



HENBURY METEORITES CONSERVATION RESERVE

DRAFT PLAN OF MANAGEMENT

November 2002



PARKS AND WILDLIFE COMMISSION OF THE NORTHERN TERRITORY

Parks and Wildlife Commission of the Northern Territory
P.O. Box 2130
Alice Springs NT 0871

Henbury Meteorites Conservation Reserve
Draft Plan of Management

November 2002

ISBN 0 7245 2765 6

Foreword

The Henbury Meteorites Conservation Reserve contains 12 craters which are of national astro-geological importance. They have played an important part in the scientific study of meteorites over the past 60 years.

The Plan sets guidelines for the future management of the Reserve in order to conserve it's natural resources while providing opportunities for visitors to appreciate the scientific values of the area.

The Reserve is increasingly becoming a popular place to visit en route to Watarrka and Uluru for those travellers on the Ernest Giles Road.

Major directions for the Reserve are listed below.

- Continued conservation of the Reserve's resources.
- Prevention of soil erosion.
- Rehabilitation of eroded areas.
- Fencing of the Reserve.
- Re-alignment of walking track.
- Establishment of new camping area.
- Expansion of interpretation signage.
- Construction of interpretation shelter.
- Monitoring and control of introduced plants and animals.

Acknowledgements

This Plan of Management has been prepared by Syd Milgate, Planning Officer with the Strategic Planning & Development Unit of the Parks and Wildlife Commission's Southern Regional Office in Alice Springs.

Special acknowledgments for assistance in preparation of the Plan are due to the Henbury Meteorites Conservation Reserve Planning Team:

Andrew Bridges (Chair)	Regional Parks Manager, (Parks South), PWCNT
Chris Day	Chief District Ranger, Central/East, (Parks South), PWCNT
Paul McCluskey	Planning Officer, Strategic Planning and Development, PWCNT
Marcus Sandford	Senior Interpretation Officer, (Parks South), PWCNT
Phil Asmussen	Technical Liaison Officer, (Parks South), PWCNT
Dave Heard	Ranger in Charge ASTS, (Parks South), PWCNT

The contribution from the Alice Springs branch of the Northern Territory Geological Survey, Department of Mines and Energy for section 3.1, Geology, Landforms and Soils, is gratefully acknowledged.

CONTENTS	Page
FOREWORD	i
ACKNOWLEDGEMENTS	ii
CONTENTS	iii
1. INTRODUCTION TO THE PLAN	1
1.1 Location and Values	1
1.2 History of discovery	3
1.3 The Concept of the Reserve and its Purposes	3
1.4 The Intent of this Plan	4
2. ZONING SCHEME	5
2.1 Outline of the Zoning Scheme	5
2.2 Visitor Facilities Zone	5
2.3 Special Protection Zone	5
2.4 Natural Zone	6
3. MANAGEMENT OF THE RESERVE'S NATURAL RESOURCES	8
Objectives	8
3.1 Geology, Landforms and Soils	8
3.2 Native Flora	12
3.3 Native Fauna	12
3.4 Introduced Plants and Animals	13
3.5 Use and Control of Fire	14
4. MANAGEMENT OF THE RESERVE'S CULTURAL RESOURCES	15
Objectives	15
4.1 Aboriginal Cultural Resources	15
5. MANAGEMENT FOR VISITORS	16
Objectives	16
5.1 Regional Context	16
5.2 Visitor Access	16
5.3 Visitor Facilities	17
5.4 Information and Interpretation	20
5.5 Visitor Monitoring	21
5.6 Visitor Safety	21
6. RESERVE ADMINISTRATION	22

Objectives	22
6.1 Staffing and Management	22
6.2 Liaison with Neighbouring Landholders	22
6.3 Research and Monitoring	23
6.4 Legal Requirements	23
7. MANAGEMENT PROGRAMMES	25
8. SOURCES AND REFERENCES	28
NOTES	29
FIGURES	
Figure 1 - The Reserve and Locality	2
Figure 2 - Zoning Scheme	7
Figure 3 - Crater names and numbers	10
Figure 4 - R.O. 1235 and R.O.1393	10
Figure 5 - Land Systems	11
Figure 6 - Existing Day Use and Camping Area	18
Figure 7 - Future Developments	19
TABLES	
Table 1 - Summary of Zoning Scheme	6

1. INTRODUCTION TO THE PLAN

1.1 Location and Values

Henbury Meteorites Conservation Reserve is located approximately 145 kilometres southwest of Alice Springs. The Reserve can be reached by travelling 132 kilometres south from Alice Springs along the Stuart Highway to the Ernest Giles Road turnoff to Kings Canyon. Travel 8 kilometres down the Ernest Giles Road to the access road turnoff to the north and follow this road for 5 kilometres to the Reserve entrance. The Reserve (NT Portion 551) covers an area of 404.68 hectares and is surrounded by Henbury Station (NT Portion 657, Perpetual Pastoral Lease 1094) from which the Reserve was excised (see Figure 1).

A Reserve of 1000 acres was first created over the crater area and gazetted in Commonwealth Gazette No 63 on 20 September 1934 under section 139 of the *Northern Territory Mining Act*. This Reserve was known as the “Henbury Meteorite Reserve”. An area of 1000 acres (404.6ha) was surveyed in February 1962 and NT Portion 551 was created. Part of NT Por 551 was proclaimed a Reserve in Commonwealth Gazette No 64 on 23 July 1964 under Section 103 of the *Crown Lands Act* as Reserve No 1133. With an area of 16.18 ha this Reserve covered only the three main craters at Henbury. The whole of NT Portion 551 with an area of 404.6 ha was transferred to the Conservation Land Corporation on 22 December 1983 to become the current Henbury Meteorites Conservation Reserve. This enlarged area now included all of the impact craters.

A Reservation from Occupation (R.O. 1393) was declared on 17 June 1998 (Gazette M23) under section 178 (1) of the *Mining Act* covering the Reserve and the meteorite scatter area outside the Reserve boundary (see Figure 4).

