

DARGAN CREEK RESERVE

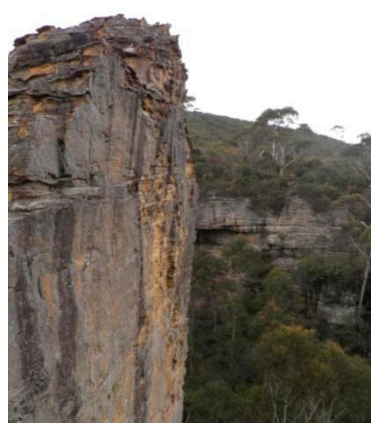
Plan of Management

Prepared for
Dargan Creek Reserve Trust, Crown Lands Division, NSW Department of Primary Industries

31 May 2012



Crown Lands Division
Department of Primary Industries



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Abbreviations

ABBREVIATION	DESCRIPTION
CLA	<i>Crown Lands Act 1989</i>
CTHLT	Central Tablelands Heritage Lands Trust
OEH	Office of Environment and Heritage
DPI	Department of Primary Industries (NSW)
DSC	Dams Safety Committee
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
HNCMA	Hawkesbury-Nepean Catchment Management Authority
HRB	Hazard Reduction Burn
KTP	Key Threatening Process
LGA	Local Government Area
LPMA	Land and Property Management Authority (now known as the Crown Lands Division of the NSW Department of Primary Industries, in this report 'Department')
NPWS	National Parks and Wildlife Service
PAS	Priority Action Statement
PoM	Plan of Management
RFS	Rural Fire Service
TSC	<i>Threatened Species Conservation Act 1995</i>
UMCC	Upper Macquarie County Council

Executive Summary

Dargan Creek Reserve is located in the Central Tablelands of New South Wales between the towns of Clarence and Dargan, approximately 15 km east of Lithgow. The Reserve has an area of approximately 591.5 ha and falls within the Lithgow City Council Local Government Area (LGA).

The Reserve is defined by Bells Line of Road / Chifley Road to the north, Dargan Creek to the south-eastern boundary and residential areas to the northwest and east. The southern section of the Reserve is contiguous with large areas of vegetation including Blue Mountains National Park World Heritage Area to the east.

The Reserve is Crown Land apart from the western railway, which runs through the north of the Reserve, with the railway corridor and a network of easements owned and managed by RailCorp. There are also two freehold lots within the Reserve. The current purpose of the Crown Land in Dargan Creek Reserve is for public recreation and is managed by the Dargan Creek Reserve Trust.

This Plan of Management (PoM) has been prepared for the Dargan Creek Reserve Trust in accordance with the requirements of the *Crown Lands Act 1989* (CLA). The Reserve's values and threats have been identified, along with objectives and actions for the long-term sustainable management of Dargan Creek Reserve. The plan has been produced in consultation with community and relevant stakeholders.

The Reserve is comprised of largely intact native vegetation with the main areas of disturbance in the north-east associated with two disused concrete dams. Disturbance includes littering, soil erosion and sedimentation, and vegetation disturbance primarily from visitors to the dam and illegal vehicle use throughout the Reserve's management access tracks and railway easements.

Key values of the Reserve include:

- Recreational value of the Reserve for various active adventure sports including bushwalking, rock climbing, canyoning and passive recreation activities.
- Commercial value for operators running adventure sports guided tours.
- High ecological value due to the Reserve's large intact size, low levels of weed invasion, proximity to Blue Mountains World Heritage Area, presence of several upland swamps (endangered ecological communities and key habitat for a number of threatened species), overall good condition of vegetation and varied habitat features.
- Recreational opportunities covering both active and passive activities with a number of commercial operators wishing to utilise Reserve.

The Reserve is threatened by rubbish dumping and environmental degradation, particularly from vehicular access to the dam, which has widened and eroded the tracks and spoils the visual amenity of the area and threatens the endangered upland swamp communities. Previous attempts to keep vehicles out of the Reserve have been met with vandalism of gates, bollards and locks.

This PoM identifies opportunities for Dargan Creek Reserve to be managed in a sustainable way through the following actions:

- Maintaining access off Chifley Road using a Crown Road Reserve and closing all other public vehicular access using locked gates and fencing; where necessary;
- Restricting vehicle access will protect biodiversity, reduce erosion and sedimentation and protect public safety;
- Develop a network of formal walking tracks and information signage to allow safe enjoyment of the Reserve;
- Identify the biodiversity and cultural heritage values of the Reserve which will inform management of the Reserve including management of weeds, threatened species, upland swamps, fire and cultural heritage;
- Manage the sustainable use of the Reserve for recreational and commercial uses
- Encourage community involvement in management of the Reserve through landcare and swampcare, restoration works and forming a community trust once management of the Reserve is stabilised.

1 Introduction

This Plan of Management (PoM) has been prepared for the Dargan Creek Reserve Trust in accordance with the requirements of the *Crown Lands Act 1989* (CLA). The PoM identifies objectives and actions for the long-term sustainable management of Dargan Creek Reserve. This PoM has been prepared by Eco Logical Australia for the Dargan Creek Reserve Trust, managed by the Lands Administration Ministerial Corporation. This report was funded from the Public Reserves Management Fund. The procedure for adoption of the PoM is outlined briefly below.

- The draft PoM was on display for no less than 28 days and notified in the Government Gazette and a newspaper with local or State circulation inviting people to submit their views on the form and content of the PoM.
- Following any amendments as a result of public display, the draft PoM will be submitted to The Minister for approval.
- After consideration, The Minister may adopt the PoM under section 114 of the CLA. The Minister has the right to amend or revoke the PoM at any time.

This PoM has been prepared in consultation with the Crown Lands Division of the NSW Department of Primary Industries, hereafter referred to as “the Department”.

1.1 LAND TO WHICH THE PLAN OF MANAGEMENT APPLIES

Dargan Creek Reserve is located in the Lithgow City Council local government area in the Blue Mountains of NSW. Dargan Creek Reserve (Figure 1) is comprised of 22 separate land parcels within 5 Crown Reserves and two other areas of Crown land. The total area is about 591.5 hectares. The Reserves and parcels are listed in Table 1.

Table 1: Land parcels within Dargan Creek Reserve covered by this Plan of Management

Land District	Lithgow	LGA	Lithgow City Council
County	Cook	Parish	Lett
Suburbs	Clarence, Dargan, Hartley and Hartley Vale		
Reserve Number	R1014490		
Lot and Deposited Plan	Lot 2 DP 778317	Lot 250 DP 751650	
	Lot 7014 DP 1020484	Lot 7034 DP 1051528	
	Lot 7311 DP 1154270	Lot 7035 DP 1051737	
	Lot 7312 DP 1154269	Lot 82 DP 751650	
	Lot 7313 DP 1154269	Lot 239 DP 751650	
	Lot 7301 DP 1123766	Lot 235 DP 751650	
	Lot 7033 DP 1051528	Lot 234 DP 751650	
	Lot 7015 DP 1051527	Lot 7015 DP 1051527	
	Lot 1 DP 778317	Lot 7035 DP 1051737	
	Lot 7018 DP1051736		
	Lot 7019 DP 1051736		
	Lot 266 DP 751650		
	Lot 251 DP 751650		

There are two additional parcels of Crown Land shown in Figure 1 (Lot 7300 DP 1123766 and Lot 370 DP 726995) that are contiguous with Dargan Creek Reserve, but are not currently included in the reserve. As a priority action, these Lots should be included in the reserve (see Section 3.14).

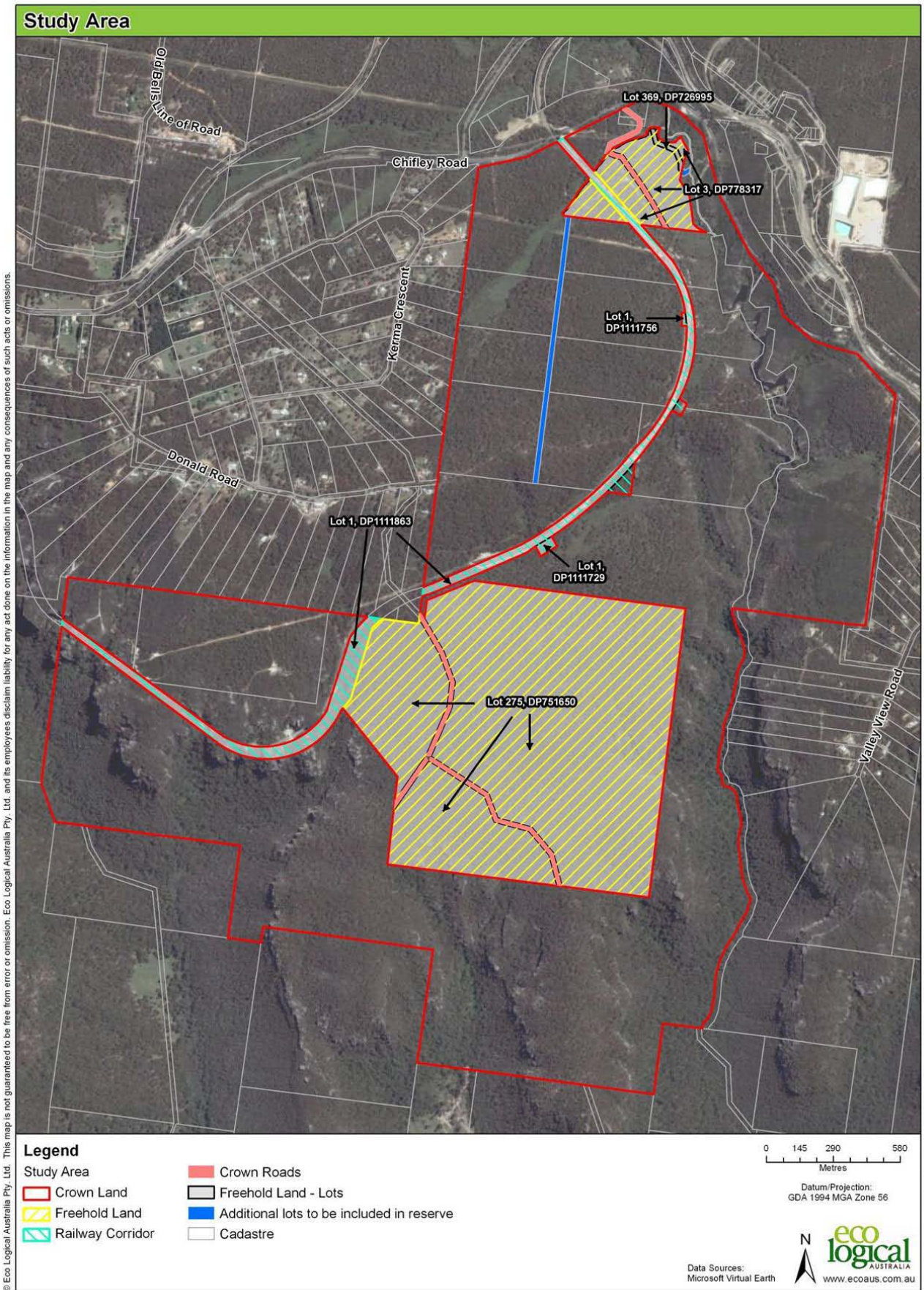


Figure 1: Dargan Creek Reserve Study Area

1.2 VISION AND OBJECTIVES

The Vision for this Plan of Management is:

To conserve biodiversity, allow compatible recreational uses and manage sustainable commercial recreation activities, in consultation with various stakeholders and the Department.

Figure 2 illustrates that Dargan Creek Reserve protects a large area of native vegetation of the Newnes Plateau. It is part of contiguous vegetation that has been identified as a biodiversity corridor linking the north and south parts of the Greater Blue Mountains World Heritage Area (WHA) along the western escarpment. Its proximity to the WHA and its high connectivity value represent a significant opportunity for in-situ conservation of biodiversity. While the Reserve has not yet been formally surveyed for flora and fauna, it is highly likely that a number of threatened plants and animals occur within the Reserve.



Plate 1: Dargan Creek Reserve and the upper dam

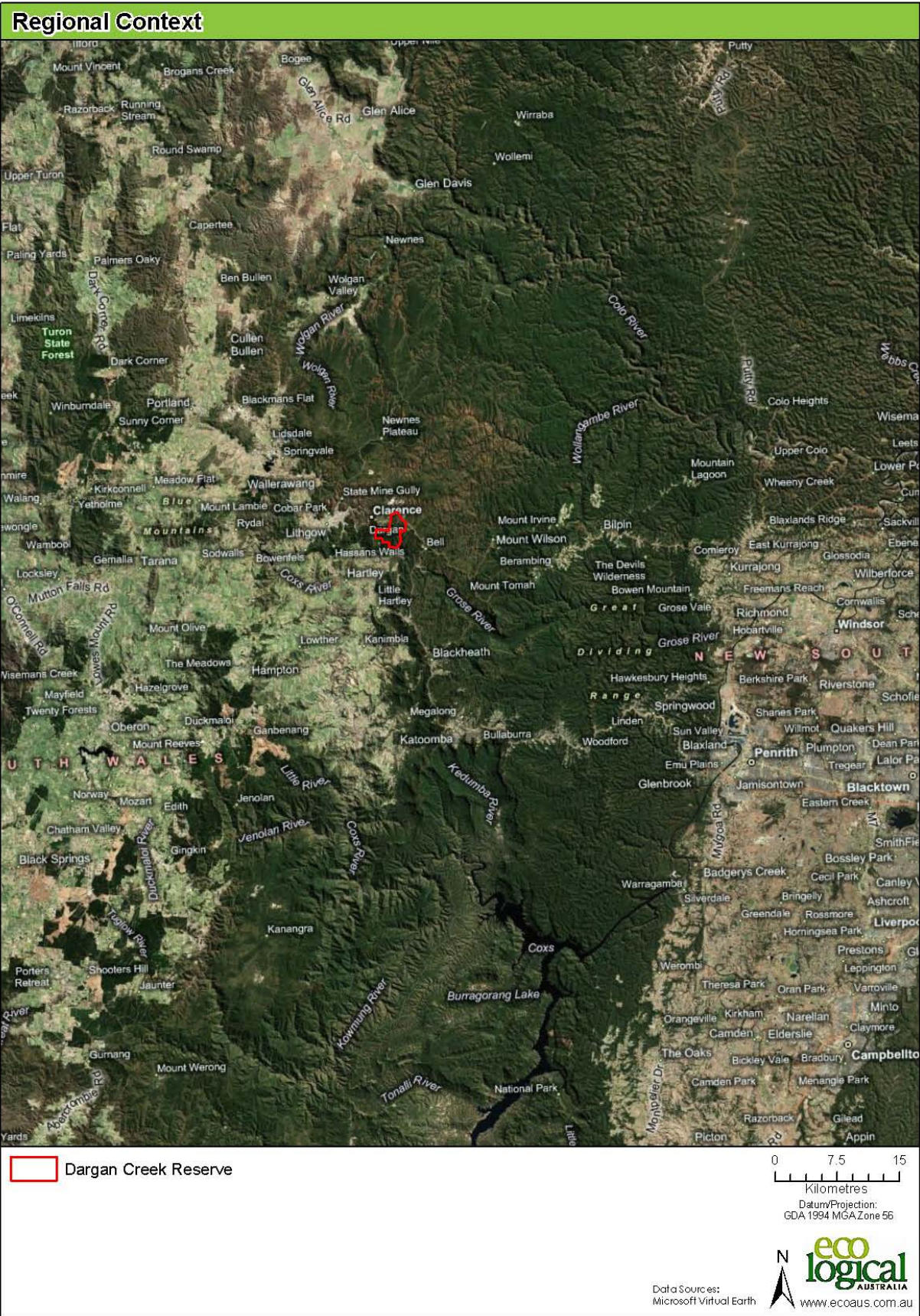


Figure 2: The location of Dargan Creek Reserve at a regional scale.

1.3 MANAGING CROWN LANDS

1.3.1 Management Principles

Section 10 of the *Crown Lands Act 1989* (CLA) requires the Department 'to ensure that Crown land is managed for the benefit of the people of NSW'. The principles of Crown Land management are listed in Section 11 of the CLA, as follows:

- that environmental protection principles be observed in relation to the management and administration of Crown Land,
- that the natural resources of Crown Land (including water, soil, flora, fauna and scenic quality) be conserved where possible,
- that public use and enjoyment of Crown Land be encouraged,
- that, where appropriate, multiple use of Crown land be encouraged,
- that, where appropriate, Crown Land should be used and managed in such a way that both the land and its resources are sustained in perpetuity
- that Crown Land be occupied, used, sold, leased or licensed in the best interests of the State consistent with the above principles.

This PoM balances encouragement of sustainable public use, the safety of visitors and the protection and conservation of the natural landscape. The Department requires that Reserve trusts adopt good risk management practices to ensure that risks are being proactively managed and that responsible action is planned. The Department provides a Risk Assessment Matrix (LPMA, 2007) to help guide the Management Trust in making decisions about the management of the Reserve.

1.3.2 Crown Lands Act 1989 and Crown Lands Regulation 2000

The CLA and *Crown Lands Regulation 2000* specifies requirements for land assessments; sale, lease or disposal of Crown land; dedication and reservation of land; administration and record-keeping by the Reserve Trust; and penalty notice offences.

1.3.3 Requirements for a PoM for a Crown Reserve

On 29 February 2008, the Dargan Creek Reserve Trust was appointed by the Minister for Primary Industries under section 92 of the CLA. The Trust is managed by Land Administration Ministerial Corporation and is comprised of three officers from the Orange Department of DPI office with a diverse range of knowledge and skills. The Ministerial Corporation manage the Reserve utilising Department staff where possible and outside contractors as required and are responsible for the care, control and management of the Reserve consistent with provisions in the CLA.

