinta group, the Mereenie Sandstone and a Parke Siltstone. Detailed mapping has shown that successive strata do not form annular belts but discrete faulted plates generally a few hundred metres long.

The outcrop pattern of the inner hills is roughly triangular with the orientation of strata on the northern two sides differing markedly from that on the southern side. The core of the structure is a tight anticline in the Stairway Sandstone.

Shatter cones (cone-shaped fractures in rocks produced through extreme shock) are scattered throughout the crater. These structures support the theory that the crater was formed by the impact of a comet colliding with the earth.

In 1988 the centre of the crater was drilled for what was believed to be extensive reserves of natural gas and oil. However, after several months of exploration the site was found to have insufficient quantities for commercial exploitation. The project was abandoned in February 1989 and the site rehabilitated shortly thereafter. A Reservation from Occupation (RO 1408) exists over the Reserve, granted 20 February, 2002.

### ***Management Guidelines***

- Care will be taken that no developments on the area disturb the geology of the crater or features associated with the comet impact structure.
- Research and surveys may be undertaken to identify sites of geological importance to ensure that they are not inadvertently damaged by management operations or development works (see 6.5).
- Erosion control and rehabilitation measures will be progressively implemented at eroded sites.
- Rehabilitation of disused four-wheel-drive tracks will take place in consultation with the Department of Lands, Planning and Environment (DLPE) Land Conservation Unit and the LMC. The interior of the crater will have only one (two-way) service vehicular access track which will terminate in the centre of the crater.

- The Interpretive Programme for the Reserve may include both scientific and Aboriginal symbolic explanations regarding the formation of the crater. The use of Aboriginal stories in the Interpretive Programme will be in accordance with the wishes of the traditional custodians as agreed by the LMC (see 5.4).
- The LMC will seek Reservation from Occupation of Mining of the Reserve under the *Mining Act* and reservation from petroleum exploration under the *Petroleum Act*.
- Operations for the exploration and recovery of minerals may be permitted in accordance with the requirements of the *Mining Act*, the *Meteorites Act* and any other relevant legislation and administrative arrangements set in place by the LMC, the PWCNT and the Department of Mines and Energy.
- Gravel or any rock material will not be removed or displaced in the Reserve.

#### 4.4 Hydrology

There are natural dendritic drainage channels within the crater which drain surface water, from the crater after rain to seasonal creeks which lie to the north and east of the Reserve.

No study has been undertaken on the groundwater resources of the area, however, they are thought to be limited. There are no bores or toilet facilities presently contained within the Reserve. Disposal of effluent will require special investigation to ensure that groundwater is not contaminated.

Waterholes within the Reserve are important cultural sites to the traditional custodians and act as a refuge for native wildlife. These resources may require special protection.

##### **Management Guidelines**

- Natural hydrological processes will continue with a minimum of interference throughout the Reserve.
- Visitors to the Reserve will be advised through pre-visit information of the need to provide their own water (see 5.4).
- The appropriate authorities will be consulted over any proposals for the disposal of effluent in the Reserve and will be asked to recommend procedures to ensure that groundwater is not contaminated.
- The location of waterholes within the crater will not be promoted (see 5.4).

#### 4.5 Native Vegetation

The Reserve contains a diversity of vegetation largely related to its complex geology, little surveying of native vegetation has been carried out within the boundaries of the Reserve.

There are known to be at least four rare species of plants found within the Reserve; these include *Comesperma viscidulum* (national significance), Red-berried Stick-plant (*Spartothamnella puberula*) (regional significance) and Desert Grass Tree (*Xanthorrhoea thurstonii*) (regional significance).

Other plants of significance in the Reserve include a significant stand of Hill Mulga (*Acacia macdonnellensis*) on the northern rim of the crater which requires special fire protection and the Woolly Mat-rush (*Lomandra lencocephala*) which is uncommon to the Northern Territory.

Management strategies are required to preserve the present distribution and diversity of native plant communities in the Reserve. A list of flora recorded in the Reserve is shown in Appendix 1, Further research will be required to determine the extent and vulnerability of plant species within the Reserve.

## Management Guidelines

- Disturbance to any vegetation communities will be minimised. The major threats to the vegetation communities are likely to result from stock, introduced weeds, uncontrolled fire and the activities of people. Management strategies to control these impacts are discussed in the following sections of the Plan.
- Any new works will be undertaken in such a way as to minimise impacts on native vegetation,
- Disturbed or denuded sites will be revegetated through colonisation of surrounding areas. Active management measures such as scarifying, seeding or planting disturbed areas may also be employed where considered necessary.
- Information concerning characteristic, distribution and habitats of native animals may be included in the Reserve's Interpretive Programme (see 5.4).
- Controlled burning of vegetation will be undertaken in accordance with the Annual Fire Action Plan with the aim of reducing fuel and maintaining diversity of vegetation (see 4.8).
- Measures will be taken to provide fire protection to the stand of Hill Mulga (*Acacia macdonnellensis*) on the northern rim of the crater (see 4.8).
- Research programmes on native vegetation will be undertaken as dictated by management requirements. Priority areas include; identification of rare or relict plants; Aboriginal nomenclature and ethnobotanical uses of native vegetation and measures necessary for their conservation as well as the impact of fire, feral animals and visitors on native plant communities (see 6.5).
- The collection of limited numbers of plant specimens for necessary research or other scientific purposes will be allowed in accordance with the Parks & Wildlife Commission's Scientific licences policy and in consultation with the LMC and within acceptable impact limits (see 6.5).
- Traditional custodians will be able to exercise their right to forage in the Reserve (see 3.1).