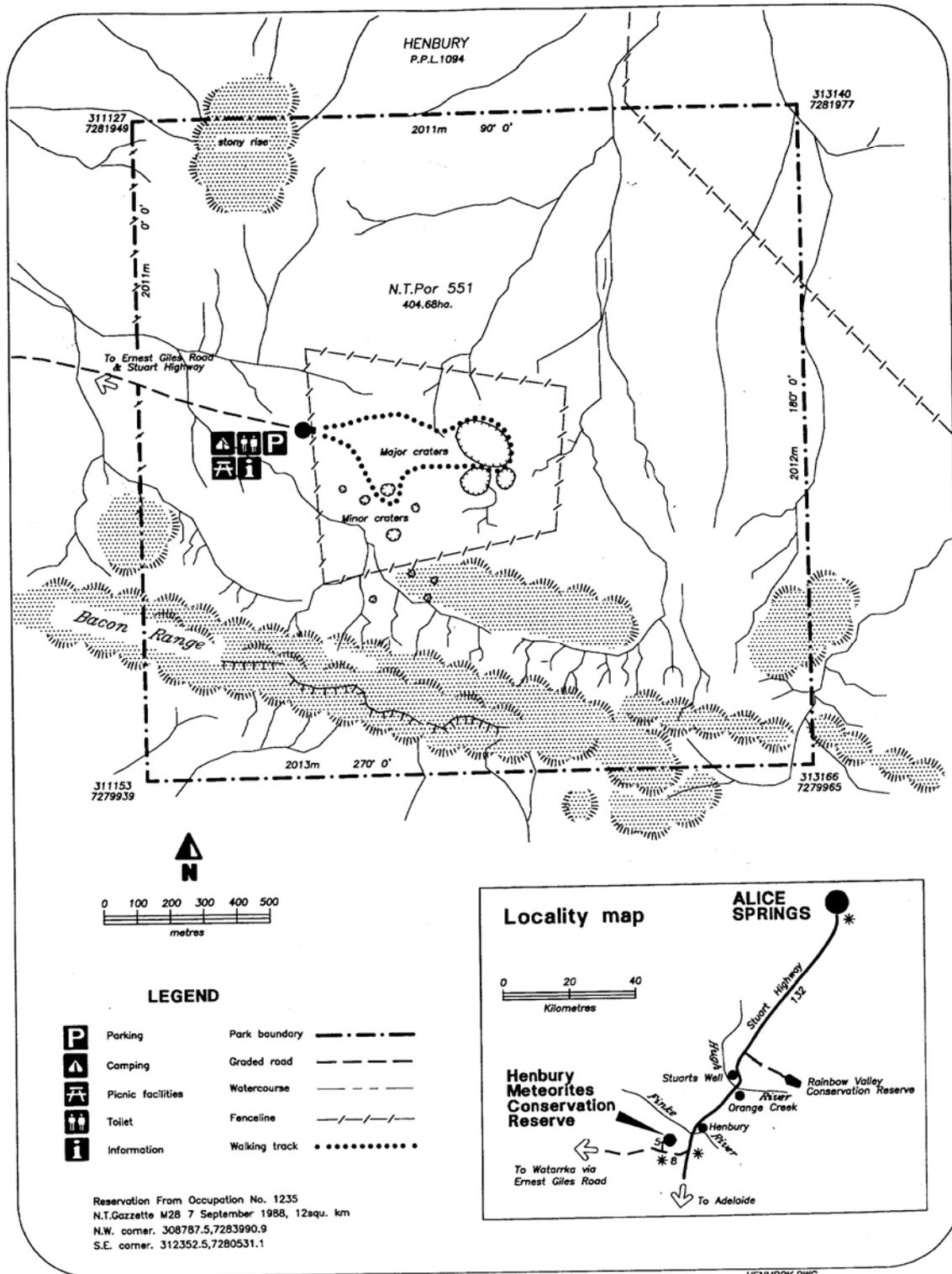
The Henbury Meteorite Craters are listed in ‘The Geological Heritage of the Northern Territory’ as a geological monument of international significance. The craters are also listed in the Register of the National Estate, natural environment section where their **scientific values** are described in a Statement of Significance as, ‘Craters and associated ejecta rays stated by geophysicists to be unique on earth. The only other known examples occur on the lunar surface’.

The **natural, tourism and recreational values** of the Reserve all relate to the cluster of meteorite craters and their considerable scientific significance. The Reserve has potential for education and interpretation of these astro geological features to interested visitors.

The Reserve is contained wholly within the Finke Bioregion and is one of only two extremely small reserves which conserve representation of this important Bioregion

The Reserve’s **Aboriginal cultural significance** relates to a recorded sacred site centred on the crater area. Little is known of Aboriginal cultural values and use of the site.

Figure 1. The Reserve and Locality



1.2 History of Discovery

At Henbury there are 12 craters ranging in diameter from 7 to 180 metres and up to 15 metres in depth. These are ‘explosive craters’, meaning that they were excavated by meteorites which penetrated a short distance into the earth before breaking up with an enormous release of energy. Sheets of near-surface rock were folded back as a result of the violent release of compressive forces to form the rims of craters and fragments of the meteorites consisting of a nickel-iron alloy were disposed over a wide area. Several tonnes of these fragments have been recovered, many torn and twisted looking like shrapnel. One piece weighing 44 kg, can be seen in the Spencer and Gillen Museum in Alice Springs. The distribution of the craters at Henbury suggests that the meteorite shower came from the southwest and radiometric age dating techniques estimates that the craters were formed around, but not more than 4700 years B.P..

The existence of the Henbury craters has been known since 1899 when the manager of Henbury station, Mr Park informed F.J. Gillen of ‘one of the most curious spots I have ever seen in the country’. Park described the craters to Gillen but did not know what had caused them or in fact what the craters were. Park went on to say ‘To look at it I cannot but think it has been done by human agency but when or why Goodness knows’.

In the early part of 1931 public interest in South Australia was stimulated by the fall of the Karoonda meteorite on November 25, 1930 and it’s discovery by an Adelaide University party led by Professor Kerr Grant. Interest concerning the Henbury meteorite craters was first aroused in 1931 when Mr. B. Bowman of Tempe Downs and Mr. J. H. Mitchell of Oodnadatta separately informed Professor Grant of the presence of craters with scattered iron fragments near Henbury Station. On the advice of Prof. Sir Douglas Mawson, the Honorary Mineralogist to the South Australian Museum, Dr. A.R. Alderman, assisted by Mr P.L. Windsor, were commissioned to make an examination of the area. Later in 1931 and again in 1932 further expeditions were made to the craters by the South Australian Kyancutta Museum. Around this time the craters were known locally as ‘The Double Punchbowl’, referring to the two largest craters. The gap in the Bacon Range where the access road now passes through was known as ‘Double Punch Gap’.

The first detailed survey of the site using geophysical methods was carried out in 1937 using the equipment and staff of the Aerial, Geological and Geophysical Survey of Northern Australia. Numerous scientific surveys have been carried out over the craters and surrounding area since those early days. The aim of a 1992 study was to produce a rainfall record for Central Australia over the last 4500 years using sedimentary data gathered from within the craters.

1.3 The Concept of the Reserve and its Purposes

The main purpose of the Reserve is to protect the natural resources within the Reserve, namely the 12 craters and the surrounding landscape. This also includes plant and animal communities associated with the area allowing visitors the opportunity to appreciate and enjoy the Reserve.

Management of the Reserve will aim at the retention of its predominantly remote and natural character and the protection of these natural, cultural and recreational values. Consequently, all future developments at the Reserve will be designed to facilitate visitor enjoyment without impairing these intrinsic values.

The principal purposes of the Reserve are to;

- protect and preserve the meteorite craters ,
- protect the area's plant and animal communities,
- protect the areas Aboriginal cultural resources in accordance with the *Northern Territory Sacred Sites Act*,
- provide recreational opportunities consistent with the astro geological features of the Reserve enabling visitors the opportunity to appreciate and understand the Reserve's values.

1.4 The Intent of this Plan

The aim of this Plan is to ensure protection of the values of the Reserve whilst providing opportunities for people to enjoy the Reserve.

The Plan states the intent of the Parks and Wildlife Commission of the Northern Territory with respect to the management and conservation of Henbury Meteorites Conservation Reserve. The Plan provides management objectives, addresses current management issues and proposes appropriate measures to guide future management and development on the Reserve.

This Plan has been prepared in pursuance of sections 18 and 19 of the *Parks and Wildlife Conservation Act* and will fulfil the function of a Plan of Management.

The PWCNT is obliged under section 21 of the *Parks and Wildlife Conservation 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 *Parks and Wildlife Conservation Act* .

2. ZONING SCHEME

The Zoning Scheme (see Figure 2) is an important tool in pursuing the intent of this Plan. The scheme provides the basis for regulating the activities of visitors and allowing for appropriate management of the Reserve's resources.

Visitor access to any of the zones may be restricted if it is seen to be having a deleterious effect on the values of the Reserve.

Any developments will be carried out with a minimum of interference to the natural environment and according to the requirements of the *Environmental Assessment Act*, the *Northern Territory Sacred Sites Act*, the *Parks and Wildlife Conservation Act*, and other relevant legislation.

2.1 Outline of the Zoning Scheme

Three zones have been identified to regulate the use, development and management of the Reserve:

- Visitor Facilities Zone
- Crater Protection Zone
- Natural Zone

The purpose of each zone is outlined below having been determined on the basis of the values occurring in the specified areas.

2.2 Visitor Facilities Zone

The purpose of this zone is to provide for a variety of day-use and camping recreational opportunities in a natural setting. Minimal disturbance to the natural resources will occur during the siting and development of facilities.