The Department encourages the public to be either directly involved in, or contribute to, the planning and management of the Reserve trust system.

Adopted Plans of Management become regulatory instruments, which bind the Trust Manager and can give statutory authority to other types of plans, such as conservation management plans for heritage components.

This Plan of Management has been prepared in accordance with Section 112 of the CLA. A range of legislation, policies and other planning instruments are relevant to the management of the Reserve and

have been considered in the formulation of the Plan of Management. The management implications of these are detailed in Appendix A..

1.3.4 Other Relevant Legislation

The associated legislative requirements and relevant polices relating to this plan include:

- Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Native Title Act 1993
- Environmental Planning and Assessment Act 1979 (EP&A Act 1979)
- Threatened Species Conservation Act 1995 (TSC Act)
- National Parks and Wildlife Act 1974 (NPW Act)
- Noxious Weeds Act 1993 (NW Act)
- Native Vegetation Act 2003 (NV Act)
- Dams Safety Act 1978
- SEPP (Infrastructure) 2007
- Drinking Water Catchment Regional Environmental Plan No. 1 (REP No. 1).
- Lithgow City Council Local Environment Plan 1994 (LCC LEP)
- Blue Mountains National Park Plan of Management
- Blue Mountains National Park Fire Management Strategy
- Hawkesbury-Nepean Catchment Action Plan (HNCAP)
- NSW Biodiversity Strategy 2010-2015 (Draft)
- Blue Mountains Nature Recreation Strategy 2004
- NSW Invasive Species Plan 2008-2015

Each of these requirements and how they impact on the management of Dargan Creek Reserve are detailed in **Appendix A**.

1.4 STAKEHOLDER CONSULTATION

In preparing this Plan of Management, a range of stakeholders were consulted from across the community. Relevant stakeholders were identified from previous community discussions regarding management issues surrounding the Reserve. They included representatives from the Dargan Creek Reserve Trust, local and state government, local residents, special interest groups and the broader community. Stakeholders were consulted over the phone and asked to provide feedback on what the values of the Reserve are and how the Reserve should be managed in future. Feedback from this process was presented to the Department as a report titled *Dargan Creek Reserve Stakeholder Issues Paper* (ELA Dec 2010).

Consulting with the community is an integral part of developing a PoM and this feedback has been used to inform the objectives and management actions for the Reserve. **Appendix B** details the results of stakeholder consultation and provides a summary of comments.

As part of this PoM, further consultation is recommended in particular to meet the legislative requirements but also specifically with the local Wiradjuri and Gundungurra people with regard to heritage values, commercial operators and user groups.



Plate 2: Heathland protected within Dargan Creek Reserve

2 Reserve Assessment

2.1 RESERVE LOCATION AND DESCRIPTION

Dargan Creek Reserve has an area of approximately 591.5 ha. It is located in the Central Tablelands of New South Wales between the towns of Clarence and Dargan, approximately 15 km east of Lithgow (Figure 2). The Reserve falls within the Lithgow City Council Local Government Area (LGA).

On the northern boundary the Reserve is bounded by the Bells Line of Road / Chifley Road. Dargan Creek runs through the north-eastern part of the Reserve and defines its south-eastern boundary (Figure 3). The western railway runs through the Reserve and this land is owned by RailCorp. There are also two other freehold lots inside, but not part of, the crown Reserve (Figure 1).

The Reserve is comprised of largely intact native vegetation adjacent to the Greater Blue Mountains World Heritage Area (WHA). The main areas of disturbance are in the north-east associated with two disused concrete dams and impacts from visitors to the dams (Figure 3). There are a number of trails throughout the Reserve which include various easements for the railway, phone lines and powerlines.

2.2 BACKGROUND AND HISTORY

Dargan Creek Reserve (R1014490) was originally gazetted as R190027 for Public Recreation on 9 December 1988 and was under the care, control and management of the Central Tablelands Heritage Lands Trust (CTHLT). The Reserve has a history of being used for recreation; specifically swimming in the disused dams and rock climbing. The disused dams were historically used for supplying water to the steam trains at the Zig Zag Railway located north of Dargan Creek Reserve, on the other side of Chifley Road. The dams are used as a popular swimming hole by local residents. The climbing occurs on various cliffs within and adjacent to the Reserve such as 'Cosmic County', the 'Dam Cliffs' and the 'Freezer'.

The main access track to the dams from Chifley Road is along the RailCorp easement then through the freehold lot (Lot 3 DP 778317), then onto the Crown Reserve. There has been a long history of access issues relating to the dams and rock climbing areas through the Reserve. Because of these issues the status was revoked on 12 May 2000 and the land became vacant crown land and was no longer under the management of CTHLT.

In January 2007 Department closed the Reserve after being made aware of the high risk issues associated with the dams. The Department conducted a risk assessment which identified that there were significant hazards present that could result in serious harm to people using the dams such as trip hazards, exposed metal edges and unfenced dam walls. The Department closed the Reserve and asked RailCorp to install a gate at the top of the easement to block vehicle access. The community was strongly opposed to closing the Reserve and the gate was vandalised and removed. The Department had also received requests from commercial operators for access licences to continue commercial trips into the Reserve.

In accordance with the *Dams Safety Act 1978*, the Department commissioned GHD to conduct a structural assessment of the dams. The assessment found that both the upper and lower dams were in satisfactory condition however highlighted that there were significant risks to the public as a recreational

area. The Dams Safety Committee (DSC) is the statutory body under the *Dams Safety Act 1978* responsible for ensuring the safety of dams in New South Wales. The DSC recommended the installation of a number of safety fences and locked gates to prevent the public from accessing the dam walls. They also recommended the removal of disused steel infrastructure and undertaking routine safety surveillance. The Department addressed these risks by installing gates across the dam walls (Plate 3) and signage to make people aware of the risks in the area. Signage was vandalised and not all of the safety recommendations have been implemented due to limited funds. A member of the soil conservation service is employed as a sub-contractor to the Department to undertake routine inspections of the dams safety every 3 months.

As a result of the ongoing access issues, the Department organised a community consultation at Clarence on 27 November 2007 facilitating a discussion about access issues, risk associated with the dams and other conflicting use issues. There is no formal record of the outcomes of this meeting however the need for a Plan of Management for Dargan Creek Reserve was raised.

On 29 February 2008 the Reserve was re-gazetted for Public Recreation under the management of Dargan Creek Reserve Trust.



Plate 3: Gate installed to prevent people walking across the dam wall of the lower dam.

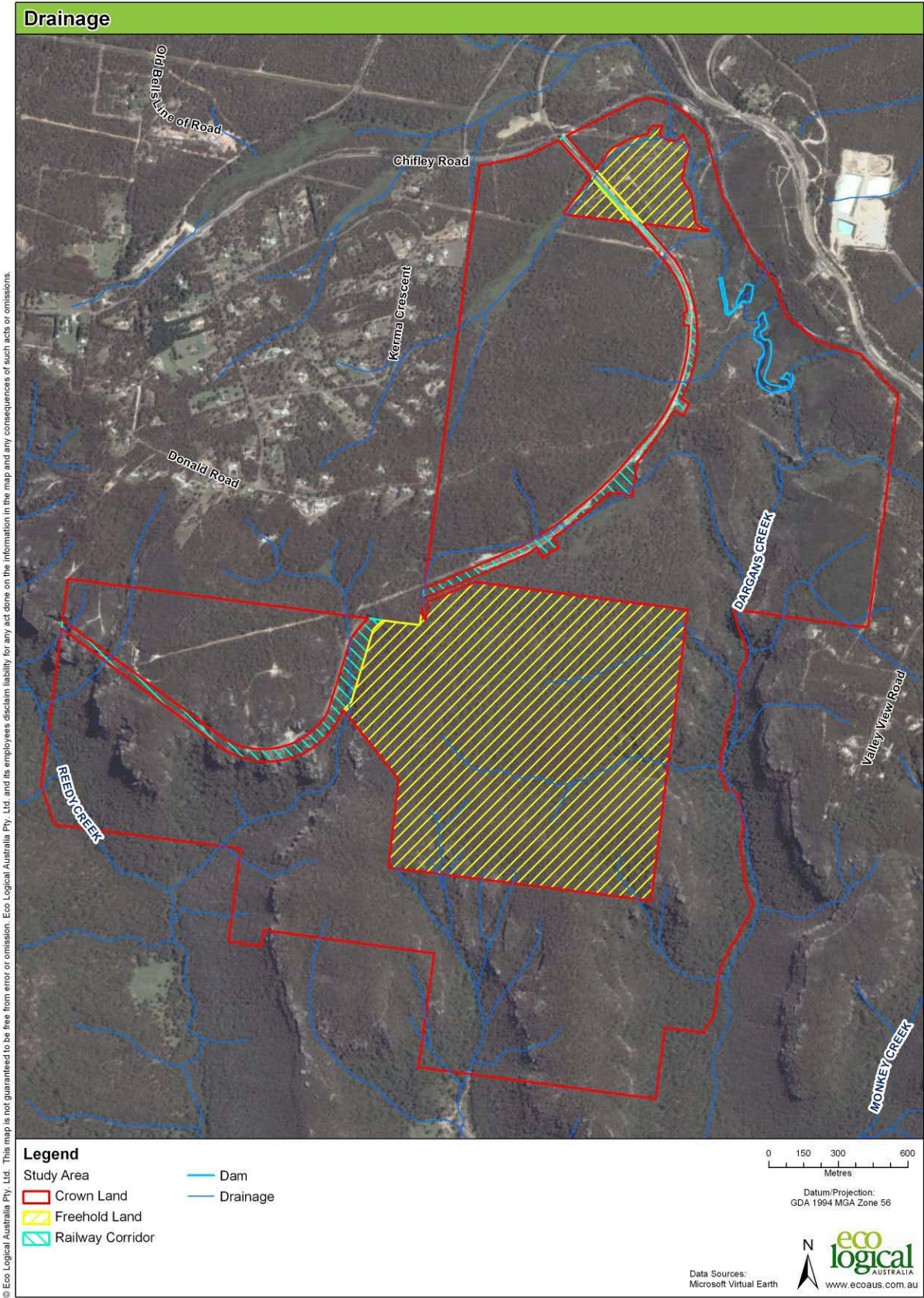


Figure 3: Drainage map

2.2.1 Purpose of Reservation

The current purpose of the Crown Land in Dargan Creek Reserve is for public recreation. This PoM identifies the conservation significance of the Reserve, and recommends that the Reserve purpose include recreation and environmental protection. This will allow conservation values to be protected and compatible recreational activities including sustainable commercial recreation activities to continue.

2.2.2 Current Leases and Licences

The Department has issued a number of licences to commercial operators and utility providers to access different parts of the Reserve. They are listed in Table 2 and are provided for in this PoM. The renewal and new licence agreements will be subject to the recommendations for recreational use in this PoM. There is potential for licence fees to contribute to the revenue for management of the Reserve.

Such Crown land licences are subject to:

- payment of annual rent, which is determined on a market value basis;
- review and reassessment at regular intervals and may also be subject to annual Consumer Price Index (CPI) adjustments;
- a specified or unspecified period of time;
- non transfer rights (except in specified circumstances), but in appropriate circumstances may be revoked and a new licence granted in its place.

Table 2: Previous Licence Holders

Licensee	Licence Type
Integral Energy	3 month temporary Commercial Recreation Licence* from the Department to use the area at the end of Donald Road for the purpose of storage of a site shed, portable toilet and storage container. The lease has expired.
High n Wild	They have a 1 year Commercial Recreation Licence* agreement with the Department to run commercial recreational trips for rock climbing, canyoning, mountain-biking, bushwalking and vehicle-touring. Commenced 10/9/08, now expired.
Perpendicular Adventures	Intention to obtain a Commercial Recreation Licence from the Department to operate commercial recreational trips. The Commercial Recreation Licence places restrictions on the total number of trips that can be run per week and per year. It also specifies the guide to client ratios for each activity.
Carinya Christian School	A two day Commercial Recreation Licence has been issued for the purposes of canyoning and bushwalking on a continual basis, with a new temporary licence issue each year. The most recent licence was for the 9 th and 10 th March 2011.
Landholders of Lot 275 DP 751650	A 5 year licence was prepared for the owners of the large freehold lot in the middle of Dargan Creek Reserve (Lot 275 DP 751650) to gain legal access to their lot. This licence allows access to the lot from the end of Donald Road via an access road through crown land (Lot 82 DP 751650 and Lot 7035 DP 1051737). This licence has since been rejected by the landowner and the offer subsequently withdrawn by the Department.
Rocla Quarry Products	5 year licence to pump water from the dams via a pipeline (3 m diameter, 600 m long). The pump station is not located within the Reserve. Commenced 10/9/98 and is a perpetual licence with Crown Lands. Now terminated.

This PoM identifies that the Dargan Creek Reserve has high conservation values, and the Ministerial Corporation are required to manage the Crown Reserve for the purpose of public recreation with care and consideration for the natural values of the Reserve. Table 3 lists a number of issues that need to be addressed when considering the provision of a licence or lease to a commercial operator or special group within Dargan Creek Reserve. See sections 3.2 and 3.3 for further recommendations.

Table 3: Issues to be considered in commercial licence agreements between the Department and commercial operators (LPMA 2007)

Issues	Considerations
The sustainable use and management of the Reserve	<ul style="list-style-type: none"> • Adherence to a Code of conduct for rock climbing and other adventure sports activities (eg. cliffcare) – see section 3.3 • Ensure minimal impact practices for all activities undertaken in the Reserve • Limit group size to minimise impact. This plan recommends small group sizes and an optimal group size should be negotiated with operators that balances commercial viability with sustainable use. • Quota on visitation rates, again to be negotiated with operators.
The size and scale of the proposed area or facility in relation to the size of the Reserve	<ul style="list-style-type: none"> • Rotation of locations for bushwalking, rockclimbing and abseiling activities • Limits on the number of operators to use the Reserve
The relationship of the proposal to development on adjoining land or on other land in the locality;	N/A
Landscaping provisions which ensure the preservation of trees and other vegetation and enhancement of the visual experience and amenity values of the Reserve	<ul style="list-style-type: none"> • Tree protectors when abseiling • Removal of all litter • Only walking within established trails
Provision of adequate infrastructure, water, electricity and sewerage	<ul style="list-style-type: none"> • Consider the installation of a composting toilet on the Reserve • All other waste to be carried out by commercial groups
Provision for adequate protection and management of environmental features/ hazards such as landform stability, erosion control, drainage & flooding, bushfire hazards, buffer zones, vegetation and landscaping, waste control and noise and lighting	<ul style="list-style-type: none"> • Prohibit the lighting of fires • Walking and driving within established trails • Avoiding tracking across steep lands • Cancel activities in hazardous conditions such as during heavy rains or high bushfire risk
The social and economic effect of the proposal on the Reserve and the locality	<ul style="list-style-type: none"> • Positive impacts on locality when using local commercial operators, transport and services
The character, siting, scale, shape, size, height, design and external appearance of the proposal	N/A

Issues	Considerations
Provisions for the protection and maintenance of any heritage buildings, archaeological, indigenous cultural values or sites or threatened species critical habitat	Observing the recommendations from a cultural heritage study (if funding available to be undertaken for the Reserve)
Criteria for the erection of signs for the proposed use which will provide for minimal signage located on the site of the activity or facility, with product advertising and sponsorship signage to have minimal impact on the landscape or amenity	Given the natural landscape of Dargan, signage advertising commercial activities in the Reserve would be inappropriate
The amount of traffic, parking, loading unloading and manoeuvring likely to be generated by the proposal and how it can be provided without compromising other users of the Reserve	<ul style="list-style-type: none"> • Operators to only use formal trails provided • Quotas on trip numbers will reduce the impact to trails and car parking areas

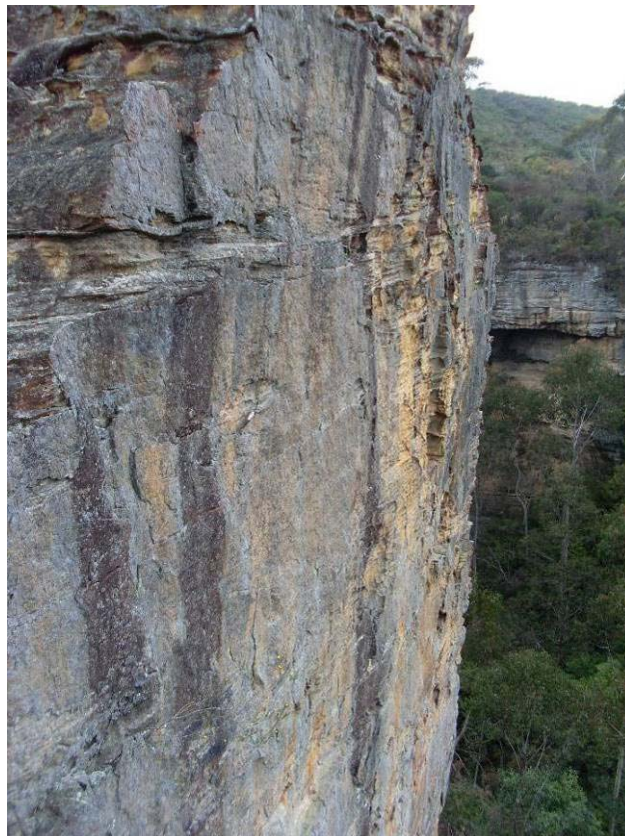


Plate 4: The climbing wall located at the end of the easement below the lower dam

2.3 SURROUNDING LAND USE AND REGIONAL CONTEXT

The Reserve forms part of a greater area of native vegetation and is adjacent to the Blue Mountains National Park, part of the Greater Blue Mountains WHA (Figure 2). The Greater Blue Mountains World Heritage Area was inscribed as a WHA in 2000 for its outstanding natural values (NPWS and Environment Australia 1998):

- outstanding examples of significant ongoing ecological and biological processes in the evolution and development of ecosystems and communities of plants and animals (criterion II), particularly eucalypt-dominated ecosystems; and
- important and significant natural habitats for in-situ conservation of biological diversity (criterion IV), including the eucalypts and eucalypt-dominated communities, primitive species with Gondwanan affinities such as the Wollemi Pine, and a diversity of rare or threatened plants and animals of conservation significance.