## 4.6 Native Fauna

Limited research has been undertaken into the native animal populations of the Reserve. The Reserve is known to contain a diverse assemblage of birds, including the Painted Firetail, the Rainbow Bee-eater, the Spotted Bow erbird and the Yellow -throated Miner.

Mammals found within the Reserve include the Euro, Gould's Wattled Bat and the Little Cave Eptesicus (a small bat), There are a number of reptile species of significance including the Central Netted Dragon, the longnosed Dragon and Gould's Goanna.

Further research to identify distribution, abundance and habitat requirements of native fauna is required. A list of fauna recorded in the Reserve is shown in Appendix 2, The range of native fauna is dependent on the diversity of habitats of survival. Maintenance of these habitats and their balanced management is an essential factor in the protection of the area's wildlife.

## ***Management Guidelines***

- As resources allow, the PWCNT will continue to research and survey the native fauna populations of the Reserve and their habitat requirements with the involvement of the LMC (see 6.5).
- Habitats and populations of rare and endangered animals, will be afforded special protection, including the possible regulation or restriction of visitor access, special provisions in the Annual Fire Action Plan, priority in introduced plant and animal control programmes and continued monitoring (see 4.8).
- All new works and rehabilitation projects will be undertaken in such a way as to minimise their impacts on native animals and their habitats.
- Limited numbers of native animals may be taken under permit and within acceptable impact limits for necessary research or other scientific purposes (see 6.5).
- Information concerning characteristic, distribution and habitats of native animals may be included in the Reserve's Interpretive Programme (see 5.4).
- Traditional custodians will be able to exercise their right to hunt in the Reserve (see 3.1).

### **4.7 Introduced Flora and Fauna**

There is a need to protect the Reserve from the intrusion of weeds, feral animals and stock in order to preserve the conservation values of the area.

The Reserve does not appear to suffer from any major infestations of weeds or introduced animals at present. However, with increased visitation it is possible that seeds or propagules of plants, foreign to the area could be accidentally brought in and become established.

Minimal disturbance to and maintenance of native plant communities will lessen the likelihood of introduced plants becoming a major problem.

Feral cats have been known to occur within the Reserve and horses, rabbits and camels are known to inhabit the surrounding terrain.

## ***Management Guidelines***

- Research will be undertaken to determine the nature and extent of introduced plants. As far as possible introduced plants will be removed or at least controlled.
- Measures that may be used, as and when appropriate, in the control of introduced plants include manual or mechanical removal, burning and the judicious use of low persistence herbicides.
- Plants used for landscaping or rehabilitation works will be local native species wherever possible.
- The distribution and status of introduced plant and animal species within the Reserve will be monitored on a continuing basis (see 6.5).
- In an effort to prevent the intrusion of stock, horses and camels into the Reserve, fencing will be established and natural barriers will be utilised (see 6.2).
- Feral animals found in the Reserve will be removed by the most appropriate means.

- Under the Territory Parks and Wildlife Conservation Act and the Parks and Wildlife Commission's Pets in Parks policy, the Reserve is classified as a "Schedule 1" area. This means that animals of any kind may not be taken into the Reserve. Visitors will not be permitted to bring dogs, domestic pets or other introduced animals into the Reserve.

#### **4.8 Use and Control of Fire**

The plants and animals within the area have evolved with fire and are partially dependant on periodic burning. Fire management techniques have remained an important component of traditional Aboriginal land management practice.

Fire management practices within the Reserve may include controlled burning undertaken by the PWCNT in cooperation with the Bush Fires Council of the N.T., adjoining landholders and the LMC. Fire control methods will be guided by minimisation of ecological damage.

There is a need for systematic research and monitoring to provide the basis for an Annual Fire Action Plan. Preparation of an Annual Fire Action Plan will facilitate fire management to direct and control both intentional and naturally occurring fires.

##### ***Management Guidelines***

- The PWCNT and the Bush Fires Council of the N.T, will be responsible for fire management within the Reserve with the LMC.
- An Annual Fire Action Plan will be prepared by the PWCNT in consultation with the Bush Fires Council, and the LMC. LMC endorsement of the plan will be required prior to implementation.
- The stand of Hill Mulga (*Acacia macdonnelliensis*) on the northern rim of the crater will require fire protection.
- Records will be kept regarding the extent and nature of any fires occurring within the Reserve, This information will be used in the preparation of an Annual Fire Action Plan, prediction of fire behaviour, direction of control operations and research projects.
- Visitors will be informed of the regulations and restrictions governing the use of fire within the Reserve. Visitors will not be permitted to light fires, gas or wood barbecues within the confines of the Reserve (see 5.4).
- Visitor access to all or part of the Reserve may be regulated or restricted during periods of high to extreme fire danger, or during controlled burning operations.



## 5. MANAGEMENT OF THE RESERVE FOR VISITOR USE

### Objectives

- To offer a balanced diversity of tourist and recreational opportunities consistent with the preservation of the Reserve's cultural and natural values.
- To monitor and where necessary, control recreation within the Reserve.
- To provide appropriate low key nature based visitor facilities, including access routes consistent with the values of the Reserve.
- To provide visitors with the opportunity of encountering and learning about traditional life and culture.
- To provide an Interpretive service which is both informative and instructive.