Facilities provided in the zone will include walking tracks, platform tables, BBQ's, car parking, camping sites, a pit toilet and unobtrusive information and interpretive signs. Access in this zone will be by vehicle to car parking areas then by walking tracks to the craters and the proposed crater lookout.

2.3 Crater Protection Zone

This zone provides special protection to the impact craters within the Reserve. Protection of the craters and crater walls from the impacts of visitor and introduced animals is the aim of management in this zone.

Facilities will be limited to carefully located information and interpretive signs advising visitors of the significance of the craters and the need for appropriate behaviour. Visitor access through this zone will be by foot only on a marked walking track.

2.4 Natural Zone

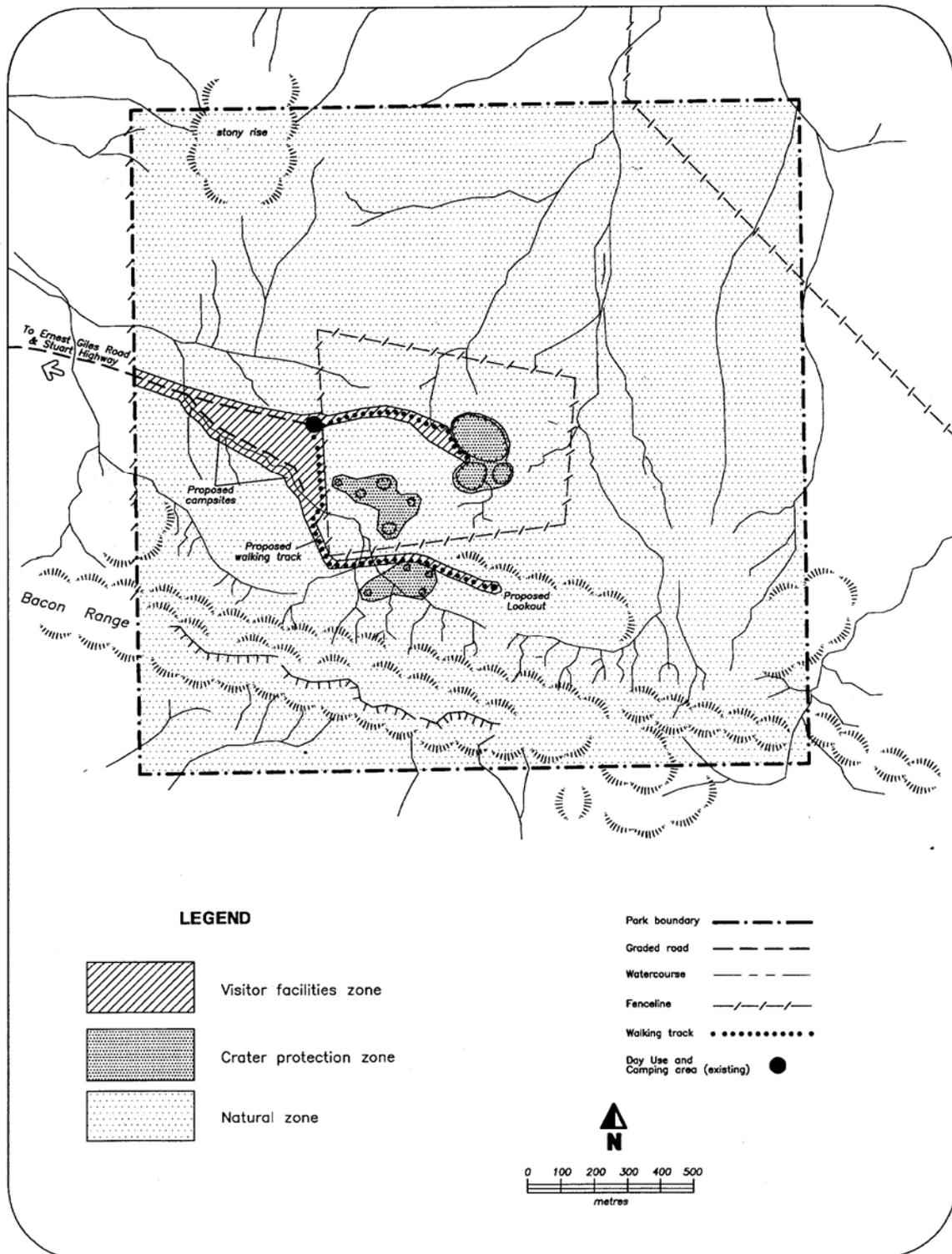
The principal purpose of the Natural Zone is to protect the area's natural resources including the flora and fauna within the different vegetation communities represented in the Park.

Only low-impact activities such as bushwalking will be permitted. To retain the natural character of this zone developments, other than boundary fencing, will not be permitted.

TABLE 1 - Summary of Zoning Scheme

	Visitor Facilities Zone	Crater Protection Zone	Natural Zone
Purpose	To provide an area where visitor facilities can be sited with minimal impact to the environment.	To protect the key natural values, i.e. the meteorite craters and crater walls.	This zone provides protection to the area's natural resources including the native flora and fauna within the Reserve.
Management Strategy.	To concentrate development and visitor use in a manageable area and to keep impacts within acceptable limits.	To provide facilities and information which will encourage visitor appreciation and appropriate behaviour.	To retain in as natural a state as possible while allowing dispersed and low-key activities.
Access	Conventional 2WD vehicle access along an unsealed road to the day use and camping areas. Elsewhere by foot on designated walking track.	Access by foot on designated walking track only.	Access by foot only
Facilities	Unsealed access road, parking lay-bys, day use and camping areas, shade shelters, BBQs, platform tables, interpretation signs and pit toilets.	Walking track, interpretation and information signs.	No developments, other than boundary fencing.
Uses	Vehicle based activities, camping picnicking, walking photography.	Walking, natural history appreciation. Photography	Bushwalking, nature appreciation and photography.

Figure 2. Zoning Scheme



3. MANAGEMENT OF THE RESERVES' NATURAL RESOURCES

Objectives

- To protect the natural landscape and scenic values of the Reserve.
- To protect the Reserve's natural resources including native plants and animals, soils, geological and water resources.
- To minimise the effects of erosion on the Reserve and, where appropriate, rehabilitate degraded areas.
- To minimise the impact of introduced plants and animals on the Reserve.
- To implement an appropriate fire management plan for the Reserve.
- To minimise the impacts of visitors to the Reserve.

3.1 Geology, Landforms and Soils

The geology of the Henbury Meteorites Conservation Reserve is briefly described here. It must be kept in mind that the geological setting of this Reserve has no relationship to the formation of the astro geological features. It does however play an important role in defining the features of the surrounding landscape and the geomorphology of the weathered remnants of the craters.

The most prominent feature in the Reserve is the Bacon Range in the south western corner. It rises fairly steeply to about 85 m above the general level of the surrounding plain. The north side of the range consists of moderately south west dipping sandstone belonging to the Winnall Beds deposited approximately 700-600 million years ago (mya) during the early stages of the Amadeus Basin. A fault near the crest of the range brings the underlying (ie older) Inindia Beds to the surface and these form the southern slopes. The range has remained a prominent feature largely because it is formed of beds of more resistant sandstone, and also because of the presence of capping of silcrete (Grey Billy) which is highly resistant to erosion. North of the main part of the range is a low rise comprised of south-dipping benches of Winnall Beds sandstone which in places have been disturbed by a few of the meteorite craters. Generally however, the craters have shale and siltstone exposed in the rims and walls. This sequence also forms part of the Winnall Beds and underlies the sandstones of the ridges. The domination of shale and siltstone beds indicates it was deposited in a deeper water environment than the sandstones of the ridges. Most of the craters lie on the weathered pediment surface underlain by these more easily weathered shales and siltstones, which slopes gently north away from the Bacon Range.