The Newnes Plateau extends to the north of the Reserve. Clarence Colliery is located on the northern side of the Chifley Road. North of the colliery is Newnes State Forest which is a popular location for recreational activities.

The adjoining land parcels are predominantly freehold land but three of the adjacent land parcels on the southern boundary are also crown land (Figure 4). The surrounding land has been zoned as 1(a) Rural (General) in Lithgow City Council's Local Environment Plan. The land south of Dargan Creek Reserve and downstream of Dargan Creek is zoned as 'Environmentally Sensitive'.

2.4 LANDFORM, GEOLOGY AND SOILS

Geographically, most of the Reserve lies on the Newnes Plateau within the western part of the Sydney Basin Bioregion (Mitchell 2003). This landscape is characterised by an undulating high level sandstone plateau with shallowly incised swampy streams and occasional relic sand dunes on horizontal Triassic quartz sandstones and shale (Figure 5). The soils are thin stony yellow red sands, deep yellow earths, podzols on dunes and yellow or grey texture-contrast soils on shale units. The highest part of the Reserve is in the north at 1100 m elevation and slopes down to the Hartley Valley in the south at 800 m elevation.

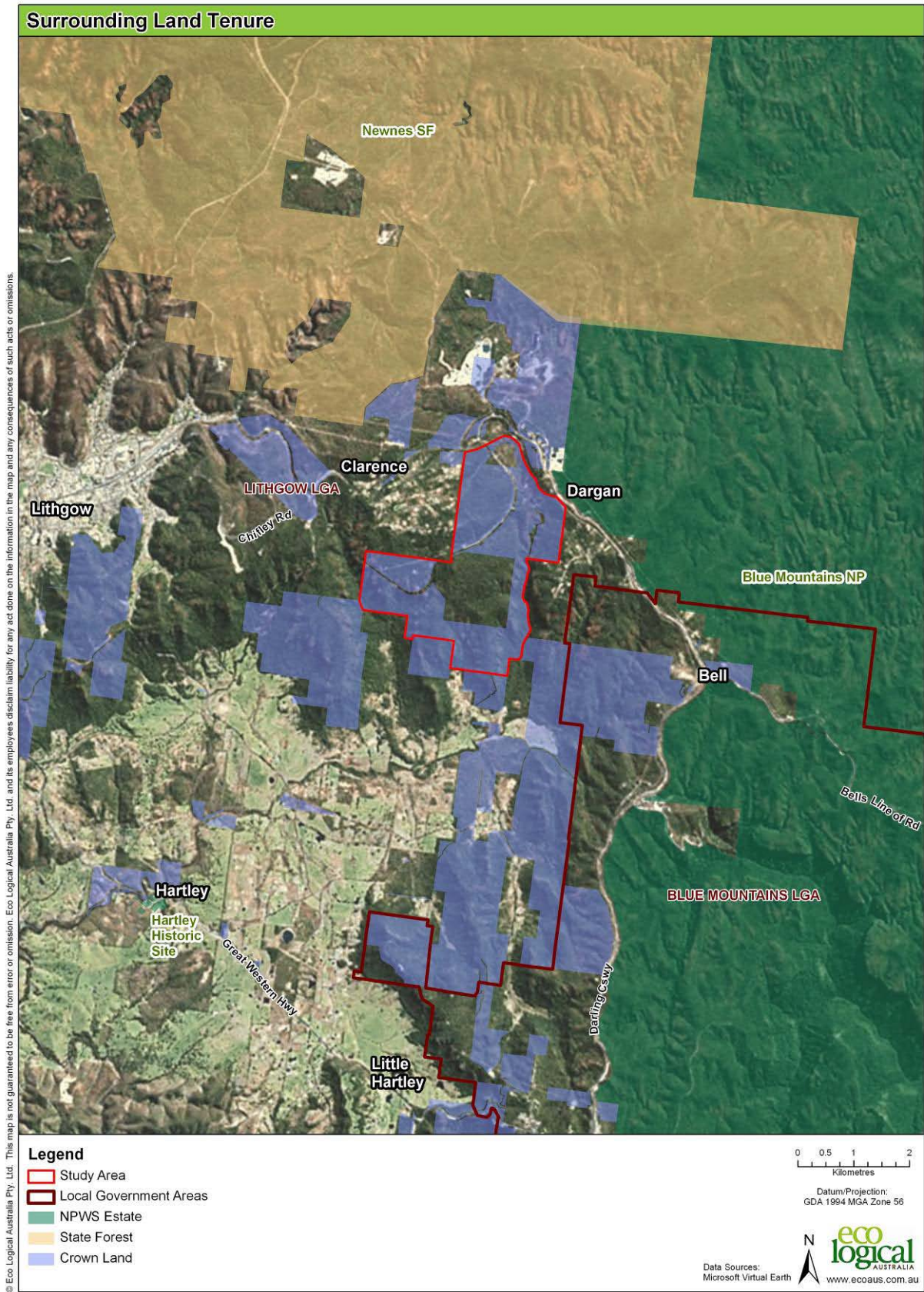


Figure 4: Surrounding Land Tenure

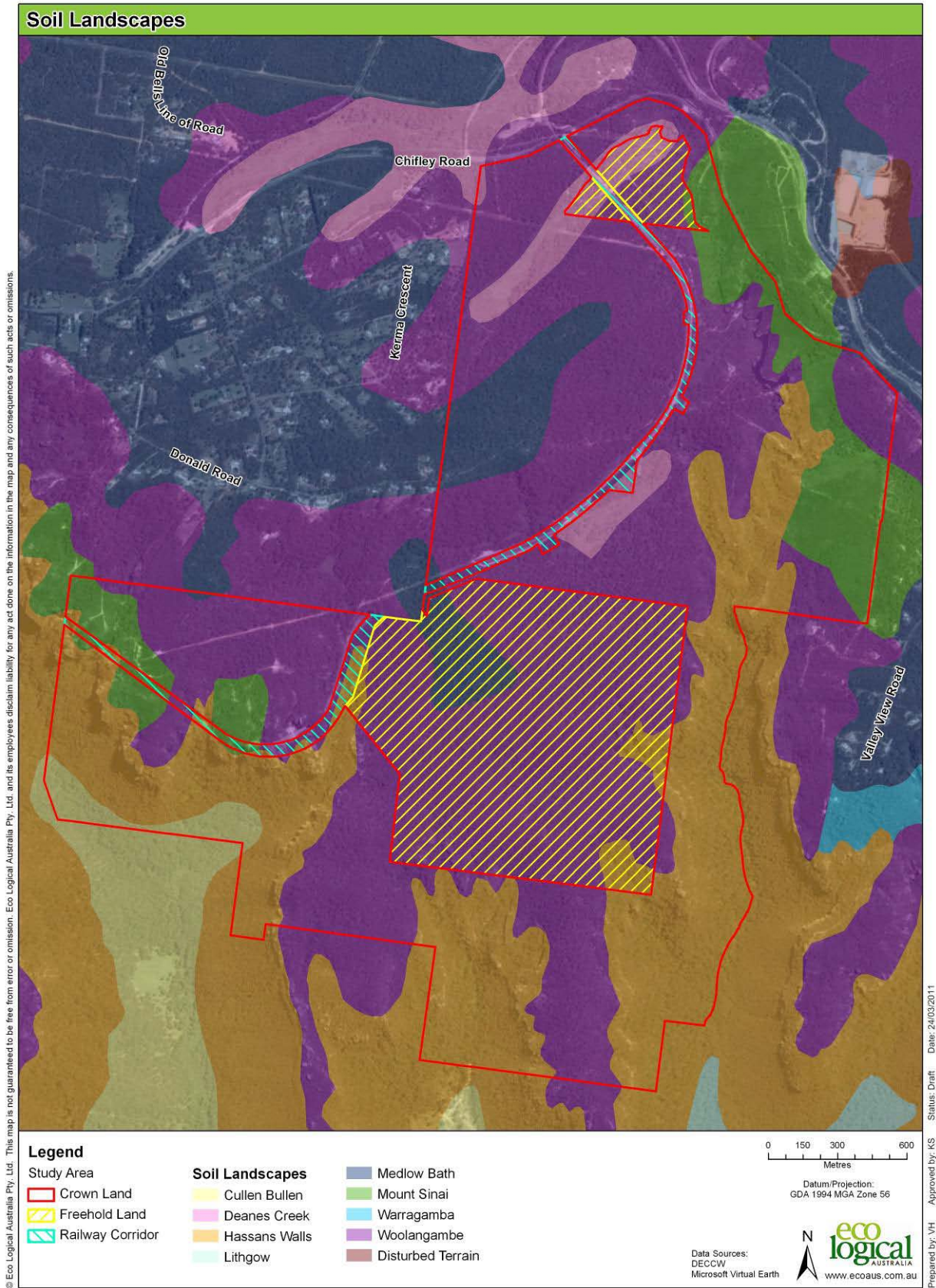


Figure 5: Soil Landscape Map for Dargan Creek Reserve



Plate 5: Steep cliffs at the lower dam



Plate 6: Heathland north of the top dam with the land sloping down to the west towards Dargan Creek



Plate 7: Same location as Plate 5 facing east along the electricity easement



Plate 8: Woodland located west of the railway easement

2.5 CLIMATE

The climate in the area is temperate with an average annual rainfall of 803 mm at Lithgow. Rainfall is fairly evenly distributed across the year where with the wettest month is January with an average rainfall of 84 mm. The driest month is May with an average rainfall of 53mm. June has the highest average number of rain days (11 days).

The annual mean minimum temperature is 6.4°C and the annual mean maximum temperature is 18.4°C. The coldest month is July with a mean temperature range of 0.6°C to 10.3°C. The warmest month is January with a mean temperature range of 12.7°C to 26.8°C.

2.6 HYDROLOGY

The Reserve is located within the Hawkesbury-Nepean Catchment Management Authority (HNCMA) within the Mid Cocks River Subcatchment. Dargan Creek is a perennial waterway that runs through the north east corner of the Reserve and defines its south eastern boundary (Figure 3). Water drains through a series of swamps as one of the headwaters to Dargan Creek before being dammed in two sections of the creek. In general, impacts of dams on natural waterways include the following:

- Reducing flows downstream
- Changes to the temperature of discharged waters
- Restrictions to fish passage and movement of other aquatic organisms and organic matter.

The degree of such impacts to Dargan Creek has not been quantified. However it is likely the ecology of Dargan Creek has adapted to the historical presence of the dams.

Dargan Creek drains into Reach 1 of the River Lett in the upper part of the Mid Cocks River Subcatchment. The River Lett drains into the Cocks River which in turn drains into Warragamba Dam, the main reservoir for Sydney's water supply. The sub-catchment as a whole is described by the HNCMA as 'stressed' however the condition of the River Lett is described as near intact and is not under active management (HNCMA 2008). The Reserve is not within the Sydney Catchment Authorities Special Areas boundary. The recommendations for this reach are to develop conservation management agreements to protect riparian vegetation.

2.7 WATER QUALITY

Riparian vegetation and upland swamps which are present at the Reserve all contribute to protecting the water quality of waterways. Upland swamps in particular play important hydrological roles, acting as water filters, releasing water slowly to downstream watercourses, thereby regulating water quality and stream flows (NSW Scientific Committee, 2005).

In terms of recreational use of the disused dams, there has been no water quality testing undertaken by the Department. Aquatic or fish surveys, also known to be an indicator of stream health, have not been conducted for the area.

However, from an ecological perspective, the condition of the surrounding vegetation would indicate a healthy aquatic environment. Regular visual inspections of the dam by Department staff have not indicated elevated levels of algae and the dark colour of the water has been attributed to high dissolved organic matter from the surrounding vegetation (pers. comm. Bruce Hundy, Soil Conservation Officer, March 2011).

2.8 VEGETATION

The vegetation of the western Blue Mountains was mapped by OEH in 2006 (DEC 2006). The vegetation communities that have been mapped within Dargan Creek Reserve are shown in Figure 6. The southern part of the Reserve was not included in the Western Blue Mountains vegetation mapping. It is likely that these communities can be extended to the unmapped portions of the Reserve however; ground-truthing would need to confirm this. These communities are representative of vegetation of the upper Blue Mountains and contain a number of species that are endemic to the Blue Mountains. Descriptions of each vegetation community are contained in Appendix C.

2.8.1 Endangered Ecological Communities

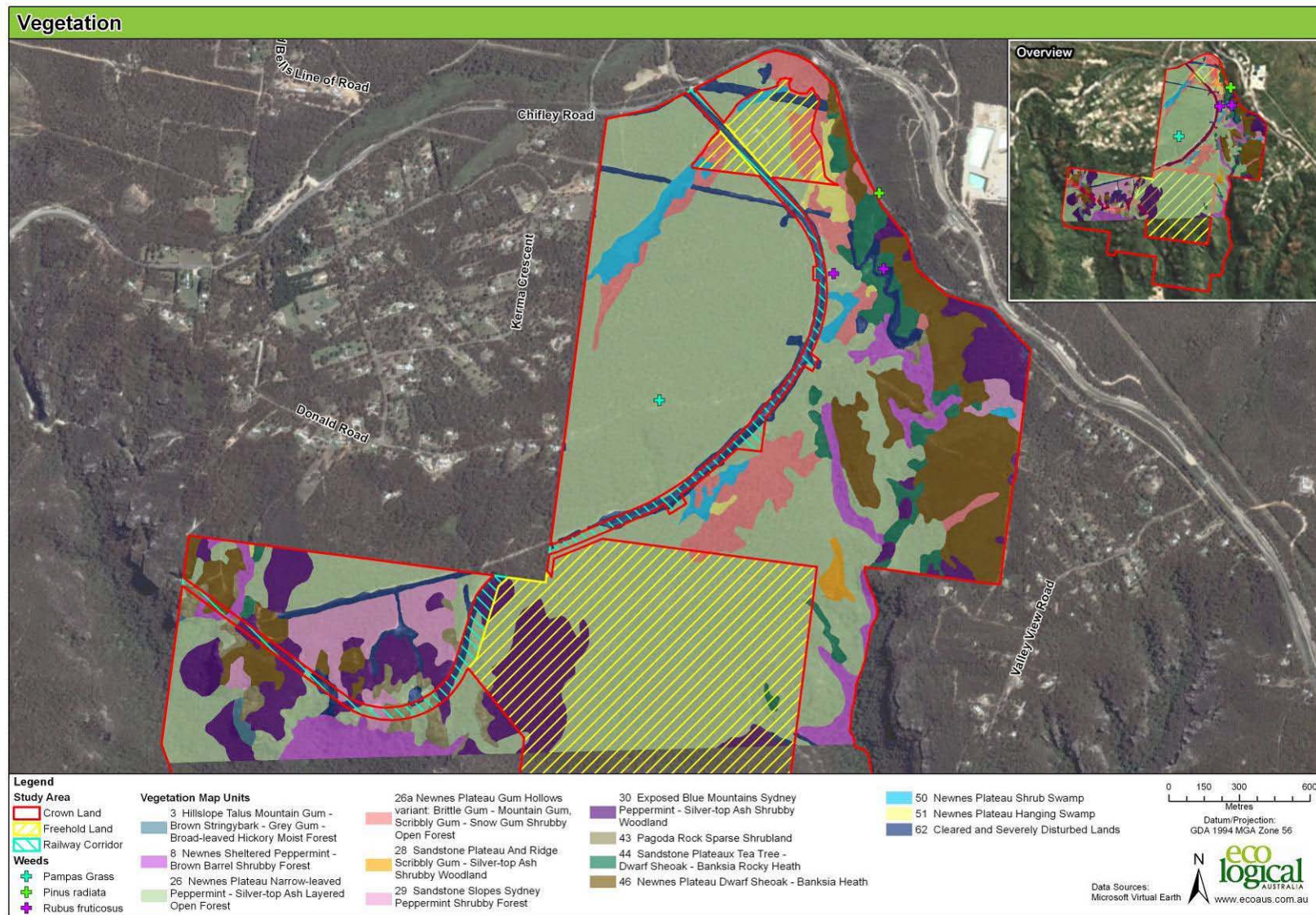
Map Unit 50, Newnes Plateau Shrub Swamp is listed as Endangered Ecological Community (EEC) under the New South Wales *Threatened Species Conservation Act 1995* (NSW Scientific Committee 2005). Both Map Units 50 and 51 (Newnes Plateau Shrub Swamp and Newnes Plateau Hanging Swamp) are listed as 'Temperate Highland Peat Swamps on Sandstone', an Endangered Ecological Community under the Commonwealth *Environment Protection and Biodiversity Act 1999* (DEH 2005).

The location of these communities at Dargan Creek Reserve is shown in Figure 7. These communities have a restricted distribution, occurring only at high elevations and are sensitive to fire and hydrological change. Upland swamps (which includes Newnes Plateau Shrub Swamp EEC) have been identified as Priority Fauna Habitat (DECC 2007a). These are habitats that contain more than three species of top conservation priority, having restricted extent in the region, having biogeographical importance and are highly threatened. The swamps contain a high level of flora and fauna diversity and are key habitat for at least 11 TSC listed threatened fauna species. Full descriptions to these two communities are contained in Appendix C.