### 5.1 General

Tnorala is a unique and spectacular geological structure, the area has a long history of Aboriginal occupation and continues to be a place of extreme importance to the Western Aranda people. The area is known to contain plants which are considered rare and unusual and a diverse assemblage of animals. There is little doubt that the Reserve will receive increasing levels of visitation, as roads are improved and the West MacDonnell District is promoted as a popular tourist destination.

### 5.2 Visitor Access

Access to the Reserve is presently by road via Hermannsburg to the south or Tylers Pass to the north. Both roads are recommended 4WD only. There is only one track leading into the crater, however a multitude of tracks occur inside. These detract from the visual appeal of the area and have exacerbated erosion in places.

Negotiations are in progress to upgrade tourist access on the Mereenie road from Hermannsburg to Watarrka National Park. The development of this road may impact upon visitation to Tnorala.

A permit is presently required from the Central Land Council to traverse the Ltalaltuma land Trust between the public access road and the Reserve.

Tnorala is occasionally used by Western Aranda people for ceremonial purposes. It may be necessary to close all or part of the Reserve to visitors during periods of ceremony.

Visitor access will be unrestricted to the Natural Recreation Zone, approximately 300 metres inside the crater. Access to the centre of the crater and areas of cultural significance will only be permitted on foot and preferably by participating in an Aboriginal tour.

## **Management Guidelines**

- The Parks and Wildlife Commission will continue to negotiate with the Central Land Council to enable public access to the Reserve in accordance with the wishes of the LMC.
- Public vehicular access to approximately 300 metres inside the crater, south of the access road to a day-use area within a Mulga stand will continue. This road will continue to the centre of the crater for use by visitors on proposed Aboriginal tours and service access only.
- The access road will be of a 2WD unsealed standard to the outside of the crater. This will be in keeping with the proposed upgrading of regional access roads to the Reserve, to a 2WD unsealed standard. The access road may need surfacing and drainage to sustain the likely increased use. The access road from the outside of the crater to the day-use area and centre of the crater is recommended 4WD (lower standard) access.
- The public access road will terminate at the day-use area where provisions for parking and turning will be provided. The area will be fenced with bollards or low barrier fencing to prevent further vehicular access. Walking tracks from this point will provide access to the proposed tour destinations (culturally significant sites), the routes to be identified by the traditional custodians when required.
- Old tracks within the crater have been closed and rehabilitated. Old mullock heaps and large windrows beside the road and shot line inside the crater have been levelled and rehabilitated.
- Visitors will be informed via the Interpretive Programme of the need to remain on the main access road (see 5.4).
- All or parts of the Reserve may have to be closed to visitors during periods of ceremony (see 3.1).
- Selected commercial tour operators using 4WD coaches will have access into the crater to the day-use area. If the demand eventuates conventional coaches will be provided with a special parking area outside the crater, possibly located near the old drill campsite. From here visitors can walk or be ferried by appropriate vehicle into the crater.

### **5.3 Visitor Facilities**

Low-key, day-use, visitor facilities including picnic tables, a pit toilet and interpretive material have been developed at a site located approximately 300 metres inside the crater, within a Mulga grove, on the south side of the access road.

A short low-key walking track is proposed within the Natural Recreation Zone from the day-use area to a lookout on an adjacent ridge.

In the past camping was uncontrolled and camp fires were being lit inside the crater. This situation is unacceptable from a management perspective and a violation of the *Northern Territory Aboriginal Sacred Sites Act*.

Increases in visitor numbers will necessitate monitoring of the day-use visitor facilities. Visitor use is presently controlled using appropriate roading and visitor amenities, Tnorala Conservation Reserve is a remote destination and the provision of basic facilities, located with minimal intrusion on the natural environment will enhance the experience for visitors and help to prevent ad hoc camping and recreational activities.

## ***Management Guidelines***

- Management of the area for visitors will be consistent with, and secondary to the need to protect the area's Aboriginal cultural values and resources.
- No camping, fires, wood or gas barbecues will be permitted within the Reserve. Visitors will also be notified that camping and fires are not permitted on adjacent Aboriginal lands (see 5.4).
- Alternative parking facilities will be provided for vehicles other than 4WD outside the crater in the old drill campsite.
- The walking track within the Natural recreation Zone will be developed in consultation with the LMC and with a minimal environmental impact.
- Management of visitor access and activities on the Reserve and the provision of visitor facilities will be directed by the area's Zoning Scheme (see section 2). The majority of visitor use of the Reserve will be in the Natural Recreation Zone.
- The Natural Recreation Zone will be managed to enable visitors to appreciate examples of the Reserve's principal cultural and natural values in a natural setting with limited facilities.
- Permissible low-impact visitor activities within the Natural Recreation Zone include sightseeing, Aboriginal cultural appreciation, photography, bush picnicking, walking, bird watching and similar nature based activities.
- Garbage bins will not be provided within the Reserve. Visitors will be requested to take their rubbish away with them (see 5.4 & 6.2).
- In accordance with the expressed wish of the traditional custodians camping will not be permitted at Thorala.

## **5.4 Information and Interpretation**

New interpretation and visitor information facilities have recently been installed in the Reserve.

By increasing public awareness and understanding of the area, its enjoyment by visitors can be improved, at the same time increasing the protection afforded the natural and cultural resources.

The lifestyle and culture of the traditional custodians represents an added dimension for interpretation in the Reserve.