The landscape features and geomorphological setting are described in detail as elements of Chandlers Land System, defined by CSIRO as part of their study of the Land Systems of the Alice Springs region in the late 1950's (Perry *et al*, 1962), and further defined by the Department of Primary Industries and Fisheries (Shaw and Bastin). The main features of the landscape are the Bacon Range and its northern slopes, low benches of shallowly outcropping sandstone, and a north sloping pediment with a rocky surface and associated north-directed drainage that is the

dominant component of the Reserve. The pediment surface consists of cobbles and smaller fragments of local sandstone and silcrete from the Bacon Range. The density of coarse material decreases with depth with a corresponding increase of in-situ soil material. The thickness of this surface varies greatly, being very thin to absent over subcropping sandstone, and quite thick where underlain by the shalier rocks. The silcrete capping present on the Bacon Range is a remnant of the Tertiary age (60-~20 mya) near-surface silification which was widespread throughout this region and occurred when the landscape was less topographically variable than today. Differential weathering as a result of some weak rejuvenation in the last 20 my or so has resulted in the present day landscape of relatively low but steep sided ridges and extensive pediments and plains.

Milton (1968) described in more detail some of the geomorphological features of the craters, including recognising that the 'water crater' (Crater 6) has captured a pre impact drainage system where it's rim has been breached. Consequently this crater commonly fills with water after rain. Milton also recognised that this crater formed on a very low ridge of sandstone, interpreted from the presence of a pre-impact rill system on the craters south side.

The Reserve is primarily covered by an alluvial deposit consisting of cobbles and smaller rounded fragments of sandstone and grey billy from the Bacon Range and a few rounded pebbles of more distant provenance in a red silty matrix. Coarse fragments are concentrated close to the surface, producing a stony gibber plain. The thickness of this pediment gravel depends on the underlying material - it is thin or even absent over the more resistant sandstone beds and may reach a thickness of 3 metres over shale. In places shale units are weathered as much as 3 metres below the pediment gravel and grade upward into a reddish clayey soil. The band of pediment gravel that crops out from beneath ejected bedrock in the upper crater walls is particularly favoured by rabbits for burrowing thus causing erosion in the crater walls. Due to years of grazing these soils have been subject to erosion especially on drainage channels and disturbed areas such as roadways and tracks. Rehabilitation work has been carried out over the old roadway to the craters and eroded areas near the car park area by land conservation officers and Reserve staff.

As the previous Reservation from Occupation (R.O. 1235) did not cover all of the craters or meteorite scatter area a new Reservation from Occupation (R.O. 1393) was declared by the Department of Mines and Energy in Gazette M23 on 17 June 1998 under section 188(1) of the *Mining Act*. R.O.1393 includes the area previously covered by R.O.1235, all of the craters and the meteorite scatter area to the north east of the craters (see Figure 4).

Management actions

- Efforts will be made to prevent soil erosion through the following measures:
 - restriction of access to areas sensitive to erosion such as crater walls.
 - stock and feral animal control.
- Further efforts will be made to rehabilitate any eroded areas that may occur within the Reserve. Vehicular and walking tracks which are not required will be closed and rehabilitated.

- Any future developments should be undertaken with a minimum of soil disturbance. Erosion control measures will be employed as required under the advice of the Department of Lands, Planning and Environment's Land Conservation Unit during the construction phase and rehabilitation measures undertaken if required following completion of a project.
- On site signage should show that visitor activities which cause excessive soil disturbance such as off road driving or clambering up or down crater walls are not permitted. Visitor access to areas in the process of rehabilitation will be regulated or restricted where necessary.

Figure 3. Crater names / numbers

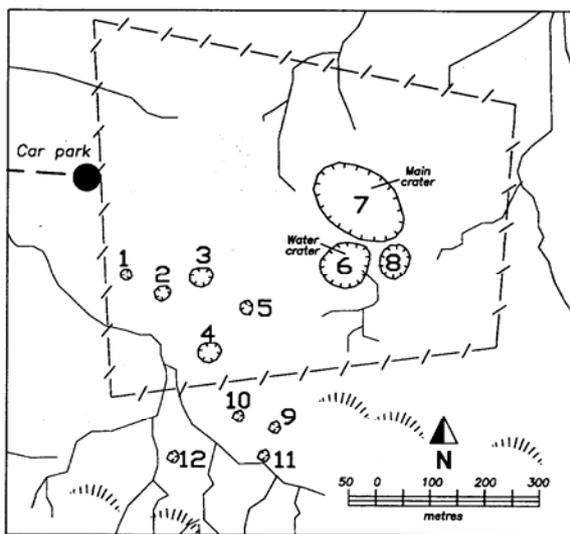


Figure 4. R.O. 1235 and R.O. 1393

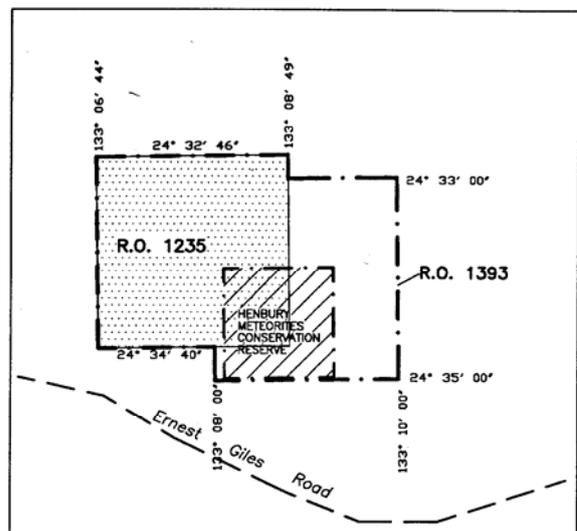
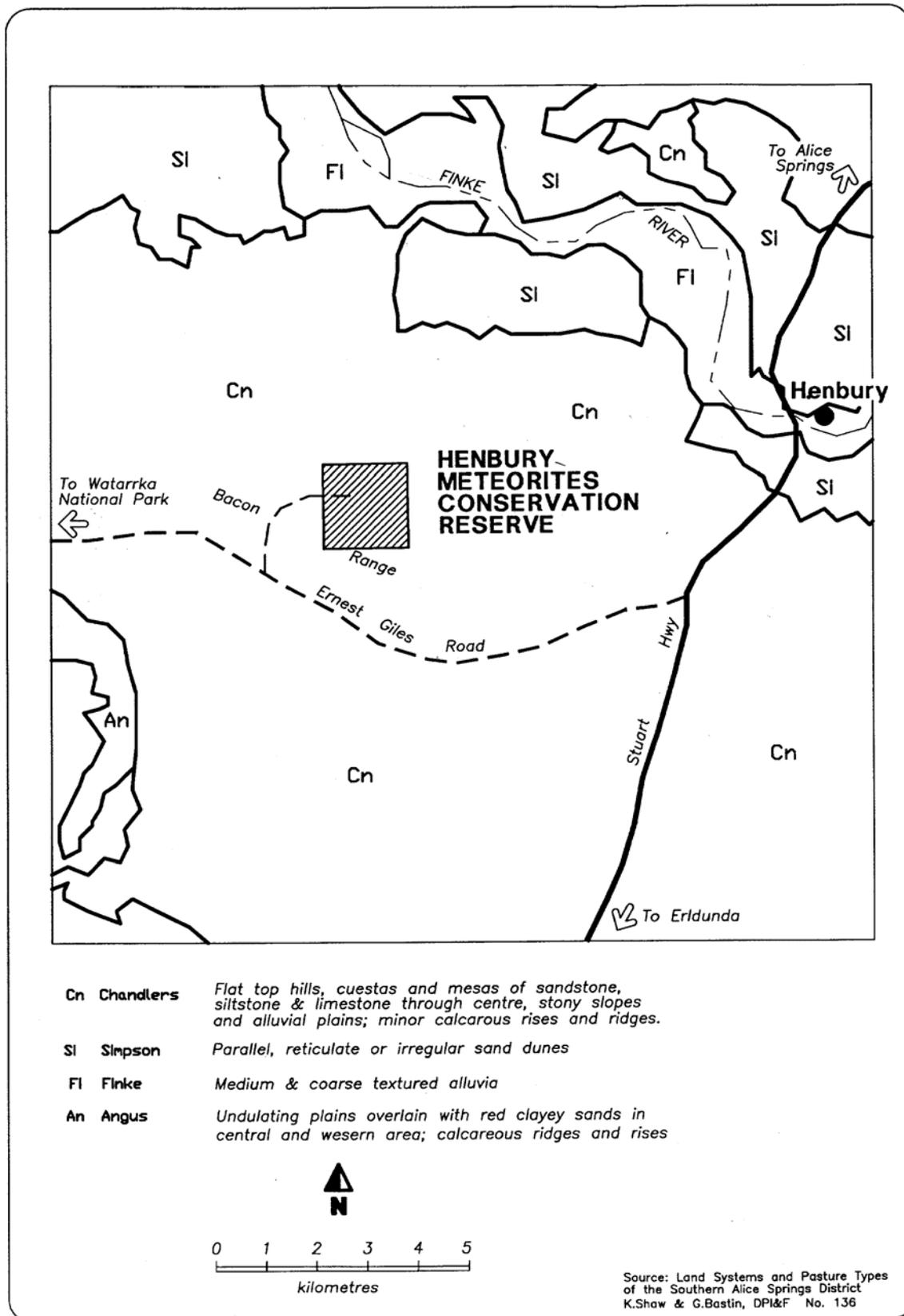