2.8.2 Other Vegetation Communities

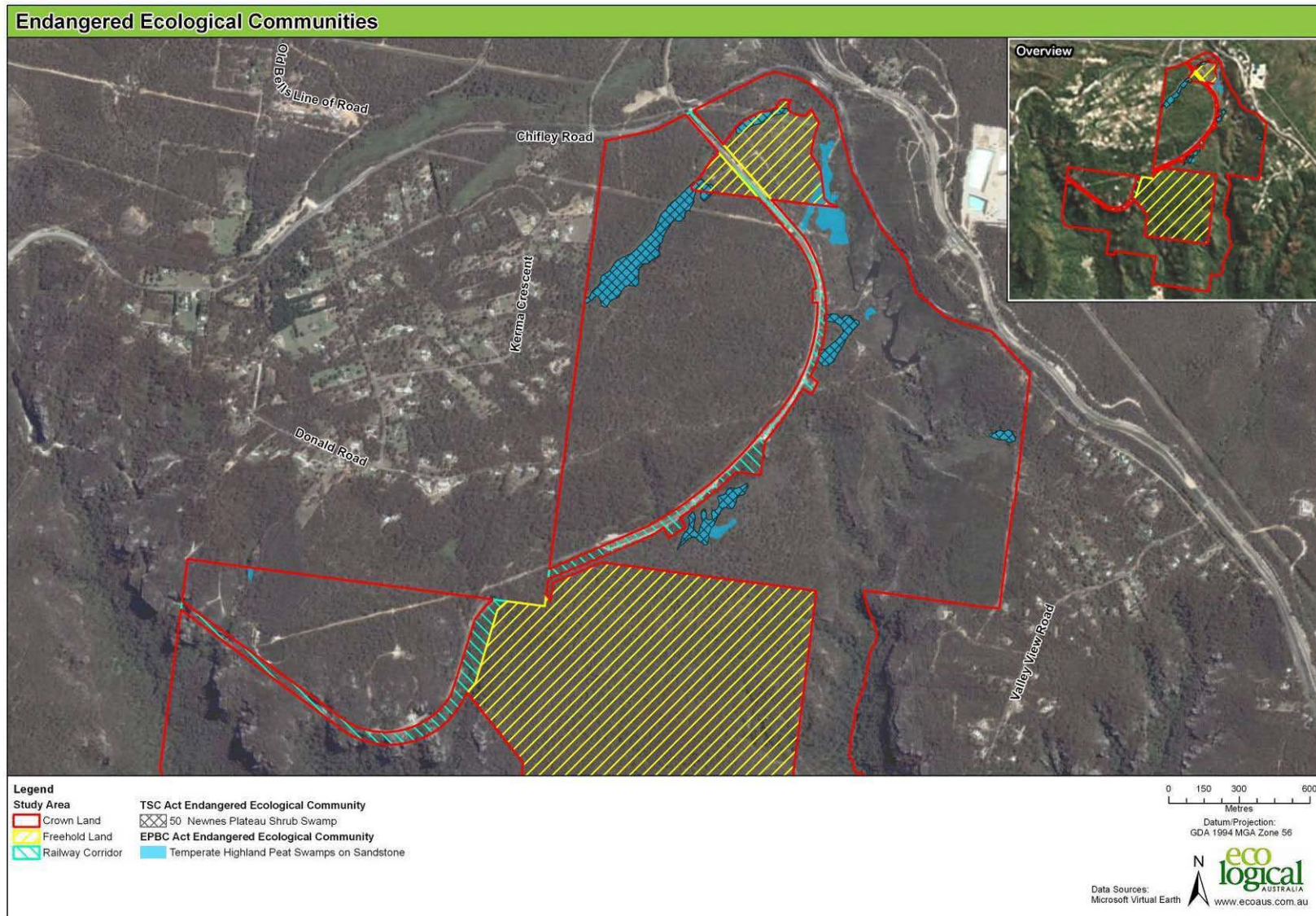
The other vegetation communities recorded at Dargan Creek and illustrated in Figure 6 are listed below. They are common vegetation associations occurring across the bioregion. For full descriptions of each community, see Appendix C.

- Mu 3 Hillslope Talus Mountain Grey Gum –Brown Stringybark – Grey Gum – Broad-Leaved Hickory Moist Forest
- Mu 8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest
- Mu 26 Newnes Plateau Narrow-Leaved Peppermint – Silvertop Ash Layered Open Forest
- MU26a Newnes Plateau Gum Hollows Variant – Brittle Gum – Mountain Gum, Scribbly Gum – Snow Gum Shrubby Open Forest
- Mu 28 Sandstone Plateau And Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland
- Mu 29 Sandstone Slopes Sydney Peppermint Shrubby Forest
- Mu 30 Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland
- Mu 43 Pagoda Rock Sparse Shrubland
- Mu 44 Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rocky Heath
- Mu 46 Newnes Plateau Dwarf Sheoak – Banksia Heath



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Figure 6: Vegetation Communities within Dargan Creek Reserve



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Figure 7: The distribution of Endangered Ecological Communities within Dargan Creek Reserve.

2.8.3 Threatened Flora

The Greater Blue Mountains World Heritage Area is recognised for an exceptional level of diversity in a number of plant families. A search of the NSW Wildlife Atlas shows that there have only been six threatened species recorded within the Reserve. These are:

- *Pultenaea aristata*
- *Persoonia hindii*
- *Persoonia acerosa*
- *Derwentia blakelyi*
- *Boronia deanei*
- *Acacia meiantha*
- *Acacia bynoeana*

However, based on a habitat assessment the number of threatened flora species found in the Reserve is likely to be much greater. The Community Profiles of the vegetation map units that occur within the Reserve list 23 threatened species (TSC Act) that definitely occur or have a possibility of occurring (DEC 2006) in the Reserve. Of these, 18 are also listed on the EPBC Act (Table 4).

Table 4: Threatened flora species listed under the TSC Act that occur or are likely to occur with the Reserve

Species	Recorded within the Reserve ¹	Definite ²							Possible ²									
		MU8	MU26	MU28	MU29	MU30	MU43	MU50	MU8	MU26	MU28	MU29	MU30	MU43	MU44	MU46	MU50	MU51
<i>Acacia bynoeana</i> [^]	✓																	
<i>Acacia flocktoniae</i> [^]					✓	✓				✓	✓			✓	✓			
<i>Acacia meiantha</i>	✓	✓																
<i>Astrotricha crassifolia</i> [^]										✓	✓	✓	✓					
<i>Atkinsonia ligustrina</i>										✓	✓	✓	✓					
<i>Baloskion longipes</i> [^]																	✓	✓
<i>Boronia deanei</i> [^]	✓						✓	✓		✓								✓
<i>Carex klaphakei</i>																	✓	
<i>Darwinia peduncularis</i>														✓	✓	✓		
<i>Derwentia blakelyi</i>	✓		✓	✓				✓				✓						✓
<i>Euphrasia bowdeniae</i> [^]									✓			✓		✓	✓		✓	✓
<i>Grammitis stenophylla</i>									✓									✓
<i>Grevillea evansiana</i> [^]													✓	✓	✓			
<i>Haloragodendron lucasii</i> [^]									✓									
<i>Lastreopsis hispida</i>									✓									
<i>Leionema sympetalum</i> [^]														✓	✓	✓		
<i>Leucopogon fletcheri</i> subsp. <i>Fletcheri</i>											✓	✓	✓	✓	✓			
<i>Persoonia acerosa</i> [^]	✓																	
<i>Persoonia hindii</i>	✓		✓		✓	✓								✓			✓	
<i>Persoonia hirsuta</i> [^]										✓	✓	✓	✓	✓				
<i>Persoonia marginata</i> [^]										✓								
<i>Philotheca ericifolia</i> [^]							✓											
<i>Prostanthera cryptandroides</i> [^]														✓	✓			
<i>Prostanthera stricta</i> [^]		✓					✓								✓			
<i>Pultenaea aristata</i> [^]	✓																	
<i>Pultenaea glabra</i> [^]									✓				✓			✓		
<i>Pultenaea</i> sp. 'Genowlan Point' [^]						✓												

1 Records from the NSW Wildlife Atlas and pers. comm. with the Blue Mountains Conservation Society 2 As per Community Profiles described in Volume 2 of DEC 2006

[^] Listed on the EPBC Act

2.8.4 Weed Species

While most of the Reserve is in very good condition weeds are present in isolated areas throughout the Reserve. Weeds are present along the northern boundary at the urban interface with Chifley Road. Some of the weed species noted within the Reserve include African Lovegrass (*Eragrostis curvula*), St John's Wort (*Hypericum perforatum*), Blackberry (*Rubus fruticosus*), Apple (*Malus sp.*) and Pine (*Pinus sp.*). Small patches of Blackberry occur throughout the dam area. The Blue Mountains Conservation Society has reported the occurrence of Pampas Grass (*Cortaderia selloana*) particularly along the rail corridor and along rail access easements in the southern part of the Reserve. The Upland Swamp EECs have been identified as at high risk of being invaded by Scotch Broom (*Cytisus scoparius*) and Gorse (*Ulex europaeus*) (DECC 2007b). Scotch Broom is highly invasive in the cool climate, high rainfall areas of the Blue Mountains. Currently the extent of these weed threats to the EEC are unknown.

African Lovegrass, St John's Wort, Blackberry and Pampas Grass are all listed as Class 4 noxious weeds. Under the Noxious Weeds Act (NW Act), Class 4 noxious weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. The local control authority for noxious weeds at Dargan Creek Reserve is the Upper Macquarie County Council (UMCC), and the legal requirement for Class 4 weeds is: *the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.*

The UMCC Weed Management Plan Number 4 (UCMM 2006) requires that the growth and spread of Class 4 weeds must be controlled according to the principles of Integrated Weed Management. Integrated Weed Management means the planning and implementation of a program of work for controlling the growth and spread of a weed using such of the available methods of control that may be appropriate in the circumstances, including, but not necessarily limited to:

- Measures to prevent invasion, or reinvasion, by the weed,
- Physical or mechanical measures,
- Biological agents,
- Herbicide methods,
- Cultural methods, and
- Land management practices.

Control of noxious and environmental weeds at Dargan Creek Reserve is outlined in Section 3.9.



Plate 9: Weeds including *Pinus radiata*, *Hypericum perforatum* and *Hypochaeris radicata* along Chifley Road on the western edge of the Reserve.

2.9 FAUNA HABITAT

The vegetation of Dargan Creek Reserve is in mostly very good condition with only few weeds throughout. The impacts on vegetation are mostly limited to the area around the dam. The rest of the Reserve is in near pristine condition and is rarely disturbed by human activities.

The Reserve falls within an area assessed by OEH as a key corridor for biodiversity (DECC 2007a). The Blue Mountains Western Escarpment continues the latitudinal link along the western escarpment edge linking the northern and southern parts of the Greater Blue Mountains World Heritage Area.

This Reserve as a whole is likely to provide habitat for a range of fauna species however there has been no formal fauna survey within the Reserve. Table 5 provides a summary of the key habitat features found throughout the study area and the faunal groups which use this habitat.

Table 5: Key habitat features and species

Key Habitat Feature	Species
Upland Swamps	Reptiles and amphibians
Hollow-bearing tree / stag	Arboreal mammals, microchiropteran bats, hollow-dependent birds including owls, reptiles
Stag	Birds, particularly birds of prey
Rocky outcrop	Reptiles
Sandstone watercourse	Amphibians, birds, reptiles, microchiropteran bats
Dense shrubs	Small birds, ground-dwelling mammals
Autumn / winter-flowering Eucalypts	Birds & bats, in particular Swift Parrot and Grey-headed Flying-fox
Flowering Myrtaceous trees and shrubs	Foraging resources for birds and mammals.
Fallen timber	Small mammals & reptiles
Leaf litter	Amphibians, reptiles, ground-dwelling mammals
Defoliating bark	Microchiropteran bats, reptiles

2.9.1 Threatened Fauna

No formal fauna surveys have been conducted within the Reserve and there are no Wildlife Atlas records within the Reserve. A search of the NSW Wildlife Atlas identified 13 threatened species listed under the TSC Act that have been recorded within a 10 km radius of Dargan Creek Reserve and could potentially occur within the Reserve (Table 6). Six species are also listed under the EPBC Act.

The Upland Swamps are key habitat for 11 threatened species (Table 6). The Giant Dragonfly and Blue Mountains Water Skink are endemic to these habitats and conservation of these species is inherently linked to conservation of Upland Swamps. Upland Swamps are also important habitat for the Tawny-

crowned Honeyeater, Emu Wren, Beautiful Firetail, Swamp Rat and Dusky Antechinus which are regionally important fauna and also support a high diversity of frog species (DECCW 2007).

Table 6: Threatened fauna species likely to occur within the Reserve

Common Name	Scientific Name	TSC Act	EPBC Act	Recorded Within 10km of the Reserve	Key Habitat is Upland Swamps
BIRDS					
Brown Treecreeper	<i>Climacteris picumnus</i>	✓		✓	
Eastern Bristlebird	<i>Dasyornis brachypterus</i>	✓	✓		✓
Flame Robin	<i>Petroica phoenicea</i>	✓		✓	
Gang Gang Cockatoo	<i>Callocephalon fimbriatum</i>	✓		✓	
Glossy Black Cockatoo	<i>Calyptorhynchus lathami</i>	✓		✓	
Ground Parrot	<i>Pezoporus wallicus wallicus</i>	✓			✓
Hooded Robin	<i>Melanodryas cucullata</i>	✓		✓	
Powerful Owl	<i>Ninox strenua</i>	✓		✓	
Scarlet Robin	<i>Petroica boodang</i>	✓		✓	
Turquoise Parrot	<i>Neophema pulchella</i>	✓			✓
MAMMALS					
Eastern Pygmy Possum	<i>Cercartetus nanus</i>	✓			✓
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	✓	✓		
Koala	<i>Phascolarctos cinereus</i>	✓		✓	
Long-nosed Potoroo	<i>Potorous tridactylus</i>	✓	✓		✓
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	✓	✓	✓	
Squirrel Glider	<i>Petaurus norfolcensis</i>	✓		✓	
Yellow-bellied Glider	<i>Petaurus australis</i>	✓		✓	
REPTILES					
Blue Mountains Water Skink	<i>Eulamprus leuraensis</i>	✓	✓	✓	✓
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	✓			✓
AMPHIBIANS					
Giant Burrowing Frog	<i>Heleioporus australiacus</i>	✓	✓		✓
Littlejohn's Tree Frog	<i>Litoria littlejohni</i>	✓	✓		✓
Red-crowned Toadlet	<i>Pseudophryne australis</i>	✓			✓
INVERTEBRATES					
Giant Dragonfly	<i>Petalura gigantea</i>	✓		✓	✓

2.9.2 Vertebrate Pest Species

Introduced species are not only a threat to native fauna but also impact on water quality in catchment areas by harbouring elevated levels of human pathogens and by increasing erosion and sedimentation. A number of exotic pest species have been recorded in the greater area of Dargan Creek Reserve (Table 7).

Table 7: Introduced Fauna Species

Common Name	Scientific Name	Priority Pest Species (DECC 2007c)
Fox	<i>Vulpes vulpes</i>	✓
Dog	<i>Canis lupus</i>	✓
Cat	<i>Felis catus</i>	✓
Pig	<i>Sus scrofa</i>	
Rabbit	<i>Oryctolagus cuniculus</i>	

Foxes and dogs are the main predators in the upper Blue Mountains (DECC 2007a) and in particular, Foxes are the main predators within Upland Swamps. Fox control is a priority for Upland Swamps as they support a rich diversity of fauna, including many species of high conservation concern (DECC 2007b). These species are predominantly ground-dwelling and are particularly at risk of fox predation which is suspected to be a major factor in causing the local extinction of some fauna in Upland Swamps.

The threat of Feral Cats is not thought to be significant throughout upper Blue Mountains and they do not appear to be common. However, Upland Swamps, particularly those inhabited by the Blue Mountains Water Skinks on the southern edges of the Reserve could be areas for targeted control (DECCW 2007b).

Although Feral Pigs are not common at present, the threat they pose is very great, especially if they are to increase in high conservation value areas like the Wolgan Valley or the Upland Swamps of the area. They should be a very high priority for continued control to ensure this does not happen. Upland Swamp fauna, in particular Blue Mountains Water Skink and Giant Dragonfly, are particularly at risk (DECCW 2007b).

As rabbits prefer open areas to graze, they historically have not been a management issue at Dargan Creek Reserve. Section 3.11 addresses management of vertebrate pest species in the Reserve.

2.10 CULTURAL HERITAGE

2.10.1 Indigenous Heritage

The broader Lithgow region borders on the Aboriginal Nations of the Wiradjuri and Gundungurra peoples (and Dharug further to the northeast) (Lithgow City Council 2008). Wiradjuri country extends from the western slopes of the Great Dividing Range, near Lithgow, and is bounded by the three rivers: Macquarie, Lachlan and Murrumbidgee. The Wiradjuri are the largest Aboriginal group in New South Wales. A number of customs were unique to the Wiradjuri communities, particularly the marking on trees to signify the burial place of a Wiradjuri person. Logging and land clearing have destroyed almost all of these burial markers, with one surviving tree trunk now on display in Bathurst Museum.

The Gundungurra Tribal Council indicates occupation and use of the Coxs River catchment prior to European settlement. There were possibly up to fourteen named bands occupying fourteen countries in Gundungurra traditional homelands. The “Therabulat” clan is believed to have occupied the Middle Coxs River including the Kanimbla, Hartley and Megalong Valleys down to Kowmung River junction, with the “Wywandy” occupying the northern catchment of the Upper Coxs River including Pipers Flat, Portland, and Wallerawang (Lithgow City Council 2008).