## ***Management Guidelines***

- An Interpretive Programme for the Reserve will be developed by the PWCNT with the LMC. The programme will focus on the scientific and Aboriginal cultural importance of the area.
- Interpretive measures will be used to inform visitors of any restrictions on their access to, or use of, certain areas and to bring relevant By-laws or other regulations to their attention.
- Pre-visit information will be provided on visitor activities including camping prohibitions. Information will also be provided on the services that can be obtained in the area.



- Information and interpretation on sacred sites will be provided by the LMC and subject to change at their discretion.

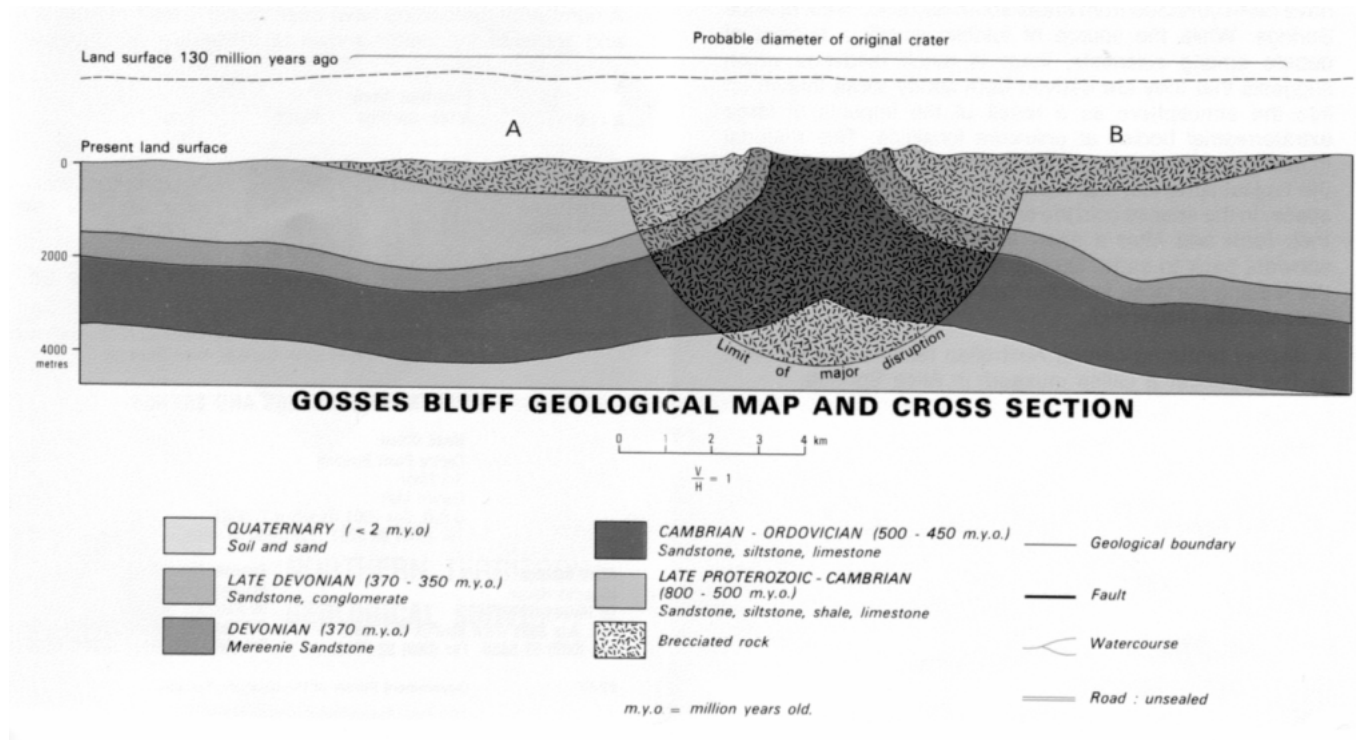
## 5.5 Visitor Monitoring

In 1994 8682 people and in 1995 15026 people visited the Reserve. Visitor numbers are expected to increase substantially with improvements to road access.

No information is presently available on visitor preferences and attitudes. This information is essential for proper management of the Reserve. As the number of visitors increases, it will be important that their impact on the area and its values be carefully monitored.

### Management Guidelines

- A visitor monitoring system will be established to survey and document visitor usage patterns, behaviours and attitudes.
- The impacts of visitor activities throughout the Reserve, particularly in significant or sensitive biological or Aboriginal sacred areas, will be monitored. Such monitoring is necessary to ensure adequate protection of the Reserve's resources and to provide information necessary for the review of appropriate visitor activities.



## 6. RESERVE ADMINISTRATION AND RESEARCH

### Objectives

- To ensure that the Reserve's management procedures and practices achieve the objectives of this Plan's guidelines.
- To administer the *Territory Parks and Wildlife Conservation Act* and By-laws, the Management Agreement and other relevant legislation in relation to the Reserve.
- To provide sufficient staff resources and facilities adequate for the efficient management of the Reserve.
- To cooperate with neighbouring landholders regarding management of the Reserve and adjacent areas.
- To encourage appropriate research into the natural environment and cultural aspects of the Reserve.

### 6.1 General

The Parks and Wildlife Commission of the Northern Territory has management responsibility for the Reserve in consultation with the Tnorala Local Management Committee and in accordance with the provisions of the Memorandum of Lease and the Management Agreement.

#### ***Management Guidelines***

- No operations will be undertaken and no developments or works carried out except in accordance with this Plan.
- Management will be periodically reviewed to ensure it is in compliance with this Plan.

### 6.2 Staffing and Management Facilities

The Reserve is managed by the PWCNT under the guidance of the LMC and maintained by Rangers from the West MacDonnell District. Patrols to the Reserve are conducted on a regular basis.