Figure 5. Land Systems



3.2 Native Flora

Mulga (*Acacia aneura*) grows along watercourses but the plains around the craters have only a sparse growth of needlebush (*Hakea leucoptera*) and other shrubs. The floor of the Main Crater is sparsely covered by saltbush (*Atriplex* sp.). The wall of the Water Crater has been breached and the crater has captured a preimpact drainage system, so that water stands in the crater after rains. Consequently, the largest trees in the vicinity grow in this crater, among which whitewood (*Atalaya hemiglauca*) is the dominant species.

Ranger staff have compiled a preliminary plant list for the Henbury Meteorites Conservation Reserve from opportunistic surveys. The list is compiled of 84 plant species none of which have conservation significance except as representative of the Finke Bioregion vegetation. Further surveys may provide additional species.

Management actions

- Disturbance to any of the vegetation communities of the Reserve will be kept to the minimum necessary to provide for public access, safety and fire protection.
- Any disturbed or denuded sites which may occur within the Reserve will generally be left to be revegetated by colonisation from surrounding natural areas wherever possible. Active management such as scarifying, seeding or planting disturbed areas may be employed where required. Priority areas for action will be high use locations, high erosion risk areas, old roads and tracks and development sites.
- The recovery of disturbed or denuded areas, by means of both natural or activemanagement measures, will be monitored by Reserve staff on their regular patrols.
- Visitors will be advised in pre-visit information and on site signage that the collection of firewood within the Reserve is not permitted and should be collected outside the Reserve.
- A detailed vegetation and soils survey will be conducted by Ranger staff in collaboration with the Parks and Wildlife Commission's Biophysical Mapping Section.
- The Reserve plant species list will be updated as and when new species are found on the Reserve.

3.3 Native Fauna

Very little research has been undertaken into the native animal populations found within the Reserve. Ranger staff have recorded various species on an opportunistic basis. A total of 20 bird species, 4 mammal species (including 2 feral) and 14 reptile species have been recorded to this date. No rare or endangered species have been recorded.

Management actions

- . Future fauna surveys at the Reserve will continue to be undertaken on an opportunistic basis coinciding with Ranger patrols.
- . Disturbance to habitats on the Reserve will be minimised as far as possible particularly in siting new developments and in fire management practices.
- . Information showing how the craters form small, but useful refuges to native animals in an otherwise desolate landscape may be included in the Reserve's interpretation.

3.4 Introduced Plants & Animals

No introduced plant species have been recorded but several species are likely to occur within the Reserve (e.g. Ruby Dock and Buffel Grass).

Introduced fauna species recorded are rabbits and cattle. Feral horses, cats, foxes and mice are likely to occur within the Reserve at various times. Stock grazed the main crater area extensively prior to fencing. Stock were attracted after rains to the larger craters which held water for some time and the surrounding area was degraded due to the grazing and trampling. Since fencing of the main craters, cattle have been mostly eliminated from within this area but are still able to graze the majority of the Reserve. Occasionally stock penetrate the main crater area to access water which is available for some time after rains. The fence surrounding the main crater area will need to be maintained to ensure the continued exclusion of stock. The entire Reserve should be fenced to prevent further plant degradation and allow regeneration of flora within the Reserve. Approximately 4 kilometres of fencing is required to effectively fence the Reserve to exclude stock. The southern boundary would not require fencing as the Bacon Range provides a natural barrier.

Rabbits favour the softer crater walls for burrows and over time have caused erosion problems. Reserve staff continually monitor the rabbit population and control numbers by laying poison in active burrows. Since its release in 1996 the Rabbit Calicivirus Disease (RCD) has reduced rabbit numbers in the Henbury area by about 60- 80% and together with the Myxoma virus these biological control methods will keep numbers at a much lower level than in the past.

Management actions

- The susceptibility of the Reserve to the invasion and spread of introduced plants will be minimised by:
 - maintaining the majority of the area in a stable natural condition;
 - reducing the incidence and extent of disturbed areas;
 - rehabilitating or revegetating where necessary using local endemic species and
 - effective programs by Reserve staff to observe the occurrence of introduced plants
 - keeping areas utilised by visitors to a minimum.
- Periodic monitoring during Ranger patrols will be undertaken to determine the distribution and status of introduced plant and animal species. Control measures will be implemented as and when required.

- The Reserve's internal fencing will be maintained and monitored with the aim to prevent the intrusion of horses and cattle to the crater area within the Reserve. If stock are found to be entering through the crater walk access point at the car park, consideration should be given to fitting a stile at this point to prevent stock from entering.
- The craters will be inspected by Rangers on routine patrols for the presence rabbits indicated by active burrows or warrens, faeces and diggings. Rabbit control will be undertaken as required and will include the fumigation of all active burrows, shooting and the destruction of warrens where possible.
- The Reserve fencing will be completed as resources permit. This would prevent stock grazing the Reserve causing further plant degradation and soil erosion. This would require approximately 4 kilometres of fencing tied into the Bacon Range as a natural barrier.
- After fencing of the entire Reserve introduced animals found within the Reserve will be removed or eliminated where possible. In this regard, close cooperation with adjacent landholders will continue.
- Consideration will be given to the removal of the existing inner fence if and when the entire Reserve is fenced.
- Dogs will only be permitted within the carpark in accordance with schedule 3 of the Parks and Wildlife Commission's Pets in Parks Policy.

3.5 Use and Control of Fire

The natural stony plains in and around the Reserve support only sparse vegetation and with the continuous cropping of grass by stock, the potential for a wildfire is extremely low.

Management actions

- If the Reserve is fully fenced to exclude stock and grasses regenerate to a level where fire could become a problem regular fuel load monitoring should occur.
- Visitors will continue to be advised to collect firewood prior to entering the Reserve and to only light fires in the fireplaces provided.

4. MANAGEMENT OF THE RESERVES CULTURAL RESOURCES

Objectives

- To conserve the recorded Sacred Site through information and interpretation signs and in pre-visit information.
- To encourage further research into the Aboriginal culture and use of the area.