To date there are no known locations of Aboriginal heritage items or locations within Dargan Creek Reserve. Past searches of the Aboriginal Heritage Information Management System (AHIMS) database by Department staff did not highlight any Indigenous heritage artefact recorded locations within the Reserve. A number of sites of Indigenous cultural significance have been found on the Newnes Plateau, north of Dargan Creek Reserve and to the south at Hyde Park Reserve. The Wiradjuri people claim value and significance of the area, particularly within Hyde Park Reserve, with some members of the Wiradjuri community maintaining a strong connection (Lithgow City Council, 2008).

There has been no archaeological survey conducted within Dargan Creek Reserve and as such the indigenous heritage values of the Reserve are not currently documented.

Two (2) aboriginal Land Claims have been identified on this Reserve being Claims 17624 and 17627 which are being investigated by the Crown Lands Division, Department of Primary Industries.

2.10.2 Non-Indigenous Heritage

There are no known locations of European cultural heritage sites within the Reserve. However, a formal cultural heritage assessment is required to identify if the dams and associated infrastructure (e.g. the steel stairs giving access below the lower dam and the crane) are potentially significant cultural heritage items, as it was used to service the steam trains at Zig Zag Railway.

The Department sub-contractor who implemented the dam safety measures believes that some of the structures deemed to be unsafe may have cultural heritage value (pers.comm Bruce Hundy, Soil Conservation Officer, March 2011). For example, the crane and an asbestos pipeline that runs from the bottom dam to the reservoir at Newnes Junction. The pipe is present above ground for about 40m through the Reserve. While this may be of cultural heritage value, there are safety concerns associated with disturbing asbestos.



Plate 10: The upper dam wall and associated infrastructures requires a cultural heritage assessment

2.11 FIRE

The bush fire season in the Lithgow Bush Fire Management Committee (LBFMC) area generally runs from November to March. Prevailing weather conditions associated with the bush fire season in the Lithgow BFMC area are north-westerly winds accompanied by high daytime temperatures and low relative humidity. Dry lightning storms occur frequently during the bush fire season (LBFMC 2009).

Fire is a natural part of the Australian landscape and the native vegetation has evolved to become ecologically adapted to fire. Ideally, a landscape should have mosaic patches including 'unburnt' areas within each vegetation type. These 'Unburnt' patches play an important role as post-fire refugia for fauna and are important reservoirs for seed dispersal and post-fire succession.

Alteration of natural fire regimes is a threat to biodiversity. '*High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition*' is listed as a Key Threatening Process on Schedule 3 of the TSC Act.

One of the threats to Upland Swamp communities is high frequency of fire. Management of fire around these ecosystems is critical because they contain many plant species that occur only within swamps and provide core habitat to some fauna species that only occur in the swamps, such as the Blue Mountains Water Skink. While the Blue Mountains is characterised by fire-prone vegetation and species show evolutionary adaptation to fire, there is limited dispersal of genetic material between swamps and fire through a swamp could result in the local extinction of some species. Furthermore, fire is likely to increase the risk of predation by foxes and cats on the predominantly ground-dwelling fauna species that use Upland Swamps as their core habitat by decreasing the amount of cover.

Bush fires have a significant effect on a landscape's hydrology, as an intense fire removes cover vegetation and exposes the soil. The lack of vegetative cover allows water run-off to increase, and during heavy rain can lead to soil erosion and increased turbidity in waterways.

Dargan Creek Reserve is mapped as a bushfire hazard on the Lithgow Bushfire Hazard Risk Mapping. As such it presents a risk to adjacent landowners, recreational users of the park and the cultural

heritage values within Dargan. There are a number of private properties on Donald Road, Kerma Crescent and Valley View Road that are adjacent to the Reserve. The areas surrounding these properties are defined as a Strategic Fire Advantage Zone by the LBFMC.

According to the Rural Fire Service (RFS) the last wildfire within the Reserve was 1997. Since then there have been no fires in the area except for small-scale hazard reduction burns (HRBs) in the Strategic Fire Advantage Zones adjacent to the freehold properties. These were most recently undertaken in 2009 and 2010 behind Kerma Crescent and to the southeast of the railway line in 2008. Further HRBs have been proposed within the Reserve in patches, mostly located around the northern boundaries of the Reserve. The RFS avoids conducting HRBs in the areas around the dams as this is used frequently for recreation.

During the site inspection, there was evidence of a small fire near the intersection of the railway corridor and Chifley Road (see Plate 11).



Plate 11: Evidence of a recent fire (<2 years) near the Railway Corridor / Chifley Road.

3 Issues, Objectives and Actions

The previous section of this PoM describes the biophysical characteristics and values of Dargan Creek Reserve. Issues affecting these values, objectives for management, and management actions are presented in the following section.

3.1 FORMATION OF A COMMUNITY TRUST BOARD

On 29 February 2008, the Dargan Creek Reserve Trust was appointed by the Minister for Primary Industries under section 92 of the CLA. The Trust is managed by Land Administration Ministerial Corporation and is comprised of three officers from the Orange Department of DPI office with a diverse range of knowledge and skills. The Ministerial Corporation manage the Reserve utilising Department staff where possible and outside contractors as required, and are responsible for the care, control and management of the Reserve consistent with provisions in the CLA.

However, there is an opportunity for the public to be either directly involved in, or contribute to, the planning and management of the Reserve trust system via the formation of a community based management trust. The nature of the management issues at Dargan Creek Reserve means a community based trust would provide the opportunity for a range of existing stakeholders, including recreational users, commercial operators and/or clubs to play an active role in the sustainable management of the Reserve. The Department may provide the trust with operational support, financial assistance and guidance.

3.1.1 OBJECTIVE

To establish a community trust for Dargan Creek Reserve.

3.1.2 ACTION

- a) A community trust could be established once management of Dargan Creek Reserve is stabilised through the implementation of priority actions in this management plan;
- b) To establish a community trust, the Ministerial Corporation facilitate the formation of a community trust through advertising and informing key stakeholders including:
 - Lithgow City Council,
 - OEH (Office of Environment and Heritage)
 - members of the local Wiradjuri and Gundungurra peoples,
 - Lithgow Rural Fire Service
 - Commercial Operators
 - Recreational Users
 - Adjoining Landholders

- Community and other interested groups
- c) Once established, the Ministerial Corporation will be disbanded and management of the Dargan Creek Reserve will continue through the community trust.

3.2 RESERVE ACCESS

The main access into the Reserve has been through the RailCorp easement immediately east of the railway, accessed from Chifley Road. This track follows the railway easement then joins up to the Crown Road within Lot 3. In the past, RailCorp has attempted to block access to the easement but the gates and fences that were installed were consistently removed or damaged through vandalism. RailCorp has since reinstalled another gate approximately 350 m south of the highway. This has allowed vehicles to continue to drive on part of the RailCorp easement, but excludes them from driving further along the railway corridor.

A network of easements to access the railway is present across the north-western part of the Reserve, between the railway and the rural residential area. There are several locked gates located along these easements to prevent access to the public (see Figure 8).

For example, at the end of Donald Road, a locked gate and several bollards have been installed to prevent unauthorised access. However there is a well worn track indicating vehicles are driving around the bollards and Railcorp has reported that locked gates are regularly vandalised or removed.



Plate 12: Uncontrolled 4WD access along powerline easements in the northeast corner of the Reserve is causing erosion problems and is upslope of hanging swamp EEC.



Plate 13: Access track from the railway corridor to the lower dam



Plate 14: Track proposed to be closed due to erosion and proximity to hanging swamp



Plate 15: Locked gate located at the end of Donald Road

There are a number of tracks used by vehicles between the upper and lower dam, some of which are highly eroded and bisect an upland swamp community which is listed as an endangered ecological community. Earth banks have been used to fill eroded area and timber barriers have been put across the tracks, but cars have continued to cross the swamp to access the lower dam rather than taking the slightly longer way around the swamp. There is no signage in place to educate the public about the values of the swamps and the penalties for illegal access.

There are two informal parking areas at the upper and lower dams. The upper dam receives less use from the public and currently has parking space for 5 vehicles, but space is restricted with little room available for turning vehicles. The ground is relatively stable at this location and erosion is not currently a problem although some sections of the track coming down to the car park are eroding.

The lower dam is more popular for visitors and has a larger area available for parking with a stable rocky platform that has low erosion potential (see Plate 16). The access track currently needs maintenance.

There are a number of issues associated with allowing unrestricted vehicular access throughout the Reserve such as illegal timber collection, rubbish dumping, increased risk of fire ignition, track scouring and resultant erosion and sedimentation. There is also a risk to public safety when using vehicles on informal tracks.



Plate 16: Car parking area for the lower dam

The formal access into the Reserve is via a Crown Road from Chifley Road as shown on Figure 8. This Crown Road continues through private land (Lot 3 DP778317) and then becomes an informal track that continues on to the dams. While the Crown Road is not the main access route, it will be used to create a formal access to the Reserve. Vehicle access will be regulated throughout the Reserve, apart from emergency vehicles and use of the easements by RailCorp and energy utilities. This will reduce threats to public safety and allow informal tracks to be rehabilitated. The preferred access arrangement may be reviewed in the future provided appropriate authorisations are granted (eg for Railcorp and the Roads and Maritime Authority) and other concerns raised in this plan are suitably addressed.

It is important to inform the local community about what activities are permissible within the Reserve. This information process could be conducted through advertising in the local media, issuing media releases at peak times and increasing the visibility of signage in the Reserve (LPMA 2007). The current level of signage within the Reserve is shown below in Plate 17 and 18. A number of signs are proposed within the day-use parking area including information on the Reserves biodiversity, cultural heritage and pedestrian access tracks.



Plate 17: Signage in the Reserve indicating various risks and preventative action.



Plate 18: Main access track to the upper dam adjacent to the parking area and indicating a range of risks associated with using the area.

As indicated in the signage above, the Department is concerned about injury resulting from people using the area. These risks need to be identified and managed through a risk assessment which forms a high priority action in this PoM. While swimming within the dams is popular in the warmer months, there are numerous risks associated with this including unknown submerged objects. Therefore, signage indicating risks associated with swimming should be installed at both dams.

3.2.1 Objectives

1. Formalise access to the Reserve through the Crown Road Reserve off Chifley Road;
2. Restrict vehicle access to allow closure and regeneration of informal tracks;
3. Ensure there is ongoing public access to the Reserve for recreational purposes using authorised tracks;
4. Minimise the environmental impact of visitation on the area;
5. Minimise risks to public safety;

3.2.2 Actions

- a) Consult with RailCorp to control vehicle access to their easement. Ensure the locked gate and fencing is as “vandal-proof” as possible;
- b) Consult with managers of the electricity transmission easement to control the erosion
- c) Establish access to the Reserve via the Crown Road off Chifley Road.
- d) Maintain an access route into the Reserve for emergency purposes using the existing RailCorp easements and Crown road entry point;

- e) Fencing and gates around the car park areas will be installed to prevent vehicle access into the Reserve and may be removed in the future if the threat of vandalism is reduced;
- f) Rehabilitate and revegetate the informal tracks within the Reserve;
- g) Ensure vehicular access into the Reserve from Donald Road is not restricted to RailCorp and emergency vehicles;
- h) Undertake a risk assessment of the site based on Department guidelines;
- i) Based on the risk assessment, formalise a network of pedestrian access tracks throughout the Reserve;
- j) Install signs regarding prohibition of littering and asking visitors to carry out all waste;
- k) Install signs indicating the location of walking tracks, grades and times to complete walks;
- l) Consider the installation of a composting toilet within the Reserve area if visitor use justifies the need.
- m) Installation of appropriate signs at the dams indicating risks of swimming.

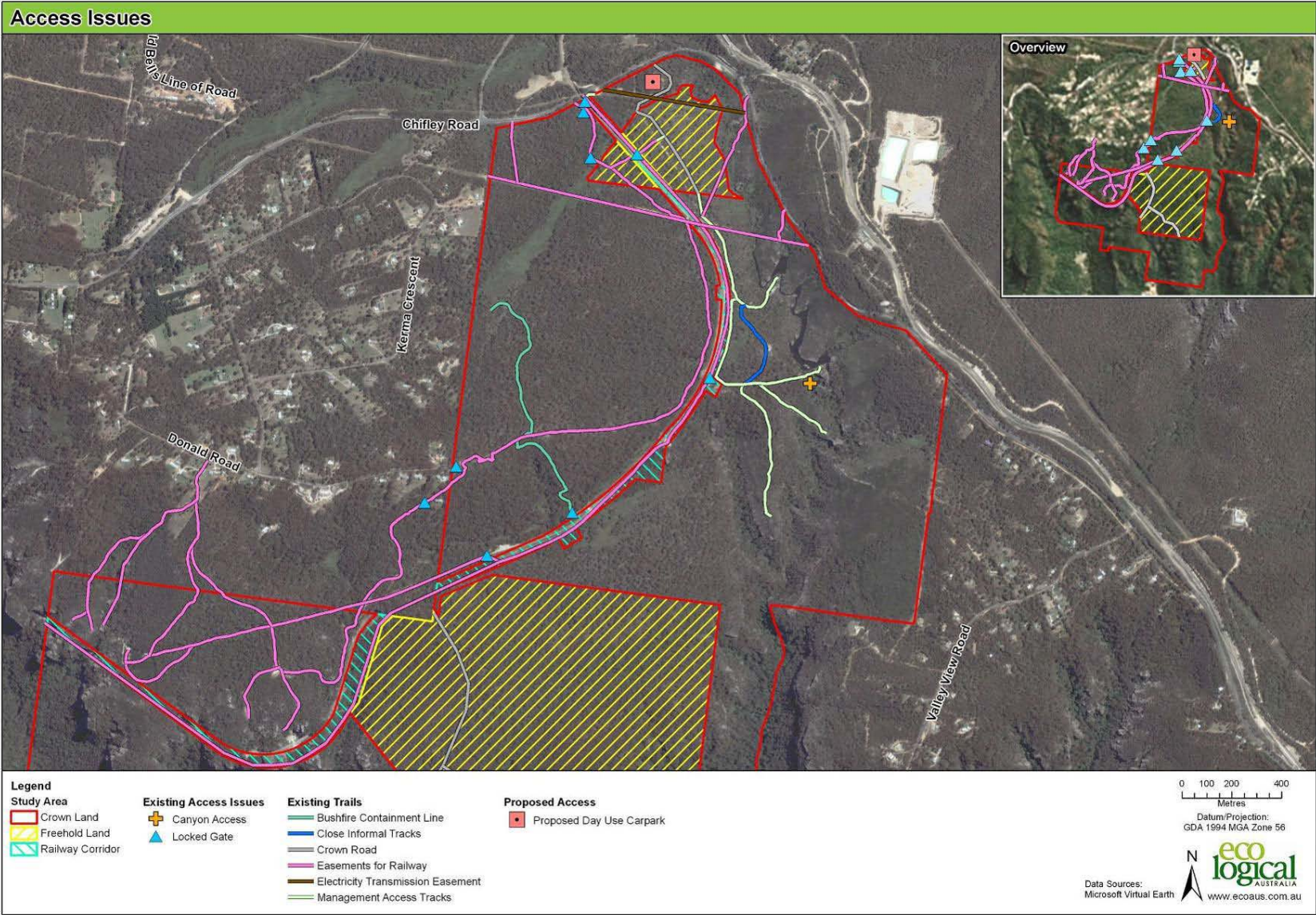


Figure 8: Access issues at Dargan Creek Reserve showing the location of existing trails and proposed day use car park.

3.3 PUBLIC RECREATION

The Reserve is a popular location with local residents and visitors to the Blue Mountains for passive and active recreational activities. The Reserve is gazetted for public recreation under the CLA and the overall objective is to manage the Reserve for recreation without significantly impacting on natural and cultural values. Although there is potential for conflict between conserving biodiversity and maintaining opportunities for recreational activities in the Reserve, these goals are not incompatible but involve formalisation of the area for recreational use and restriction of vehicle access to minimise the impact on biodiversity, particularly the Upland Swamps.

The dams have a long history of being used as a recreational area for swimming, picnicking, rockclimbing, bushwalking and many other activities, with highest visitation during the summer months. High visitation rates to the area have resulted in rubbish dumping, track degradation and erosion issues through excess vehicle usage. The sensitive Upland Swamp vegetation communities are located in close proximity to the dams and are vulnerable to these impacts.

There are a number of hazards associated with the dams that present a considerable risk to public safety. While a number of recommended safety measures have been put in place since the risk assessment of the dams, there are a number of hazards that have not been addressed, including exposed metal and the swing rope (

Plate 19). A fence was installed to prevent access to the lower dam wall (Plate 3). A cultural heritage assessment needs to be conducted prior to removing and/or addressing all safety issues.

While the site is popular for swimming there are numerous safety issues that are difficult to address including unknown submerged objects and rock ledges, cold water and no permanent supervision. Therefore, appropriate signage will be installed on the reserve to inform the public of the risks with swimming.



Plate 19: The swings into the lower dam that the Department wish to remove for safety reasons

Blue Mountains National Park (BMNP) is adjacent to Dargan Creek Reserve and the Plan of Management for BMNP (NPWS 2001) includes specific objectives for recreation. Some of these objectives are applicable to public recreation in Dargan Creek Reserve, and include:

- Encourage awareness and appreciation of the park and maintain the local significance of the park in providing nature- based recreation and tourism opportunities.
- Management of recreation and tourism within the Reserve to ensure sustainable use, to minimise the impacts on the Reserves natural and cultural features and to maintain opportunities for a range of recreational experiences.

Achieving these objectives for recreation will require specific monitoring and improved management of public (and commercial) recreation activities.

3.3.1 Objectives

1. Sustainable use of the Reserve for public recreation;
2. Avoid, mitigate and manage impacts from recreation on the natural environmental values of the Reserve;
3. Avoid, mitigate and manage the risk to public from hazards associated with the dams and infrastructure; and
4. Avoid conflicts from different user groups of the Reserve.