Management facilities on the Reserve are limited to boundary fencing and a small network of vehicular tracks.

The entire boundary of the Reserve is not fenced. Boundary fencing will prevent uncontrolled access into the Reserve.

Numerous informal tracks occur in the Reserve which are a legacy from uncontrolled vehicle access. These tracks will be rationalised and rehabilitated to provide effective management access to most of the Reserve.

Rubbish from the Reserve will be taken out of the Reserve for disposal.

## ***Management Guidelines***

- The Reserve will continue to be patrolled on a regular basis by Rangers. Regular contact with visitors and traditional custodians will enable Park staff to; monitor the Reserve's cultural and natural resources; monitor visitor numbers and behaviour; and to enforce relevant legislation and By-laws.
- Where ever practicable relevant Aboriginal people will be trained and employed to participate in management activity in accordance with the PWCNT's Aboriginal Employment and Career Development Strategy (see 3.1).
- It may be necessary to increase the frequency of Ranger patrols if visitation levels increase in the future.
- The entire Reserve boundary will be fenced to prevent uncontrolled access by vehicles and feral animals. There will be a locked service gate on the western boundary at the shotline crossing and at both ends of the oil/gas pipeline (see 4.7). Boundary fencing will be monitored and maintained in good repair.
- A service road network will be developed in the Reserve, based on the area's existing informal tracks. The network will be designed to impact as minimally as practicable for the Reserve's effective management.
- The service road network will provide access to the centre of the crater, the area outside the southern part of the crater and along the oil/gas pipeline in the southern part of the Reserve.
- The rough track outside and around the southern end of the crater will be retained for service access only. Visitor access will not be permitted (see 5.2).
- Existing informal tracks not required as part of the service road network, including the shotlines through the centre of the crater will be closed and rehabilitated (see 4.2).
- Rubbish will continue to be disposed of outside the Reserve (see 5.3).

### **6.3 liaison with Neighbouring Landholders**

The Reserve is neighboured by Haasts Bluff Aboriginal Land Trust (N.T. Portion 1635) to the west and the Ltalaltuma Aboriginal Land Trust (N.T. Portion 2075) to its northern, eastern and southern boundaries (see figure 1).

Proper management of the area is dependent upon cooperation with neighbouring landholders, Glen Helen Pastoral Estate, Tjuwanpa Resource Centre, Ngurratjuta Council, the Central Land Council and NT Gas.

#### ***Management Guidelines***

- Efforts to maintain active liaison and cooperation with surrounding landholders will be undertaken. Cooperation will be especially important in the areas of fire prevention, control of introduced plants and animals, provision of access and fencing.

## 6.4 Commercial Operations

The PWCNT has not been approached regarding any form of commercial operation within the Reserve. However, commercial interest in the Reserve may develop in the future as the region's tourism industry continues to grow.

### **Management Guidelines**

- Commercial operations will only be permitted within the Reserve in accordance with the PWCNT's Concessionary Operations policy and in consultation with the LMC, Operators must clearly demonstrate that they will have no adverse impacts on the Reserve's natural and cultural values.
- A permit or licence fee for commercial use of the Reserve may be charged, as may a fee for Aboriginal guides (if required).

## 6.5 Research and Monitoring

A limited amount of scientific research has been undertaken within the Reserve, mostly concerning geological aspects of the crater. Development of a Research and Monitoring Programme for the Reserve would result in an increase in knowledge about the area which could lead to more effective management practices.

### **Management Guidelines**

- A Research and Monitoring Programme will be developed with the LMC and will aim to rectify the deficiencies in knowledge about the natural environment, ecosystems and Aboriginal culture of the Reserve.
- The Research and Monitoring Programme will incorporate all research and monitoring projects identified in earlier sections of this Plan.
- Management of the Reserve's resources and visitor activities will be undertaken on a regular basis. Priority will be given to monitoring the condition of Aboriginal cultural sites and art sites, as well as visitor numbers and activities (see 3.1 & 5.5).
- Scientific research or monitoring by persons or agencies outside of the PWCNT will be allowed in accordance with Section 111 of the *Territory Parks and Wildlife Conservation Act* and in accordance with the PWCNT's Scientific licences policy.
- Scientific licences for external research programmes within the Reserve will require the approval of the Director of Conservation in consultation with the LMC which will retain the right to have an Aboriginal overseer of any operation.
- Aboriginal people are to be involved in scientific programmes whenever possible (see 3.1).
- Aboriginal people retain copyright over all material with its origins in traditional Aboriginal law and retain discretion over its public use.

## 6.6 Legislative Requirements

The entire 4,759 hectares of Tnorala Conservation Reserve (N.T, Portion 937) is registered as a sacred site with the AAPA and known as "Anurrula". This requires that the PWCNT obtain an Authority Certificate under Section 20 of the *Northern Territory Aboriginal Sacred Sites Act*, providing clearance for any actions or works within this area.

Once this Plan is gazetted and operational, Section 21 of the *Territory Parks and Wildlife Conservation Act* requires the PWCNT to manage the Reserve in compliance with this Plan.

The provisions of this Plan warrant periodic review to ensure they continue to provide the most appropriate management directions for the Reserve.