4.1 Aboriginal Cultural Resources

The Aboriginal Areas Protection Authority have advised that there is one recorded Sacred Site centered on the crater area at the Reserve. The Arrernte name for the crater area is *Tatyeye Kepmwere* (Tatjakapara). Some of the mythologies for the area are known but will only be used for interpretation purposes after agreement by the Aboriginal custodians of the site.

Management actions

- The Aboriginal custodians and their representative organisations will be consulted over research into the Aboriginal cultural values and significance of the Reserve and Aboriginal cultural information suitable for possible inclusion in the Reserve's pre visit and on site interpretation.
- All new developments in the Reserve require a certificate of clearance from the Aboriginal Areas Protection Authority.
- The PWCNT will apply to AAPA for an Authority Certificate to allow visitors to enter the Sacred Site covering the crater area. Management will ensure that visitor use complies with any conditions set down in the certificate.
- Any Aboriginal sites/artefacts that may be in the Reserve are protected as "Prescribed Archaeological Objects" under the *Heritage Conservation Act*.
- Aboriginal artefacts found on the Reserve will be left *in situ* wherever practicable, unless the Aboriginal custodians wish to determine alternative arrangements. Artefacts in danger of being damaged or souvenired may be documented and collected for storage or display, in accordance with the wishes of the Aboriginal custodians and subject to approval by the Minister responsible for heritage under the Heritage Conservation Act.
- Pre visit information and on site signage will advise visitors on the correct behaviour in areas of Aboriginal significance and to be aware of their responsibilities.

5. MANAGEMENT OF VISITORS

Objectives

- To offer visitors recreational opportunities consistent with the Reserves natural values.
- To provide facilities in keeping with the remote character of the Reserve including day use facilities, basic camping sites and unobtrusive information and interpretation signs.
- To manage the impacts of visitors on the Reserves resources and values so they are within acceptable limits.

5.1 Regional Context

Most of the visitors to the Henbury Meteorites Conservation Reserve are travelling to or from Watarrka National Park via the Ernest Giles Road. Only a small proportion of visitors specifically set out solely to visit the Reserve. This Reserve provides camping and day use facilities for visitors and provides a unique, interesting and educational experience.

Management actions

- Pre visit information will advise visitors of the remote character, access and facilities provided at the Reserve.

5.2 Visitor Access

Visitor access to the Reserve is via a gravel road, the turnoff being 8 kilometres west along the Ernest Giles Road from the Stuart Highway/Watarrka turnoff. The Ernest Giles Road can be closed after heavy rainfall in the area, however for the majority of the year the road remains open and in reasonable condition for use by most vehicles.

Management actions

- Existing pre visit information should be continued advising visitors on access, when to visit and activities at the Reserve. Existing directional signage is adequate for visitors. Routine Ranger patrols to the Reserve provide reports on road and sign conditions. These will continue.
- Visitor access to the craters from the day use area in the Reserve will be by foot only. Vehicle access to other areas within the Reserve will be for management purposes only. (see Zoning Scheme-Figure 2)
- Tracks within the Reserve not required for management purposes such as the old access road to the main crater area will be closed and rehabilitated.
- To reduce impacts on the crater walls the walking track which currently leads visitors from the day use area to the main crater area then back to the car park will be rationalized. This will be done by closing off the southern section of the existing loop walk and the

walk around the main crater rim, keeping visitors to a single track from the carpark area to a central point at the main crater where the interpretation signage will be located (see Figure 7).

- The PWCNT will apply to AAPA for an Authority Certificate to allow visitors to enter the Sacred Site covering the crater area. Management will ensure that visitor use complies with any conditions set down in the certificate.
- Provision for a future walking track and lookout point above the craters has been incorporated into the plan.(see Figure. 5). This track and lookout is currently used by visitors and requires formalisation.
- When developing the camping area access track and camp sites (see section 5.3) efforts will be made to cause minimal soil disturbance and minimise impacts on the native flora.
- The PWCNT will liaise with appropriate experts on the siting of the camping areas and access track to these areas within the Reserve.

5.3 Visitors Facilities

Visitor facilities provided at the Reserve are centred on the existing day use and camping area. This area provides a parking area, shade shelters with seating and tables, fire pits and a pit toilet (see Figure 6). Low key interpretation signs exist at the start of the crater walk and at vantage points along the walk. An interpretation shelter is planned at the beginning of the crater walk at the carpark.

Management actions

- The provision of visitor facilities and recreational opportunities will be in accordance with the Zoning Scheme (Section 2)
- Extra camping facilities for vehicle based groups may be provided in the future dependent on demand (see Figure 7). Each group site will be provided with a wood burning BBQ and a platform table. A pit toilet will be centrally located to service all sites (see Figure 5). In the event these new camping sites are provided the existing day use and camping area will be designated for day use visitors only with all camping at the new bush camping sites.
- Prior to the commencement of any new developments all necessary environmental, heritage and AAPA clearances will be obtained.
- Any facilities will be sited and designed to complement the Reserve's natural setting.
- Camping within the reserve will be restricted to the designated camping area within the Visitor Facilities Zone (see Figure 2).
- As mentioned in section 5.2 provision for a lookout and walk to the lookout has been

made in this Plan (see Figure 5), this will be constructed dependent on demand.

- Rubbish bins will not be provided in the Reserve and all rubbish must be taken from the Reserve by visitors. Information regarding these requirements will be provided.
- Consideration will be given to installing gas barbeques at the day use area as firewood supplies in the area are limited. Pre visit information should encourage visitors to carry and use their own fuel cooking facilities e.g. gas cook tops and stoves.