Actions to address these recreational objectives are also addressed through the access provisions (outlined in 3.2.2).

3.3.2 Actions

- a) Install appropriate signage prohibiting walking on dam walls and other dangerous structures;
- b) Remove exposed metal infrastructure;
- c) Routine assessment of the structural soundness of the dams;
- d) Remove the rope swing at the lower dam;
- e) Continue to erect and maintain signage advising appropriate Reserve use;
- f) Continue to erect and maintain signage prohibiting visitors from littering including food scraps;
- g) Develop interpretive signage to foster community stewardship for the Reserve;

3.4 CLIMBING AND CANYONING

There are a number of well established climbing areas within the Reserve that provide recreational opportunities for rock sports enthusiasts (Plate 4). These areas are well-known among the climbing community and are described in the climbing guide book for the Blue Mountains area. Currently the Dam Cliffs are heavily bolted for sports climbing and accessed regularly. Other routes known as

Cosmic County and the Freezer are also bolted, however predominately rely on traditional climbing gear (non permanent or fixed anchors).

The climbing community has established its own code of conduct (Cliffcare code of conduct) for appropriate and sustainable use of natural areas which forms an excellent basis for an approach to recreational use of the Reserve. The code includes a requirement to:

- Observe all access restrictions and agreements
- Use existing access tracks and keep to hard ground and rock surfaces
- Do not disturb nesting birds or other wildlife and protect all native plants especially at the base of cliffs.
- Avoid removing vegetation from cracks and ledges when developing new climbs
- Respect Aboriginal sites and avoid developing climbs in near vicinity
- Minimise use of chalk especially near walking tracks. Remove 'tick marks' after you have climbed
- Minimise the placement of fixed gear and respect established 'no bolting' areas
- Carry out all your rubbish – this includes finger tape, cigarette butts and citrus peel
- Bury your human waste and paper correctly – at least 50 metres from any water source

3.4.1 Objectives

Promote appropriate and sustainable climbing and canyoning activities.

3.4.2 Actions

- a) Develop key partnerships with Council, NPWS and Reserve user groups to promote the benefits of long term sustainable use of the Reserve and address issues with respect to use of the site;
- b) Through these partnerships, support working bees, maintenance and clean-up days and promote the sustainable use of the Reserves. Although funding may not be available other means of support may be provided including equipment, information dissemination etc;
- c) Place signage outlining a code of conduct similar to that presented in this plan at the entrance to the Reserve;
- d)

3.5 COMMERCIAL RECREATION

The Department has issued a number of licences to commercial operators and utility providers to access parts of the Reserve for various purposes (Table 2). While the revenue earned from these licences would not be adequate for funding management actions, it is a requirement under the CLA to licence commercial operations within crown land.

Commercial recreation based activities can be defined as those including paying and non-paying groups involved in organised instructional, training and recreational activities. Groups are comprised of identifiable leaders or instructors managing a number of less experienced persons and can be large,

with up to 20 or more people (BMCC, 2004). The LPMA Trusts handbook states that Trusts that organise or host high-risk activities are required by the Department to obtain their own public liability insurance for not less than \$20,000,000 coverage, at their own cost. Likewise, the Department also requires that trusts ensure that the organisers of high-risk and/or commercial activities hold their own public liability insurance as a condition of the use of trust land and provide the necessary indemnification.

The Blue Mountains City Council Nature-based Recreation Strategy 2005-2015 notes that recent reforms to Insurance Liability legislation have placed much of the responsibility for personal safety in recreation activities back onto the individual participant. There are a number of reforms with respect to legal liability that need careful legal examination. Reforms address the definition of negligence; risk warnings; and assumption of risk matters. General principles have been established for determining liability including a requirement to consider the financial and other resources that are available to an authority, the range of activities of the authority and compliance with general procedures and applicable standards. These issues should be considered as part of the future leasing/licencing agreements.

The commercial rock climbing, abseiling and canyoning operators would like to continue to guide clients within the Reserve. The existing use generally results in minimum impacts on the Reserve from these activities and provided they are undertaken in a sustainable and responsible manner, and in partnership with the managing trust to leverage resources, knowledge and expertise should continue.

There is a need to increase user awareness of the impacts of recreation activities and the way to minimise these impacts (BMCC 2004). Ensuring that commercial operators operate in a sustainable manner and communicate appropriate messages to clientele is critical.

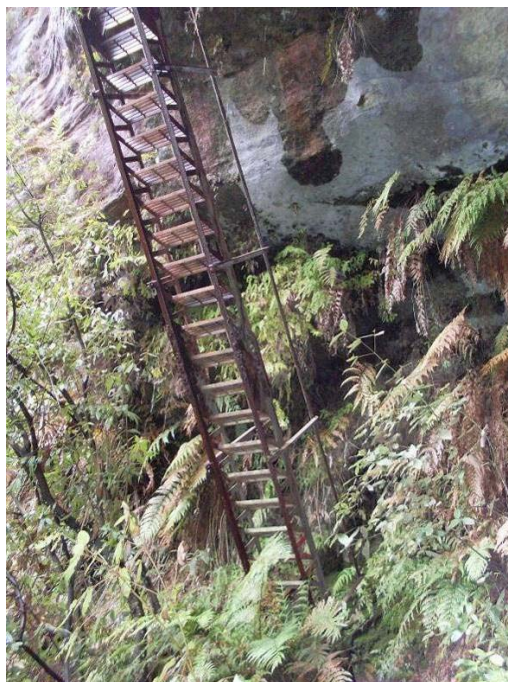


Plate 20: Access to the canyon below the lower dam is via this ladder

3.5.1 Objectives

To allow for sustainable use of Dargan Creek Reserve by commercial operators without compromising the natural and cultural values of the Reserve;

3.5.2 Actions

- a. Ensure that commercial operators comply with the issues outlined in Table 3 of this PoM;
- b. The Management Trust and the commercial operator applying for a licence work through a risk assessment matrix prior to signing the licence agreement to determine risk liabilities - Legal liability issues should be considered as part of the future leasing/licencing agreements;
- c. The Management Trust and Commercial operators collaboratively develop a 'Rocksports Guideline' for the Reserve which defines and identifies the most sustainable group numbers, site rotation requirements, minimal impact practices, codes of conduct, and self-impact assessment that serves a performance measure and condition of issuing a commercial licence;
- d. The Management Trust is to form partnerships with commercial operators and local climbing communities to support working bees, maintenance and clean-up days and promote the sustainable use of the Reserves. Although funding may not be available other means of support may be provided including equipment, information dissemination etc.

3.6 CONSERVATION OF NATURAL VALUES

While the vegetation mapping for the area is fairly recent (DEC 2006), the mapping does not extend to the southern part of the Reserve. The vegetation communities within Dargan Creek Reserve are representative of vegetation of the upper Blue Mountains area and contain a number of endemic species to the area. Given its proximity to the Blue Mountains National Park, a conservation area of international significance and also possessing World Heritage Values, it is clear that the Reserve should be managed for biodiversity conservation.

3.6.1 Objectives

1. To enhance and protect plants and animals (biodiversity) and maintain ecosystem function through appropriate management of the Reserve;
2. To protect threatened flora and fauna habitat, including connectivity;
3. To increase community awareness of the natural values of the Reserve.

3.6.2 Actions

- a. Commission flora and fauna surveys to document the Reserves ecological values and complete the vegetation mapping of the southern section of the Reserve. Where funding is an issue consider partnerships with tertiary institutions;
- b. The purpose of the crown Reserve be gazetted for environmental protection in addition to the current declared purpose for recreation (see Section 121a of the Crown Lands Act 1989);
- c. Provide training to owners of the freehold land and RailCorp Operations staff with respect to identification of threatened flora and fauna and appropriate management as detailed in Section 3.7.2 and 3.8.2;
- d. Update records on threatened species and their locations through 12 monthly reviews of the NPWS Wildlife Atlas and when information becomes available;

- e. Review this Plan of Management every 5 years and incorporate information gathered from the ecological survey and any relevant Recovery Plans prepared for species listed under the TSC Act and EPBC Act;
- f. Liaise with OEH officers regarding identified threatened species and habitat and their ongoing management and conservation, particularly with regard to appropriate fire management;
- g. Promote conservation of the Reserve through partnerships with the formation of the Dargan Creek Reserve Community Trust;
- h. Produce a pamphlet for the community introducing this PoM and the major changes to management of the Reserve including access and recreation, highlighting the conservation significance of the Reserve and the need to remove threatening processes;

3.7 UPLAND SWAMPS

The mapped vegetation units Newnes Plateau Shrub Swamp and Newnes Plateau Hanging Swamp as shown in Figure 7 are Endangered Ecological Communities and are collectively referred to as Upland Swamps. These communities primarily occur in the northern part of the Reserve adjacent to the disused dams, where impacts from recreational use are highest. Given their proximity to areas of high visitation, it is important that these sensitive ecosystems are managed appropriately.

Newnes Plateau Shrub Swamp provides habitat for threatened species including *Boronia deanei*, *Petalura gigantea*, the Giant Dragonfly, and *Eulamprus leuraensis*, the Blue Mountains Water Skink. The endangered shrub, *Persoonia hindii*, is also associated with the margins of the swamps. Upland swamps play important hydrological roles, acting as water filters, releasing water slowly to downstream watercourses, thereby regulating water quality and stream flows (NSW Scientific Committee 2005).

Threats to Upland Swamps that are relevant to Dargan Creek Reserve include (NSW Scientific Committee 2005):

- Changes to drainage and moisture conditions caused by damming of swamp watercourses; creation of tracks across the swamps and sedimentation and erosion associated with roadways
- Invasion of exotic species and changes to fire regimes
- Weed invasion by woody weeds – *Pinus radiata*, *Rubus* sp, *Ulex europaeus* (Gorse) and *Cytisus scoparia* (Scotch Broom).

The Draft NSW Biodiversity Strategy 2010-2015 lists Temperate Highland Peat Swamps on Sandstone EEC as a priority freshwater wetland. This includes Newnes Plateau Shrub Swamp and Newnes Plateau Hanging Swamp. The draft Strategy lists threats to freshwater wetlands including:

- river regulation and water diversion works that alter the timing and volumes of water to wetlands, including floodplain drainage
- catchment scale disturbance that affects the quality of water and ecosystem functioning
- altered native vegetation composition and structure resulting from reductions in annual rainfall in some inland areas

Key threatening processes (KTP) of relevance to upland swamps include:

- Ecological consequences of high frequency fires
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands

The Blue Mountains National Park Fire Management Strategy (2004) lists Blue Mountains Sedge Swamps (similar community to Newnes Plateau Shrub Swamp, but occurs at lower altitudes) as a vegetation community at high risk of extinction from ecologically inappropriate fire regimes and fire management activities. Upland swamps require special consideration with regard to fire management. High intensity fires should be excluded from Upland Swamps as they damage the peat layer and destroy the hydrological function of the swamp.

Widespread high intensity fires also open up the dense vegetation cover that characterises this habitat making it more accessible to introduced predators. In addition, the patchy distribution of Upland Swamps and the fact that many swamp fauna have poor capacity to disperse means that they are particularly vulnerable to local extinction.

The Bell-Clarence-Dargan Landcare Group does some weed management in the Newnes Plateau Shrub Swamp adjacent to Kerma Crescent but not within the Reserve.

3.7.1 Objectives

Ensure that the upland swamp communities are protected through removal of threats including high intensity fire, weed invasion and trampling from recreation.

3.7.2 Actions

- Ecological survey to validate the mapping of the upland swamp EEC's. Include a survey for swamp dependent threatened flora and fauna;
- Encourage community groups including eg. Swampcare and Landcare to work within the Reserve;
- Work with the HNCMA to ensure the health of the upstream catchment;
- Obtain external funding to supply local Landcare groups (e.g. Bell-Clarence-Dargan Landcare Group) with the resources to manage the upland swamps (e.g. manage weeds, employ 'soft engineering' techniques to manage erosion etc.);
- Approach Lithgow Council to raise awareness in the community about the presence of upland swamps within the Reserve as part of Swampcare educational workshops;
- Ensure the RFS are aware of the upland swamps and amend their asset maps as appropriate;
- Signage and policing of the no fire policy for recreational users in the Reserve;
- Formalisation of pedestrian access to avoid upland swamp vegetation.

3.8 THREATENED FLORA

A list of threatened flora species that are known or likely to occur within the Reserve is shown in Table 4. Further threatened species are likely to occur at the site following a detailed flora survey.

3.8.1 Objectives

To conserve all threatened species within the Reserve through appropriate management as detailed in recovery plans and priority action statements (PAS).

3.8.2 Actions

- a. Conduct a survey of the Reserve, with targeted searches for the species listed in Table 4. The survey should focus on disturbed areas where intervention and management is a priority. Locations of threatened flora should be mapped;
- b. At this time, no recovery plans under the EPBC Act or TSC Act have been made for the species listed below. Appendix D lists species likely to occur at the Reserve along with relevant management actions from the PAS's for each species. Once the presence of a threatened species is confirmed on the site, the actions in Appendix D should be incorporated into on-site management of the species.
- c. General management actions that protect threatened flora species include:
 - o Appropriate fire management in accordance with the Lithgow Bush Fire Risk Management Plan
 - o Restricting access to areas with known threatened species;
 - o Eradicating weeds;
 - o Appropriate management of railway corridor and easements involving identification and care of threatened species and education of staff who undertake maintenance works.

3.9 WEEDS

While the Reserve has relatively low weed invasion, this offers an opportunity to control and eradicate weeds to prevent their spread. Weeds species can reduce the ecological integrity of the Reserve by reducing biodiversity and can threaten populations of rare and threatened plants and endangered ecological communities.

3.9.1 Objectives

Implement integrated weed control measures to improve ecological integrity of the Reserve and fulfil the legal requirements under the Noxious Weeds Act (NW Act).

3.9.2 Actions

- a. Survey and map weed distribution throughout the Reserve and develop a weed management strategy in line with the NSW Invasive Species Plan 2008-2015, to control environmental and noxious weeds;
- b. Discussions with Railcorp regarding the removal of the Pampas Grass present in the rail corridor;
- c. Discussions with Railcorp, Integral Energy and private landholders regarding weed control within easements/private land and maintenance techniques involving the removal of weed seed and stockpiles and the use of clean machinery prevent the introduction of seeds from other locations;

- d. Control noxious weeds as outlined in their respective control plans (see Table 8);
- e. With regard to chemical control, the following document provides information on control of noxious and environmental weeds. However, the use of chemical techniques should only involve the use of non-persistent chemicals such as Roundup® Biactive, particularly near watercourses (howevhttp://www.dpi.nsw.gov.au/__data/assets/pdf_file/0017/123317/noxious-and-environmental-weed-control-handbook.pdf).

Table 8: Noxious weeds known to occur at the Reserve and their respective control plan

Noxious Weed	Class	Legal Requirement	Control plan
African Lovegrass <i>Eragrostis curvula</i>	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles/african-lovegrass#Control
Blackberry <i>Rubus fruticosus</i> aggregate	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed	http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0020/301682/awmg_blackberry.pdf
Pampas Grass <i>Cortaderia selloana</i>	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles/pampas-grass
St John's Wort <i>Hypericum perforatum</i>	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles/st-johns-wort

3.10 THREATENED FAUNA

No fauna survey has been undertaken within the Reserve; however 23 threatened species have been recorded in the locality and may occur on the site (see Table 6). Appendix E lists all these species along with relevant priority action statements to manage the recovery of these species.

Of particular concern to Dargan Creek Reserve is the presence of Upland Swamps, which provide habitat for 11 of the threatened species likely to occur. Therefore, the management actions listed below have focused on protection of these species.

3.10.1 Objectives

To identify and manage threatened fauna species within the Reserve in line with recovery plans and priority action statements.

3.10.2 Actions

- a. Conduct a survey to confirm the presence of habitat for threatened fauna listed in Table 6;
- b. Refer to Appendix E for management of particular species;

- c. General management actions that will protect threatened fauna species include:
- Close and regenerate access tracks in known habitat;
 - Control foxes, feral cats, rabbits;
 - Provide input to local bushfire management plans to minimise impacts of fire on critical habitat resources;
 - Conduct annual monitoring of key populations;
 - Retain dead timber on the ground in open forest and woodland areas;
 - Work with Lithgow Council to encourage residents to keep domestic cats indoors at night;
 - Control weeds particularly in the upland swamps;
 - Undertake a community education and involvement program in conjunction with existing landcare and bushcare groups (eg. Swampcare) to promote protection of threatened species and their habitat;
 - Control pigs impacting on upland swamps;
 - Liaise with landholders of the freehold sites if their land contains threatened species habitat, particularly upland swamps. Explore opportunities for private landholder incentives to promote best practice management of such habitat areas;
 - Manage fire trails and unsealed roads to reduce sedimentation impacts
 - Where impacts of bushwalkers or use of informal trails are a problem install signage that conveys the significance of this species and the sensitive nature of its habitat
 - Maintain hydrological regimes and protect water flows and water quality around the upper reaches of streams and perched swamps

3.11 VERTEBRATE PESTS

3.11.1 Objectives

Implement measures to control the impacts of vertebrate pest species on water quality, predation and competition with native fauna and land degradation.

3.11.2 Actions

- a. Develop a pest management plan in consultation with the NSW Invasive Species Plan 2008-2015 which is a strategic document that prioritises and directs invasive species management programs, funding and resources for NSW. Threat Abatement Plans including Predation by European Fox, Predation by Feral Cats and Competition and Land Degradation by the Feral Rabbit should also be consulted in the preparation of the pest management plan.
- b. Work with the Livestock Health and Pest Authority to control vertebrate pest species.