### ***Management Guidelines***

- Clearance from the AAPA will be obtained for any new works or major management actions proposed for Tnorala Conservation Reserve (N.T, Portion 937).
- To prevent the necessity for repeated ad hoc requests to the AAPA for clearances, the AAPA will be approached to provide an Authority Certificate endorsing the proposed use, management and development of the Reserve as set out in this Plan.
- Management of the Reserve will be periodically reviewed to ensure that it complies with the provisions of this Plan.
- This Plan will be periodically reviewed to ensure that its provisions are still relevant to the evolving management issues and conditions pertaining to the Reserve.

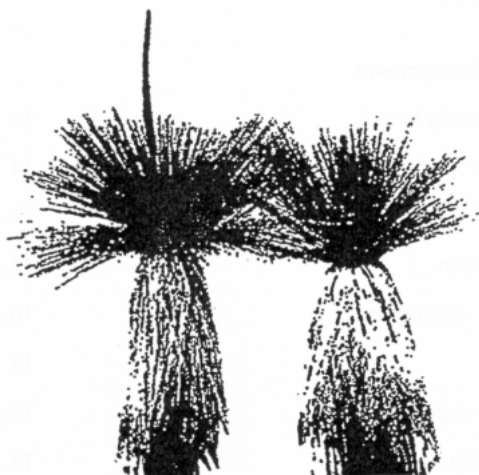
## 6.7 Leases and Licenses

The Mereenie oil pipeline traverses the southern part of the Reserve (see map 2). Constructed in 1985, the pipeline carries crude oil from the Mereenie oil-field to the Brewer Estate Terminal, south of Alice Springs. Santos Ltd is the licensee and operator of the pipeline.

Infrastructure on the Reserve owned by parties other than the TAC or Conservation Land Corporation should be subject to legal agreements endorsed by the Local Management Committee.

### ***Management Guidelines***

- The Conservation Land Corporation may grant leases of, or licences in respect of land in the Reserve for the purposes of a pipeline or other infrastructure, subject to the approval of the Local Management Committee.



The Desert Grass Tree, *Xanthorrhoea thorntonii*, a significant rare Central Australian plant found within and to the south of the Reserve.



## 7. PROGRAMMES

In this part of the Plan some of the more definite and interdependent guidelines are regrouped and presented as Programmes to be systematically implemented. Actions in these Programmes are referred back to the Guidelines by page numbers.

Priorities are assigned as follows:

- High:** Imperative to achieve the Plan's stated objectives;
- Medium:** Very important to achieve the Plan's stated objectives but subject to the availability of resources; and
- Low:** Desirable, but will be undertaken only if the necessary resources are available or other conditions stated in the guidelines are fulfilled.

ACTION	PAGE	PRIORITY
<b>§3. Aboriginal Interests Management</b>		
• LMC participation in management programmes	8, 21, 22	High
• Sites and artefact protection	9	High
• Interpretation of Aboriginal cultural values	9, 18	High
• Visitor access restrictions	5, 9	High
• Documentation of sites	9	Medium
<b>§4. Natural Resource Management</b>		
• Rehabilitation of vehicle tracks	11, 17	High
• Feral animal control	14	High
• Pets in Parks	15	High
• Annual Fire Action Plan	13, 15	High
• Erosion control and rehabilitation	10, 11, 13, 17	Medium
• Disposal of effluent	12	Medium
• Research of native vegetation	13, 22	Medium
• Research of native fauna	14, 22	Medium
• Control and monitoring of exotic plants	14, 22	Medium
• Fencing	14, 21	Low

<b>ACTION</b>	<b>PAGE</b>	<b>PRIORITY</b>
• Research to identify sites of geological importance	11, 22	Low
• Collection of plant specimens	13, 22	Low
• Collection of animal specimens	14, 22	Low
• Research into exotic plants	14, 22	Low
<b>§5. Visitor Management</b>		
• Interpretive Programme	9, 10, 12-15,18	High
• Visitor access control	9, 16-17	High
• Fencing centre of crater	17	High
• Camping restrictions	17	High
• Parking facilities	17	High
• Walking tracks	18	High
• Improvement of access	17	Medium
• Visitor monitoring	19	Medium
<b>§6. Administration and Research</b>		
• Ranger patrols	21	High
• Commercial operations	22	High
• AAPA clearance	23	High
• Review Plan	23	High
• Liaison with surrounding landholders	21	Medium
• Research and Monitoring	22	Medium