Figure 6. Existing Day Use and Camping Area

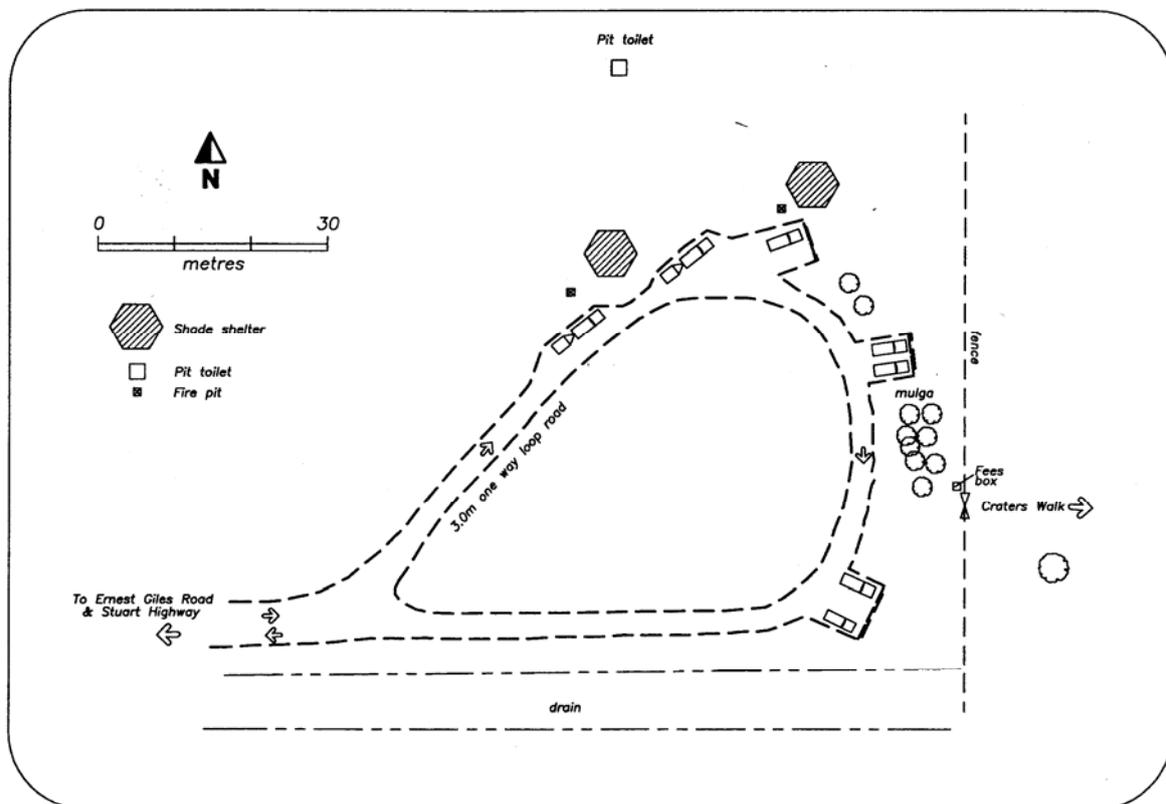
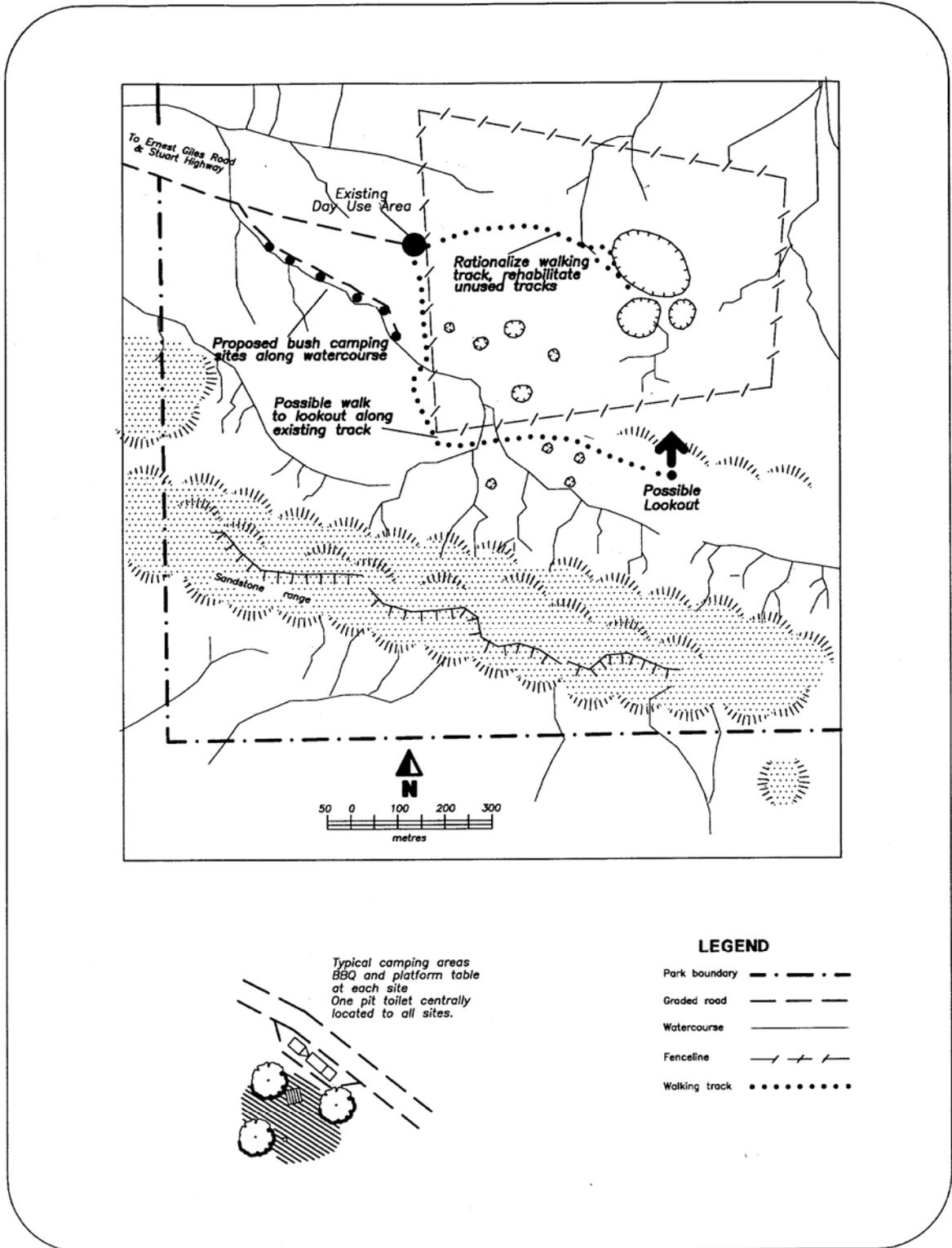


Figure 7. Future Developments



5.4 Information and Interpretation

The Parks and Wildlife Commission of the Northern Territory has an Information and Interpretation program for the Henbury Meteorites Conservation Reserve which aims to educate and inform visitors of the values of the Reserve.

Information and interpretation at the site will continue to be developed in consultation with key stakeholders and implemented in a fashion which is in keeping with the Reserve's remote and lunar character. The interpretation will link strongly with material currently produced by the PWCNT.

Management actions

- Detailed interpretation will deal primarily with the meteorite craters at the site. The information and interpretation program for the Reserve will be reviewed and evaluated in association with the Plan of Management review.
- Park orientation information will be located adjacent to the current camping and day use area at the beginning of the crater walk in a new interpretation shelter. The orientation information will also introduce the Reserve's information and interpretative theme. The focus for interpretive signs will be the meteorite craters and associated information gathered from the many studies carried out over the site. The location of interpretive signs within the Crater Protection Zone should not detract from the natural fabric of the site.
- Key stakeholders including Aboriginal traditional custodians for the site, Northern Territory Government Departments and the neighboring pastoralists will be consulted in the further development of information and interpretation for the Reserve if appropriate.
- Where possible consultation with the Aboriginal custodians will determine the Aboriginal cultural values for the site and to what extent interpretation will be used as a management tool in the protection and interpretation of cultural resources and places of significance.
- A new interpretation shelter (type SH 11) will be constructed at the beginning of the crater walk (see Figure 7).
- Information showing how the craters form small, but useful wildlife refuges to native animals in an otherwise desolate landscape may be included in the Reserve's interpretation.
- Pre visit information -will continue to be made available through the PWCNT .
- Visitors will be encouraged to adopt appropriate behaviour codes in relation to camping and the protection of natural, cultural and aesthetic values.

5.5 Visitor Monitoring

Visitor monitoring figures show that over 24,000 people visited the Reserve in 1997 and that this figure has remained fairly constant over the past few years. A peak in visitor numbers occurred in 1994 with 38,500. Based on figures obtained from payment of camping fees and Reserve staff observations approximately 1500 visitors camped at the Reserve in 1997.

Management actions

- Visitor numbers will be monitored on an ongoing basis to ensure that management of the Reserve is in keeping with changing visitor needs and impacts. A traffic counter will monitor vehicle numbers entering the Reserve.
- A visitor book will be provided at the the Reserve in the proposed interpretive shelter to record visitor numbers, attitudes and comments. Qualitative surveys may be conducted in the future to determine visitor needs
- Campers will be monitored by Rangers on periodic patrols and reminded of the need to pay camping fees.
- A traffic counter will continue to be located at the entrance to the Reserve. Data collected along with comments from the visitor book will then be assessed in order to meet the needs of visitors.
- The impacts of visitors will be especially monitored in the Crater Protection Zone in order to protect the craters and the crater walls.

5.6 Visitor Safety

Visitors need to be aware of the Reserve's isolated and exposed location and the fact that they may be alone at the Reserve.

Management actions

- Pre-visit information and on site signage will advise visitors on appropriate behaviour in isolated areas and emergency procedures.
- Visitors will be advised in pre visit information that drinking water is not provided at the Reserve and of the need to supply their own.
- The need for qualitative surveys may be required to resolve issues of where to camp and firewood supplies. Such surveys could also be used to gauge visitor satisfaction and usage.