- c. Develop relationships with local residents who can report sightings of feral animals to the Reserves trust.

3.12 FIRE

Dargan Creek Reserve is mapped as a Bushfire Hazard under Lithgow Councils Bushfire Hazard Maps. As such, commercial and recreational use of the Reserve should be avoided during periods of high bush fire risk.

3.12.1 Objectives

1. Prioritise protection for life and property and the upland swamp communities;
2. Ensure fire management within the Reserve maximises protection of water quality and ecosystem integrity.
3. Ensure that future planned hazard reduction burns retain patches of 'unburnt' vegetation of each vegetation type.

3.12.2 Actions

- a. Close access to the Reserve during times of high bush fire risk. Visitors will be informed by signage within the car park area.
- b. Suppress all unplanned fires within the Reserve as soon as possible.
- c. The Dargan Creek Reserve Trust participates in the Lithgow Bush Fire Management Committee, particularly in regard to preparation of the updated Lithgow Bush Fire Risk Management Plan (in preparation);
- d. Cooperation with Rural Fire Service, Lithgow Bush Fire Management Committee, adjacent landholders and private landholders within the Reserve with the aim of reducing fuel levels and fire suppression;
- e. Develop a fire management plan of prescribed fires for patches within the Reserve with the aim of maintaining maximum biodiversity and reducing fuel levels so as to avoid uncontrollable high intensity wild fires, particularly adjacent to the upland swamp EEC's. The Blue Mountains National Park Fire Management Plan (2004) provides a good example of fire management by classifying land into fire management zones. The plan has assessed the risks to life, property, natural heritage and cultural heritage values. The Strategy then details bush fire management actions for each zone to minimise these risks. An example of these management zones includes:

Table 9: Suggested fire management zones to be identified for Dargan Creek Reserve (Adapted from NPWS 2004)

Fire Management Zone	Primary Objective	Locations	Strategies
Asset Protection Zones (APZ)	<ul style="list-style-type: none"> • To protect human life, including permanent residents, visitors and fire fighters from bush fires. 	<ul style="list-style-type: none"> • Areas adjacent to urban areas, high visitation areas, utilities or other built assets, which are exposed to a high level of 	<ul style="list-style-type: none"> • Prescribed burning. • Slashing/ mowing. • Selective shrub/tree removal and under

	<ul style="list-style-type: none"> To protect residential areas, utilities, day use areas, urban interface, cultural heritage assets and other built assets from bush fire. 	bush fire Risk	<p>scrubbing.</p> <ul style="list-style-type: none"> Herbicide application. Watering. Trail maintenance and construction where necessary.
Strategic Fire Management Zones (SFMZ)	<ul style="list-style-type: none"> To reduce fire intensity, spotting distance and containment of bush fires and the protection of fire fighters. To reduce the probability of bush fires being ignited in areas of high bush fire risk. To complement APZs and to strengthen existing fire control advantages. To restrict the movement of bush fires between Fire Management Zones. 	<ul style="list-style-type: none"> Within large continuous areas of high bush fire behaviour potential. In areas with a proven history of bush fire ignitions. In areas of high bush fire behaviour potential that occurs along the boundaries of the Reserve. Adjacent to APZs. Other strategic areas for controlling the spread of bush fires. 	<ul style="list-style-type: none"> Generally prescribed burning supplemented with slashing/mowing, selective shrub/tree removal and under-scrubbing.
Heritage Area Management Zones (HAMZ)	<ul style="list-style-type: none"> To prevent the extinction of all species which are known to occur naturally within the Reserve To protect Aboriginal sites, Historic Heritage sites and other culturally significant features from fire. 	<ul style="list-style-type: none"> Areas not satisfying the criteria for inclusion in APZs or SFMZs. 	<ul style="list-style-type: none"> As appropriate to conserve biodiversity and cultural heritage Suppressing bush fires and, where necessary, conducting prescribed burns to maintain fire regimes within biodiversity thresholds

3.13 CULTURAL HERITAGE

The Reserve has not been formally surveyed for Indigenous and non-Indigenous cultural heritage values.

3.13.1 Objectives

Formally assess the Reserve for any significant Indigenous and non-Indigenous cultural heritage.

3.13.2 Actions

- a. Commission a qualified archaeologist to survey the Reserve for potential Indigenous heritage items or locations.
- b. Liaise with the Local Aboriginal Land Council to discuss the significance of the Reserve to local indigenous communities and to obtain comment and feedback on this plan.
- c. Commission a qualified heritage officer to assess the non-indigenous cultural heritage of the Reserve, in particular, the structures associated with the dams.

3.14 ADDITIONAL LAND

Two small areas of Crown Land (Lot 7300 DP 1123766 and Lot 370 DP 726995) are shown in Figure 1 and occur within the boundaries of Dargan Creek Reserve, but are not included in the reserve. As a priority action, these Lots should be included in the reserve.

Large areas of Crown Land are contiguous with the southern part of Dargan Creek Reserve (Figure 4) and should be considered for future incorporation into the Reserve to enhance the conservation values and management of these areas. To the north of the reserve are smaller areas of Crown Land that could also be incorporated into the Reserve. In particular, the alignment of the old Wolgan Valley Railway is situated on Crown Land to the north of Chifley Road and the existing railway corridor. Including this Crown Land into the reserve may enhance the overall European Cultural Heritage values of the Reserve.

3.14.1 Objectives

Incorporate areas of contiguous Crown Land into Dargan Creek Reserve to enhance the management and conservation of these lands.

3.14.2 Actions

- a. Include the two Crown Land Lots identified in Figure 1 (Lot 7300 DP 1123766 and Lot 370 DP 726995) into the Dargan Creek Reserve.
- b. Investigate surrounding contiguous areas of Crown Land for incorporation into Dargan Creek Reserve.

3.15 SUMMARY OF MANAGEMENT OBJECTIVES

Table 10 below lists all of the management objectives for Dargan Creek Reserve against the relevant management issue.

Table 10: Summary of Management Objectives

Issue	Management Objectives	Section
Reserve Management	To establish a community trust for Dargan Creek Reserve.	3.1
Reserve Access	<ol style="list-style-type: none"> 1. Formalise access to the Reserve through the Crown Road Reserve off Chifley Road; 2. Restrict vehicle access to allow closure and regeneration of informal tracks; 3. Ensure there is ongoing public access to the Reserve for recreational and management purposes using authorised tracks; 4. Minimise the environmental impact of visitation on the area; 5. Minimise risks to public safety; 	3.2
Public Recreation	<ol style="list-style-type: none"> 1. Sustainable use of the Reserve for public recreation; 2. Avoid, mitigate and manage impacts from recreation on the natural environmental values of the Reserve; 3. Avoid, mitigate and manage the risk to public from hazards associated with the dams and infrastructure; and 4. Avoid conflicts from different user groups of the Reserve. 	3.3
Climbing, Canyoning and Adventure Sports	Promote appropriate and sustainable climbing, canyoning and adventure sports activities.	3.4
Commercial Recreation	To allow for sustainable use of Dargan Creek Reserve by commercial operators without compromising the natural and cultural values of the Reserve;	3.5
Conservation of Natural Values	<ol style="list-style-type: none"> 1. To enhance and protect plants and animals (biodiversity) and maintain ecosystem function through appropriate management of the Reserve; 2. To protect threatened flora and fauna habitat, including connectivity; 3. To increase community awareness of the natural values of the Reserve. 	3.6
Upland Swamps	Ensure that the upland swamp communities are protected through removal of threats including high intensity fire, weed invasion and trampling from recreation.	3.7

Issue	Management Objectives	Section
Threatened Flora	To conserve all threatened species within the Reserve through appropriate management as detailed in recovery plans and priority action statements (PAS).	3.8
Weeds	Implement integrated weed control measures to improve ecological integrity of the Reserve and fulfil the legal requirements under the Noxious Weeds Act (NW Act).	3.9
Threatened Fauna	To identify and manage threatened fauna species within the Reserve in line with recovery plans and priority action statements.	3.10
Vertebrate Pests	Implement measures to control the impacts of vertebrate pest species on water quality, predation and competition with native fauna and land degradation.	3.11
Fire	<ol style="list-style-type: none"> 1. Prioritise protection for life and property and the upland swamp communities; 2. Ensure fire management within the Reserve maximises protection of water quality and ecosystem integrity. 3. Ensure that future planned hazard reduction burns retain patches of 'unburnt' vegetation of each vegetation type. 	3.12
Cultural Heritage	Formally assess the Reserve for any significant Indigenous and non-Indigenous cultural heritage.	3.13
Additional Land	Incorporate areas of contiguous Crown Land into Dargan Creek Reserve to enhance the management and conservation of these lands.	3.14

4 Implementation

4.1 POTENTIAL OPPORTUNITIES

This PoM identifies opportunities for Dargan Creek Reserve to be managed in a sustainable way through the following actions:

- Restricting vehicle access to protect biodiversity, reduce erosion and sedimentation and protect public safety
- Develop a network of formal walking tracks to allow safe enjoyment of the Reserve
- Identify the biodiversity and cultural heritage values of the Reserve. This information will then be used to inform management of the Reserve including management of weeds, threatened species, upland swamps, fire and cultural heritage.
- Manage the sustainable use of the Reserve for recreational and commercial uses

4.2 IMPLEMENTATION ACTION PLAN

The management objectives specified in section 3 above will be implemented by the Dargan Creek Reserve Trust, or any subsequent managing authority, according to the resources available and the broad priorities indicated in Table 11.

The Dargan Creek Reserve Trust will monitor and assess the implementation of this plan according to the criteria shown in Table 11.

Table 11: Implementation Action Plan

No.	Objective Met	Action	Priority	Performance Criteria
1	Erosion control	Discuss and address erosion along the transmission line easement with energy company	High	On-ground works in place along easement to control erosion
2	Fire	Close access to the Reserve during times of high bush fire risk. Visitors will be informed by signage and local media.	High	signage installed
3	Fire	The Dargan Creek Reserve Trust participates in the Lithgow Bush Fire Management Committee, particularly in regard to preparation of the updated Lithgow Bush Fire Risk Management Plan (in preparation)	High	Meetings between the Trust and LBFMC
4	Fire	Cooperation with RFS, Lithgow Bush Fire	High	Ongoing

No.	Objective Met	Action	Priority	Performance Criteria
		Management Committee, adjacent landholders and private landholders within the Reserve with the aim of reducing fuel levels and fire suppression;		communication
5	Incorporate contiguous Crown Land	Reclassify Crown Land - Lot 7300 DP 1123766 and Lot 370 DP 726995 as Dargan Creek Reserve	High	Lots included into Dargan Creek Reserve
6	Maintain emergency access	Maintain emergency access route using the existing RailCorp easements and management access tracks – ensure locked gates can be open by emergency services and RFS	High	Keys/access codes exchanged
7	Pest control and threatened fauna protection	Control foxes, feral cats, rabbits and pigs particularly in upland swamps in line with the NSW Invasive Species Plan 2008-2015 and Threat Abatement Plans in consultation with the Rural Lands Protection Board	High	Pest control undertaken
8	Prevent littering	Install signs regarding prohibition of littering and asking visitors to carry out all waste	High	Littering signage installed on Reserve
9	Protect public safety	Undertake risk assessment of the Reserve based on Department guidelines	High	Formal pedestrian tracks established and safety signage installed
10	Protect Public Safety	Installation of signs at the dams informing the public of the risks of swimming	High	Public Safety
11	Protect Public Safety	Install appropriate signage prohibiting walking on dam walls and other dangerous structures;	High	No accidents related to dam structures
12	Protect Public Safety	Remove exposed metal infrastructure	High	No accidents related to dam structures
13	Protect public safety and upland swamps	Formalise a network of pedestrian access tracks throughout the Reserve and provide information on walking tracks, grades and times to complete walks	High	Public walking only within formalised walking tracks
14	Public safety and upland swamp protection	Continue to erect and maintain signage prohibiting camping and lighting fires	High	Regeneration of native vegetation; no arson events

No.	Objective Met	Action	Priority	Performance Criteria
15	Restrict vehicle access	Consult with RailCorp to control vehicle access to their easements. Ensure the locked gates and fencing is as "vandal-proof" as possible	High	Controlled vehicle use within the Reserve
16	Restrict vehicle access	Establish formal access to the Reserve via the Crown Road Reserve off Chifley Road;	High	Controlled vehicle use within the Reserve
17	Restrict vehicle access	Install fencing and gates around any car park areas. Remove in future if threat of vandalism is reduced.	High	Manage vehicle use within the Reserve
18	Threatened fauna protection	Provide input to local bushfire management plans to minimise impacts of fire on critical habitat resources;	High	Meeting with RFS to identify threatened fauna habitat areas
19	Threatened fauna protection	Manage fire trails and unsealed roads to reduce sedimentation impacts	High	On-ground works in place to reduce erosion
20	Weed control	Survey and map weed distribution throughout the Reserve and develop a weed management strategy in line with the NSW Invasive Species Plan 2008-2015, to control environmental and noxious weeds	High	Weed management strategy written and on-ground works underway
21	Weed control	Discussions with Railcorp regarding the removal of the Pampas Grass present in the rail corridor	High	Pampas grass removed
22	Weed control	Discussions with Railcorp, Integral Energy and private landholders regarding weed control within easements/private land and maintenance techniques involving the removal of weed seed and stockpiles and the use of clean machinery prevent the introduction of seeds from other locations	High	Reduction in weeds within easements and private land
23	Weed control	Control noxious weeds as outlined in their respective control plans (see Table 8);	High	Noxious weeds controlled
24	Conservation of Natural Values	Produce a pamphlet for the community introducing this PoM and the major changes to management of the Reserve including access and recreation, highlighting the conservation significance of the Reserve and the need to remove threatening processes	Medium	Prepared prior to on-ground works so community are informed
25	Access for	Discuss use of management access tracks for	Medium	During renewal of or new licence

No.	Objective Met	Action	Priority	Performance Criteria
	commercial users	commercial operators as part of licence agreements		preparation
26	Community involvement in Reserve management	Develop interpretive signage to foster community stewardship for the Reserve	Medium	Community support of management plan
27	Community involvement/ Threatened fauna protection	Develop relationships with local residents who can report sightings of feral animals to the Reserves Trust.	Medium	Community meeting to introduce this PoM
28	Community involvement/ Threatened fauna protection	Work with Lithgow Council to encourage residents to keep domestic cats indoors at night	Medium	A reduction in cat predation in native fauna (difficult to record)
29	Conservation of Natural Values	Provide training to owners of the freehold land and RailCorp Operations staff with respect to identification of threatened flora and fauna and appropriate management as detailed in Section 3.7.2 and 3.8.2	Medium	Threatened species identified within private land and easements are protected
30	Conservation of Natural Values	Liaise with OEH officers regarding identified threatened species and habitat and their ongoing management and conservation, particularly with regard to appropriate fire management	Medium	Fire management plan to incorporate threatened species requirements
31	Conservation of Natural Values and Threatened Species	Commission Flora and fauna surveys to document the Reserves ecological values (particularly upland swamps) and complete the vegetation mapping of the southern section of the Reserve. Where funding is an issue consider partnerships with tertiary institutions;	Medium	Documented inventory of biodiversity values within the Reserve
32	Cultural Heritage	Commission a qualified archaeologist to survey the Reserve for potential Indigenous and non-indigenous heritage items or locations	Medium	Archaeological survey completed
33	Cultural Heritage	Liaise with the Local Aboriginal Land Council to discuss the significance of the Reserve to local indigenous communities and to obtain comment and feedback on this plan.	Medium	Discussions held between Trust and LALC

No.	Objective Met	Action	Priority	Performance Criteria
34	Erosion control and biodiversity protection	Rehabilitate and revegetate the informal tracks within the Reserve	Medium	Native vegetation within closed tracks
35	Fire	Develop a fire management plan of prescribed fires for patches within the Reserve with the aim of maintaining maximum biodiversity and reducing fuel levels so as to avoid uncontrollable high intensity wild fires, particularly adjacent to the upland swamp EEC's	Medium	Fire Management Plan prepared after biodiversity survey
36	Protect Public Safety	Routine assessment of the structural soundness of the dams;	Medium	No accidents or incidents related to the dam
37	Protect Public Safety	Remove the rope swing at the lower dam	Medium	No swimming related accidents
38	Protection of upland swamps	Encourage community groups including Swampcare and Landcare to work within the Reserve and obtain external funding to resource work	Medium	Ongoing restoration works underway within upland swamps
39	Protection of upland swamps	Work with the HNCMA to ensure the health of the upstream catchment	Medium	Meetings with HNCMA to introduce this PoM
40	Protection of upland swamps	Approach Lithgow Council to raise awareness in the community about the presence of upland swamps within the Reserve as part of Swampcare educational workshops	Medium	Educational material circulated in community
41	Protection of upland swamps	Ensure the RFS are aware of the upland swamps and amend their asset maps as appropriate	Medium	Meeting with RFS to introduce this PoM and identify upland swamps
42	Protection of upland swamps	Work with private landholders who have upland swamps	Medium	Meetings with landholders of Lot 3
43	Sustainable commercial use	Ensure that commercial operators comply with the issues outlined in Table 3 of this PoM	Medium	All new licence agreements and licence renewals to demonstrate compliance prior to licence

No.	Objective Met	Action	Priority	Performance Criteria
				issued/renewed
44	Sustainable commercial use	Legal liability issues should be considered in future leasing/licencing agreements including commercial user completing a risk assessment	Medium	Compliance prior to licence issued/renewed
45	Sustainable commercial use	The Trust and Commercial operators collaboratively develop a 'Rocksports Guideline' which defines and identifies the most sustainable group numbers, site rotation requirements, minimal impact practices, codes of conduct, and self-impact assessment that serves a performance measure and condition of issuing a commercial licence	Medium	Prior to licence renewal / issue
46	Sustainable recreational use	Develop partnerships with Council, NPWS and Reserve user groups to promote the benefits of long term sustainable use of the Reserve and address issues with respect to use of the site	Medium	Meetings held between user groups to discuss commercial use
47	Sustainable recreational use	Install signage outlining a 'code of conduct' for climbing within the Reserve	Medium	Signage install
48	Threatened Fauna Protection	As part of biodiversity survey, confirm the presence of threatened fauna listed in Table 6	Medium	Biodiversity survey completed
49	Threatened Flora Protection	As part of biodiversity survey, map locations of threatened flora species listed in Table 4 with focus on disturbed areas where management is a priority.	Medium	Threatened flora mapped within Reserve
50	Threatened Species Protection	Refer to Appendix D and E of this PoM for management of threatened species detected on site	Medium	Management strategy for threatened species written and implemented
51	Threatened fauna protection	Conduct annual monitoring of key populations	-	If necessary
52	Community involvement in Reserve management	Once Reserve management has stabilised, Min. Corp to advertise for volunteers to create a community trust	Low	Min Corp is disbanded
53	Conservation of Natural Values	The purpose of the crown Reserve be gazetted for environmental protection in addition to the current declared purpose for recreation (see Section 121a of the Crown Lands Act 1989);	Low	New purpose gazetted
54	Conservation of	Update records on threatened species and their	Low	Data entered

No.	Objective Met	Action	Priority	Performance Criteria
	Natural Values	locations through 12 monthly reviews of the NPWS Wildlife Atlas and when information becomes available		onto Wildlife Atlas once a year
55	Conservation of Natural Values	Review this Plan of Management every 5 years and incorporate information gathered from the ecological survey and any relevant Recovery Plans prepared for species listed under the TSC Act and EPBC Act	Low	Revised plan every 5 years
56	Incorporate contiguous Crown Land	Investigate surrounding contiguous areas of Crown Land to the north and south of the Reserve for incorporation into Dargan Creek Reserve	Low	Investigations / recommendations made
57	Protection of water quality	Install a composting toilet within the Reserve	Low	Low faecal coliforms in dam

5 Monitoring and Review

To ensure that this document stays current and relevant it will need to be reviewed and updated at key intervals. It is recommended that this document be updated and reviewed every five years. As results of future survey and monitoring become available, management actions may need to be adjusted in response. Management practices also need to respond to new management techniques, technology or information. In particular, changes to relevant legislation and the introduction of new legislation relating to natural resource management and biodiversity should trigger a review of all or part of this PoM.