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# APPENDIX 1

## TNORALA CONSERVATION RESERVE FLORA LIST



FAMILY	GENUS	SPECIES	COMMON NAME
AMARANTHACEAE	Ptilotus	exaltatus	Tall Mulla Mulla
	Ptilotus	helipteroides	Hairy Mulla Mulla
	Ptilotus	obovatus	Silver Tails
	Ptilotus	schwartzii	-
APIACEAE	Trachymene	glaucifolia	Blue Parsnip
ASTERACEAE	Calotis	kempei	-
	Calotis	latiuscula	Leafy Burr Daisy
	Helichrysum	bracteatum	Golden Everlasting
	Helipterum	floribundum	White Paper Daisy
	Helipterum	saxatile	Hill Sunray
	Ixiolaena	tomentosa	Woolly Plover Daisy
	Olearia	subspicata	Spiked Daisy Bush
	Pterocaulon	sphacelatum	Apple Bush
	Vittadinia	eremaea	-
	Vittadinia	pterochaeta	Rough Fuzzweed
	Vittadinia	sulcata	-
BRASSICACEAE	Lepidium	phlebopetalum	Vined Peppergrass
CAESALPINIACEAE	Senna	artemisioides	Silver Cassia
	Senna	glutinosa	-
CHENOPODIACEAE	Atriplex	elachophylla	-
	Atriplex	humifusa	-
	Einadia	nutans	Climbing Saltbush
	Maireana	scleroptera	-
	Sclerolaena	patenticuspis	Spear-fruit Copper Burr
CUPRESSACEAE	Callitris	glaucophylla	White Cypress Pine
EUPHORBIACEAE	Euphorbia	biconvexa	-
FABACEAE	Indigofera	helmsii	-
	Psoralea	patens	Native Verbena
	Tephrosia	supina	-
	Goodenia	heterochila	-
GOODENIACEAE	Goodenia	mueckeana	-
	Goodenia	vilmoriniae	-
	Lechenaultia	divaricata	Tangled Lechenaultia
	Scaevola	amblyanthera	-
LAMIACEAE	Prostanthera	striatiflora	Striped Mintbush
LORANTHACEAE	Amyema	maidenii	Pale-leaf Mistletoe
MALVACEAE	Abutilon	fraseri	Dwarf Lantern Flower
	Abutilon	otocarpum	Desert Chinese Lantern
	Gossypium	sturtianum	Sturt's Desert Rose
	Sida	cryphiopetala	Hill Sida
	Sida	cunninghamii	Ridge Sida
	Sida	fibulifera	Silver Sida
MIMOSACEAE	Acacia	cibaria	-
	Acacia	macdonnelliensis	Hill Mulga
	Acacia	validinervia	-
MYOPORACEAE	Eremophila	freelingii	Rock Fuchsia Bush
	Eremophila	gilesii	Desert Fuchsia
	Eremophila	latrobei	Native Fuchsia
	Eremophila	longifolia	Weeping Emu Bush



**TNORALA CONSERVATION RESERVE  
FLORA LIST**

<b>FAMILY</b>	<b>GENUS</b>	<b>SPECIES</b>	<b>COMMON NAME</b>
MYRTACEAE	Eucalyptus	opaca	Bloodwood
	Eucalyptus	papuana	Ghost Gum
OLEACEAE	Jasminum	calcareum	Poison Creeper
	Jasminum	didymum	-
POACEAE	Aristida	strigosa	Rough Threeawn
	Stipa	aquarii	-
POLYGALACEAE	Comesperma	viscidulum	-
PROTEACEAE	Hakea	suberea	Long-leaf Corkwood
SAPINDACEAE	Dodonaea	viscosa	Sticky Hopbush
SOLANACEAE	Solanum	centrale	Desert Raisin
	Solanum	ellipticum	Potato Bush
STERCULIACEAE	Melhania	oblongifolia	Velvet Hibiscus
VERBENACEAE	Spartothamnella	puberula	Red-berried Stick-plant
XANTHORRHOEACEAE	Lomandra	leucocephala	Woolly Matrush
	Xanthorrhoea	thorntonii	Desert Grass Tree
ZYGOPHYLLACEAE	Zygophyllum	iodocarpum	Violet Twinleaf
	Zygophyllum	tesquorum	-

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## APPENDIX 2

### TNORALA CONSERVATION RESERVE FAUNA LIST



(SUB)FAMILY	GENUS	SPECIES	COMMON NAME
<b><u>BIRDS</u></b>			
FALCONIDAE	Falco	peregrinus	Peregrine Falcon
	Falco	berigora	Brown Falcon
	Falco	cenchroides	Australian Kestrel
TURNICIDAE	Turnix	velox	Little Button-quail
COLUMBIDAE	Geopelia	cuneata	Diamond Dove
	Ocyphaps	lophotes	Crested Pidgeon
CACATUIDAE	Cacatua	roseicapilla	Galah
PLATYCERCIDAE	Melopsittacus	undulatus	Budgerigar
	Barnardius	zonarius	Port Lincoln Ringneck
	Psephotus	varius	Mulga Parrot
CUCULIDAE	Cuculus	pallidus	Pallid Cuckoo
STRIGADAE	Ninox	novaeeseelandiae	Southern Boobook
PODARGIDAE	Podargus	strigoides	Tawny Frogmouth
CAMPRIMULGADAE	Camprimulgus	guttatus	Spotted Nightjar
ALCEDINIDAE	Halcyon	pyrrhopygia	Red-backed Kingfisher
MEROPIIDAE	Merops	ornatus	Rainbow Bee-eater
HIRUNDINIDAE	Cecropis	ariel	Fairy Martin
MOTACILLIDAE	Anthus	novaeeseelandiae	Richard's Pipit
CAMPEPHAGIDAE	Coracina	novaeeseelandiae	Black-faced Cuckoo-shrike
	Coracina	maxima	Ground Cuckoo-shrike
	Lalage	sueurii	White-winged Triller
MUSCICAPIDAE	Microeca	leucophaea	Jacky Winter
	Pachycephala	rufiventris	Rufous Whistler
	Colluricincla	hamonica	Grey Shrike-thrush
	Oreica	gutturalis	Crested Bellbird
	Rhipidura	leucophrys	Willie Wagtail
TIMALIIDAE	Pomatostomus	temporalis	Grey-crowned Babbler
SYLVIIDAE	Cinclorhampus	mathewsi	Rufous Songlark
	Cinclorhampus	cruralis	Brown Songlark
MALURIDAE	Malurus	lamberti	Variagated Fairy-wren
	Malurus	leucopterus	White-winged Fairy-wren
	Amytornis	purnelli	Dusky Grasswren
ACANTHIZIDAE	Smicronis	brevirostris	Weebil
	Acanthiza	chrysothorax	Yellow-rumped Thornbill
	Aphelocephala	leucopsis	Southern Whiteface
MELIPHAGIDAE	Acanthagenys	rufogularis	Spiny-cheeked Honeyeater
	Manorina	flavigula	Yellow-throated Miner
	Lichenostomus	virescens	Singing Honeyeater
	Lichenostomus	keartlandi	Grey-headed Honeyeater
	Lichenostomus	penicillatus	White-plumed Honeyeater
EPHTHIANURIDAE	Ephthianura	tricolor	Crimson Chat
PARDALOTIDAE	Pardalotus	rubricatus	Red-browed Pardalote
	Pardalotus	striatus	Striated Pardalote
PLOCEIDAE	Emblema	picta	Painted Firetail
PARADISAEIDAE	Poephila	guttata	Zebra Finch
	Chlamydera	maculata	Spotted Bowerbird