6. RESERVE ADMINISTRATION

Objectives

- To ensure that management procedures and practices achieve the objectives of this Plan by adhering to the management actions.
- To administer the *Parks and Wildlife Conservation Act*, its By-Laws and other relevant legislation.
- To ensure developments or works on the Reserve meet environmental requirements.
- To co-operate with neighbouring landholders regarding management of the Reserve.
- To provide sufficient resources for the efficient management and administration of the Reserve.
- To encourage appropriate research into the Reserve's natural and cultural resources.

6.1 Staffing and Management

The Reserve is currently patrolled by Parks and Wildlife Commission Ranger staff from the Central District Parks based at the Alice Springs Telegraph Station Historical Reserve. Frequency of visits vary from about monthly during summer to fortnightly during peak visitor periods.

Management actions

- Consideration will be given to increasing Ranger patrols if and when required to accommodate any increase in visitation.
- Regular maintenance of fencing will be undertaken by Reserve staff to prevent the access of stock into the crater area of the Reserve.

6.2 Liaison with Neighbouring Landholders

Henbury Meteorites Conservation Reserve is surrounded by Henbury Station, N T Portion 657, PPL 1094 (see Figure 2). The owners of Henbury Station should be consulted regarding any ongoing management activities at the Reserve that may affect the station such as fencing or access.

Management actions

- The Parks and Wildlife Commission will, as a courtesy, advise the lease holders of Henbury Station prior to fencing the Reserve on boundary.

6.3 Research and Monitoring

Numerous scientific investigations have been carried out over the craters and the geology surrounding the craters. Periodic Ranger patrols have been the main source of information regarding flora and fauna within the Reserve. These patrols have also provided information on erosion, feral animals and visitor behaviour.

Management actions

- Assessing the craters will be regularly undertaken in conjunction with Ranger patrols to determine the impacts of visitors, vegetation regrowth and natural deterioration.
- A detailed vegetation and soils survey will be conducted by the Parks and Wildlife Commission's Biophysical Mapping Section.
- All research and monitoring activity proposed by persons or agencies external to the Parks and Wildlife Commission requires the approval of the Director of Parks and Wildlife in accordance with section 111 of the *Territory Parks and Wildlife Conservation Act* and consistent with the Parks & Wildlife Commission's Scientific Licences Policy.

6.4 Legal Requirements

The Henbury Meteorites Conservation Reserve is covered by a recorded sacred site centred on the crater area. This requires that the PWCNT obtain an Authority Clearance under section 20 of the *Northern Territory Aboriginal Sacred Sites Act*, providing clearance for any actions, works and visitation within this area.

The Parks and Wildlife Commission is obliged, under section 21 of the *Territory Parks and Wildlife Conservation Act* to manage the Reserve in accordance with this Plan once it has been gazetted and is operational.

The management of the Reserve will follow the guidelines outlined in this Plan. The Plan may be amended at any time in accordance with the *Territory Parks and Wildlife Conservation Act*.

Management actions

- Clearance from AAPA will be obtained for any new works or major management actions proposed for the Reserve.
- To prevent the necessity for repeated 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. This clearance would also enable visitors to enter the sacred site without first obtaining an Authority Certificate.
- Management will ensure that use of the Reserve complies with any conditions set down in the Authority Certificate.

- The Reserve's ongoing management will be annually reviewed to ensure that it complies with the guidelines of this Plan.
- The guidelines of this Plan will be annually reviewed to ensure the most appropriate management is provided and the relevant issues addressed.

7. MANAGEMENT PROGRAMS

Listed below are Management actions stated in earlier sections of the Plan which are to be implemented systematically as Management Programs. Actions in these Programs are referred back to the Management actions by page numbers.

Priorities are assigned as follows:

- High** - imperative to achieve the Plan's stated objective;
- Medium** - very important to achieve the Plan's stated objectives but subject to the availability of resources;
- Low** - desirable but will be undertaken only if necessary resources are available or other conditions stated in the Management actions are fulfilled; and
- Ongoing** - must be implemented on an ongoing basis in order to achieve the objectives of the Plan.

Guideline	Page	Priority
------------------	-------------	-----------------

3. Management of the Reserve's Natural Resources

3.1 Geology Landforms and Soils

Prevention of soil erosion	9	high
Rehabilitation of eroded areas	9	high
Siting of future developments	9	medium
Regulation of visitors	10	medium

3.2 Native Flora

Protection, re-establishment and monitoring	12	high
Detailed vegetation and soil survey	12	medium

3.3 Native Fauna

Ongoing research and monitoring	12	medium
Interpretation of the Reserve's native fauna	13	medium

3.4 Introduced Plants and Animals

Monitoring and control of introduced species	13	high
Maintenance of fencing	13	ongoing
Fence entire Reserve	14	high

3.5 Use and Control of Fire

Monitoring of fuel loads	14	ongoing
Firewood collection by visitors	14	ongoing

4. Management of Cultural Resources

4.1 Aboriginal Cultural Resources

Consultation with traditional Aboriginal Custodians	15	ongoing
Certificate of clearance from AAPA for developments	15	ongoing
Interpretation of Aboriginal values	15	medium
Protection of Aboriginal artefacts	15	high

5. Management of Visitors

5.2 Visitor Access

Re-align walking track to craters and rehabilitate unwanted sections	16	high
Possible walk to lookout above craters	17	medium

5.3 Visitor Facilities

Establishment of new camping area	17	medium
Installation of gas barbeques	18	medium

5.4 Information and Interpretation

Development of interpretation and signage at the Reserve	20	high
Construct new interpretation shelter	20	high

5.5 Visitor Monitoring

Ongoing monitoring of visitor numbers	21	high
Qualitative surveys	21	medium

5.6 Visitor Safety

Production of pre-visit advisory information	21	high
6. Reserve Administration		
6.1 Staffing and Management		
Continue regular Ranger patrols	22	ongoing
6.2 Liaison with Neighbouring Landholders		
Consultation with Henbury Station re Reserve boundary fencing	22	high
6.3 Research and monitoring		
Ongoing assessment of the Reserve's natural resources	23	ongoing
Detailed vegetation and soil survey	23	medium
6.4 Legal Requirements		
Review of guidelines in plan and management	24	ongoing

8. Sources and References

- Alderman, A.R., 1932 *The Meteorite Craters at Henbury Central Australia*. Adelaide.
- Cook, P.J., 1968 *1:250,000 Geological Explanatory Notes, Henbury N.T.* Bureau of Mineral Resources, Geology and Geophysics, Canberra.
- Fortowski, D. Crick, I. Lau, G., 1988 *The Geological Heritage of the Northern Territory ...*, A report prepared for the Conservation Commission of the Northern Territory.
- Kimber, R.G., 1998 *Some Aboriginal Perspectives on Henbury Meteorite Craters*. A report prepared for the Parks and Wildlife Commission of the Northern Territory. Alice Springs.
- Milton, D.J., 1968 *Structural Geology of the Henbury Meteorite Craters*, Contributions to Astrogeology, Professional paper 599-c. Washington USA.
- Mulvaney, J. Morphy, H. Petch, A., 1997 *'My Dear Spencer'* the letters of F.J. Gillen to Baldwin Spencer. Hyland House Melbourne,.
- N.T. Geological Survey, 1991 *Astro-Geological Features of Central Australia*. Department of Mines and Energy pamphlet Alice Springs.
- Perry et al, 1962 *Lands of the Alice Springs Area*. Land Research Series No. 6. CSIRO,.
- Shaw, K. Bastin, G., *Land Systems and Pasture Types of the Southern Alice Springs District*. Department of Primary Industries and Fisheries Report 136, Alice Springs.
- Spencer Gillen Museum, *Information Leaflet No 5, Meteorites*. Alice Springs.

Notes