**TNORALA CONSERVATION RESERVE  
FAUNA LIST**

<b>(SUB)FAMILY</b>	<b>GENUS</b>	<b>SPECIES</b>	<b>COMMON NAME</b>
<b><u>BIRDS</u></b>			
ARTAMIDAE	Artamus	personatus	Masked Woodswallow
	Artamus	cinereus	Black-faced - Woodswallow
GRALLINIDAE	Artamus	minor	Little Woodswallow
	Grallina	cyanoleuca	Australian Magpie-lark
CRACTICIDAE	Cracticus	nigrogularis	Pied Butcherbird
	Gymnorhina	tibicen	Australian Magpie
CORVIDAE	Corvus	bennetti	Little Crow
	Corvus	orru	Torrensian Crow
<b><u>MAMMALS</u></b>			
TACHYGLOSSIDAE	Tachyglossus	aculeatus	Short-beaked Echidna
DASYURIDAE	Sminthopsis	ooldea	Ooldea Dunnart
	Ningau	ridei	Wongai Nigau
MACROPODIDAE	Macropus	robustus	Euro
VESPERTILIONIDAE	Chalinolobus	gouldii	Gould's Wattled Bat
	Eptisicus	pumilus	Little Cave Eptisicus
MURIDAE	Pseudomys	desertor	Desert Mouse
	Pseudomys	hemannsburgensis	Sandy Inland Mouse
	Notomys	alexis	Spinifex Hopping-mouse
	Mus	musculus	House Mouse
LEPORIDAE	Oryctolagus	cuniculus	European Rabbit
CANIDAE	Canis	familiaris dingo	Dingo
<b><u>REPTILES</u></b>			
CHELIDAE	Emydura	victoriae	Turtle
GEKKONIDAE	Diplodactylus	ciliaris	Spiny-tailed Gecko
	Diplodactylus	conspicilatus	Fat-tailed Diplodactylus
	Diplodactylus	elder!	Jewelled Gecko
	Diplodactylus	stenodactylus	Gecko
	Gehyra	variegata	Tree Dtella
	Heteronotia	binoei	Bynoe's Gecko
	Nephrurus	levis	Gecko
	Oedura	mamorata	Marbled Velvet Gecko
	Rhynchoedura	ornata	Beaked Gecko
	PYGOPODIDAE	Delma	nasuta
Delma		tincta	Legless Lizard
Lialis		burtonis	Burton's Snake Lizard
Pygopus		nigriceps	Hooded Scaly Foot

**TNORALA CONSERVATION RESERVE  
FAUNA LIST**

<b>(SUB) FAMILY</b>	<b>GENUS</b>	<b>SPECIES</b>	<b>COMMON NAME</b>
AGAMIDAE	Ctenophorus	nuchalis	Central Netted Dragon
	Diporiphora	winneckeii	Dragon Lizard
	Lophognathus	longirostris	Dragon Lizard
	Moloch	horridus	Thorny Devil
	Pogona	vitticeps	Bearded Dragon
	Tympanocryptis	lineata	Dragon Lizard
VARANIDAE	Varanus	giganteus	Perentie
	Varanus	gouldii	Sand Monitor
SCINCIDAE	Carlia	triacantha	Skink
	Ctenotus	leonhardii	Skink
	Ctenotus	pantherinus	Skink
	Ctenotus	quattuordecimlineatus	Skink
	Ctenotus	saxatilis	Skink
	Ctenotus	schomburgkii	Skink
	Egernia	slateri	Skink
	Eremiascincus	richardsonii	Broad Banded Sand-Swimmer
	Lerista	bipes	Skink
	Lerista	desertorum	Skink
	Lerista	labialis	Skink
	Tiliqua	branchialis	Blue Tongued Lizard
	Tiliqua	multifasciata	Centralian Blue Tongued-Lizard
TYPHLOPIDAE	Ramphotyphlops	centralis	Blind Snake
	Ramphotyphlops	endoterus	Blind Snake
BOIDAE	Liasis	childreni	Children's Python
ELAPIDAE	Pseudechis	australis	King Brown Snake
	Pseudonaja	modesta	Ringed Brown Snake
	Pseudonaja	nuchalis	Western Brown Snake
	Pseudonaja	textilis	Eastern Brown Snake
	Suta	monachus	Hooded Snake
<b><u>FROGS</u></b>			
MYOBATRACHIDAE	Limnodynastes	spenceri	Burrowing Frog
	Neobatrachus	centralis	Trilling Frog
HYLIDAE	Cyclorana	maini	Tree Frog
	Litoria	rubella	Desert Tree Frog