With respect to the monitoring and review of identified actions, the action table above (Table 11) identifies priorities and performance measures. The recommended approach to monitoring is based on a two tiered structure that a dedicated member/s of the Trust will need to be responsible for. These two tiers are monitoring of process and monitoring of outcome.

The first tier of assessment (process) involves ensuring that each of the actions identified in this PoM are undertaken and implemented in consultation with relevant stakeholders. This is generally evaluated by recording what action was completed, who completed it and when it was completed.

The second tier of assessment (outcome) involves identifying the measure of success for the actions in Table 11, and then reviewing and evaluating progress against these measures and how well they have been achieved by the nominated actions to address them. Evaluation should include adequacy of resourcing, timing and any constraints or opportunities identified in trying to achieve the action.

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Appendix A: Relevant Legislation

Statutory Document	Considerations
FEDERAL LEGISLATION	
<p><i>Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i></p>	<p>EPBC Act provides a national scheme for protecting the environment and conserving biodiversity values. Approval from the Commonwealth Environment Minister is required under the EPBC Act if an action will, or is likely to, have a significant impact on matters considered to be of National Environmental Significance (NES matters). NES matters relevant to this proposal include listed threatened species and ecological communities including:</p> <ul style="list-style-type: none"> • 18 flora species (Table 4) • 7 fauna (Table 6) • Temperate Highland Peat Swamps on Sandstone EEC. <p>Recovery plans relevant to this PoM have been reviewed and incorporated into Section 3 where applicable. Any impacts to matters of NES listed under the EPBC will require an assessment of significance.</p>
<p><i>Native Title Act 1993</i></p>	<p>The <i>Native Title Act 1993</i> was enacted as a result of the decision made by the High Court of Australia in <i>Mabo v Queensland (No.2)</i> 1992. Native title is the recognition by Australian law that some Indigenous people have rights and interests to their land that come from their traditional laws and customs. Since 1993, over 1400 claims have been dealt with under the <i>Native Title Act 1993</i>. There are no claims to the land within Dargan Creek Reserve.</p>
<p><i>Aboriginal Land Rights Act 1983</i></p>	<p>The <i>Aboriginal Land Rights Act 1983</i> provides a mechanism for compensating Aboriginal people of NSW for loss of their land. To redress the loss of land Aboriginal Land Councils can claim crown land which, if granted is transferred as freehold title. There are 121 Local Aboriginal Land Councils and the NSW Aboriginal Land Council comprising of 9 regional councillors that are elected every 4 years. Additionally, the Aboriginal Land Rights Act 1983 established a statutory investment fund, managed by the NSW Aboriginal Land Council that invests and disburses funds to maintain the network of land councils, and when possible invests in other initiatives for the betterment of the Aboriginal people of NSW.</p>
STATE LEGISLATION	

Statutory Document	Considerations
<p><i>Environmental Planning and Assessment Act 1979 (EP&A Act 1979)</i></p>	<p>The NSW <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. Various legislation and environmental planning instruments, such as the NSW TSC Act, are integrated with EP&A Act.</p> <p>Section 5A of the EP&A Act specifically requires consideration of whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats. This assessment of significance is known as the 'seven part test' and is undertaken in relation to species, communities, habitat and processes listed under either the TSC Act 1995 or the Fisheries Management Act 1994 (FM Act).</p> <p>Activities or development proposals that are not endorsed in the plan of management would need to be subject to a separate assessment and approvals process under the EP&A Act.</p>
<p><i>Threatened Species Conservation Act 1995 (TSC Act)</i></p>	<p>The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The following threatened species occur or are likely to occur with Dargan Creek Reserve:</p> <ul style="list-style-type: none"> • 27 flora species (Table 4) • 23 fauna (Table 6) • Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion EEC. <p>Recovery plans and Threat Abatement Plans relevant to this PoM have been reviewed and incorporated into Section 3 where applicable.</p>

Statutory Document	Considerations
<i>National Parks and Wildlife Act 1974 (NPW Act)</i>	<p>Under the NPW Act, the Director-General of the NPWS is responsible for the care, control and management of all national parks, historic sites, nature reserves, reserves, Aboriginal areas and state game reserves. The Director-General is also responsible under this legislation for the protection and care of native fauna and flora, and Aboriginal places and objects throughout NSW.</p> <p>All native flora and fauna within Dargan Creek Reserve is protected under the NPW Act. No Aboriginal places and objects are currently known from the site, but a recommendation in this PoM is for an Aboriginal Heritage Study to be undertaken.</p> <p>Restoration works within the Reserve may require that contractors obtain a licence under section 132C of the NPW Act works are likely to harm protected fauna, threatened species or endangered ecological communities (eg. collecting plant specimens or collecting seed for revegetation purposes).</p>
<i>Noxious Weeds Act 1993 (NW Act)</i>	<p>The objectives of the NW Act is to identify which noxious weeds require control measures, identify control measures suitable to those species and to specify the responsibilities of both public and private landholders for noxious weed control.</p> <p>The site lies within the Upper Macquarie County Council control area which includes the local government areas of Bathurst Regional, Blayney, Lithgow and Oberon. Control of noxious weeds known to occur at Dargan Creek Reserve and the legal requirements under the NW Act is addressed in Section 2.8.4.</p>
<i>Native Vegetation Act 2003 (NV Act)</i>	<p>This <i>Native Vegetation Act 2003</i> repealed the <i>Native Vegetation Conservation Act 1997</i> and regulates the clearing of native vegetation on all land in NSW. Land excluded from the Act is listed in Schedule 1 and includes National Parks, State Forests, urban areas and biodiversity certified land. The Act outlines what landowners can and cannot do in clearing native vegetation. As no clearing is proposed under this PoM, the NV Act is not considered further.</p>
<i>Dams Safety Act 1978</i>	<p>All dams in NSW have to meet the requirements of the Dams Safety Committee (DSC) under the NSW Dams Safety Act, 1978. The Dams Safety Committee (DSC) is the State's regulator for dam safety and therefore responsible to develop and implement policies and procedures for effective dam safety management to protect life, property and the environment from dam failures.</p> <p>The safety requirements of this Act would be imposed on the two disused dams on the site.</p>

Statutory Document	Considerations
<i>SEPP (Infrastructure) 2007</i>	<p>Under the Infrastructure SEPP:</p> <p>Clause 65(2) states <i>'Development for any purpose may be carried out without consent: ...</i></p> <p><i>(d) in the case of land that is a reserve within the meaning of Part 5 of the Crown Lands Act 1989, by or on behalf of the Director-General of the Department of Lands, a trustee of the reserve or (if appointed under that Act to manage the reserve) the Ministerial Corporation constituted under that Act or an administrator,</i></p> <p><i>if the development is for the purposes of implementing a plan of management adopted for the land under the Act referred to above in relation to the land.'</i></p> <p>Therefore, implementing this PoM will not require development consent or approval. However, a Section 132C licence from may be required (OEH) as discussed above under the NPW Act.</p>
<i>Drinking Water Catchment Regional Environmental Plan No. 1 (REP No. 1).</i>	<p>The southeast of the Lithgow LGA including Lithgow, Hartley and Wallerawang is located within the Sydney drinking water catchment and is subsequently subject to the requirements of the Drinking Water Catchment Regional Environmental Plan No. 1 (REP No. 1). The REP sets out obligations relating to planning and regulating new development in the catchments, and preparing plans to rectify the effects of existing development on the catchments.</p> <p>Any development proposed to be carried out must have a neutral or beneficial effect on water quality. This PoM aims to enhance the ecological integrity of the Reserve which will protect the water quality of the catchment.</p>
<i>Lithgow City Council Local Environment Plan 1994 (LCC LEP)</i>	<p>The LCC LEP is the primary planning document for the Lithgow LGA. Dargan Creek Reserve is zoned 1(a) Rural General on the LEP planning maps. An environmental sensitive overlay applies to the majority of the site, excluding the northern sections containing the railway. One of the objectives of this zone is to protect, enhance and conserve trees and other vegetation in environmentally sensitive areas, where the conservation of the vegetation is significant for scenic amenity or natural wildlife habitat or is likely to control land degradation.</p>
<i>Blue Mountains National Park Plan of Management</i>	<p>Blue Mountains National Park occurs to the east of Dargan Creek Reserve. The Reserve and national park share a common boundary along a section of Chifley Road, and the vegetation in both Reserves is contiguous below Chifley Road.</p>

Statutory Document	Considerations
<i>Blue Mountains National Park Fire Management Strategy</i>	<p>This Strategy provides direction for fire management activities within Blue Mountains National Park to fulfil the NPWS' obligations under various legislation and Government policy. The plan identifies the primary objectives and performance indicators for fire management operations, the characteristics of the bush fire environment and a summary of the major assets and natural heritage. This document has been consulted for fire management of Dargan Creek Reserve, particularly for the EEC swamp vegetation that is adversely impacted by fire.</p>
<i>Hawkesbury-Nepean Catchment Action Plan (HNCAP)</i>	<p>The Hawkesbury Nepean Catchment Action Plan (CAP) is a ten-year plan to improve natural resource management outcomes throughout the Hawkesbury Nepean Catchment. The CAP aims to:</p> <ul style="list-style-type: none"> • improve river health • protect biodiversity and • identify and encourage best practice soil and land management. <p>These goals will be achieved within the context of community and partnerships by building general community awareness and capacity, and supporting Indigenous community involvement.</p> <p>Dargan Creek Reserve is within the Mid Coxs River Sub-catchment of the Hawkesbury Nepean CMA. The CAP is further discussed in Section 2.6. The actions proposed in this plan area consistent with the actions in the CAP.</p>
<i>NSW Biodiversity Strategy 2010-2015 (Draft)</i>	<p>The draft NSW Biodiversity Strategy 2010-2015 has recently been on public exhibition and was prepared by OEH and Department of Primary Industry (DPI), with the aim to coordinate and guide investment and effort in biodiversity conservation in New South Wales for the next five years.</p> <p>The draft Strategy identifies state-scale investment priorities for 15 broad terrestrial and aquatic ecosystems in New South Wales. Freshwater Wetlands is one such priority ecosystem that includes Temperate Highland Peat Swamps on Sandstone' which is a nationally listed EEC present at the Reserve as Newnes Plateau Shrub Swamp and Newnes Plateau Hanging Swamp. Protection of these vegetation communities is discussed in Section 3.7.</p>

Statutory Document	Considerations
<i>Blue Mountains Nature Recreation Strategy 2004</i>	<p>Blue Mountains City Council has prepared a Nature Based Recreation Strategy in consultation with key stakeholders to guide the management of recreation on natural areas of the City in both public and private ownership.</p> <p>This strategy provides a basis for Council policy and decision-making in the management of sustainable nature based recreation opportunities and tourism in the Blue Mountains.</p>
<i>NSW Invasive Species Plan 2008-2015</i>	<p>The NSW Invasive Species Plan 2007-2015 has four goals:</p> <ol style="list-style-type: none"> 1. Exclude – prevent the establishment of new invasive species 2. Eradicate or contain – eliminate or prevent the spread of new invasive species 3. Effectively manage – reduce the impacts of widespread invasive species 4. Capacity – ensure New South Wales has the ability and commitment to manage invasive <p>The plan has been consulted for the control of invasive species within Dargan Creek Reserve.</p>

Appendix B: Stakeholder Consultation

STAKEHOLDER CONSULTATION

A list of stakeholders was provided to Eco Logical Australia by the Dargan Creek Reserve Trust. The stakeholders listed were contacted by the Department in 2008 as part of a community consultation about issues surrounding the use of Dargan Creek Reserve. The outcome of the 2008 consultation was that the community became aware that management of the Reserve would benefit from having a Plan of Management prepared.

ELA consulted with stakeholders over the phone between November 2010 and December 2010. 24 people were able to be consulted over the phone including interested individuals, representatives for government organisations and community groups.

Stakeholders were divided into the following groups:

- Commercial Operators
- Government Organisations
- Tourism
- Recreational Users
- Adjoining Landholders

RESERVE VALUES

Key values identified from the literature review and stakeholder consultation:

- Recreational value of the Reserve for bushwalking, rock climbing and canyoning.
- Commercial value for operators running rock climbing and canyoning guided tours.
- The Reserve has high ecological value as it is largely intact and free of weeds and is adjacent to the Blue Mountains World Heritage Area. The Reserve contains several Upland Swamps which are threatened vegetation communities and key habitat for a number of threatened species. The condition of the vegetation is near pristine and is likely to provide habitat to a variety of fauna.

KEY ISSUES

Stakeholder issues are summarised in Table 1. The key issues that were identified were:

- The main purpose of the Reserve should be for biodiversity conservation.

Stakeholders appreciate the Reserve as a large area of intact bushland and the visual amenity it provides. The Department of Environment, Climate Change and Water, Lithgow City Council (David

Durie) and the Blue Mountains City Council (Michael Hensen) recognise that the Reserve is adjacent to the Greater Blue Mountains World Heritage Area and it has ecological value in facilitating connectivity across the landscape. Community groups such as the Blue Mountains Conservation Society and various Landcare groups also value the Reserve for its diversity of flora and fauna and are aware of a number of threatened or rare species that are within the Reserve. They are also concerned with managing weeds within the Reserve as it is largely in pristine condition.

- Maintaining recreational use of the dam and climbing areas within the Reserve.

The dams have a long history of being used as a recreational area for swimming, picnicking and bushwalking. The dams are a popular swimming hole for the local residents of Lithgow, Clarence and Dargan. The area around the dams is highly utilised as an area for nature-based recreation and is particularly attractive to families as the area is level ground.

There are also a number of well established climbing sites within the Reserve that provide recreational opportunities. These sites are well-known among the climbing community and are described in the climbing guide book for the Blue Mountains area. Rock climbing is a popular activity in the upper Blue Mountains. Comments from NPWS (Neil Stone) regarding rock climbing in surrounding National Parks is that it is generally treated as a self-managed activity and their main concerns have been associated with track maintenance and erosion; however there is no clear policy on rock climbing in National Parks. The commercial operators would also like to continue to guide clients on rock climbing and canyoning trips.

- Environmental impacts

A consistent response from stakeholders who used the dam and surrounds concerned rubbish dumping and environmental degradation. Respondents recognised that allowing vehicular access to the dam has widened and eroded the tracks and spoils the visual amenity of the area. There are ongoing problems with managing rubbish in the area which is perhaps exacerbated because people can drive vehicles all the way to the dams. Many expressed the desire to prohibit vehicles from this activity. This part of the Reserve also contains a number of threatened Upland Swamp communities. The Blue Mountains Conservation Society and other individuals are concerned about the impacts of 4WD vehicles and high visitation on these communities.

- Access tracks

Stakeholders strongly expressed the desire to continue to allow access to the dam area. The Reserve has had a long history of access issues. There is no formal access track through the Reserve. The main access track used to get to the dam area begins on the RailCorp easement and then passes through the northern freehold lot before going onto the crown lots. In the past RailCorp have attempted to block access to the easement but the gates and fences that were installed were consistently removed or damaged through vandalism. RailCorp has since reinstalled another gate approximately 350 m south of the highway. This effectively has allowed vehicles to continue to drive on part of the RailCorp easement to the dam areas but excludes them from driving along the railway corridor. There are a number of tracks between the upper and lower dam, some of which are highly eroded and bisect an upland swamp community which is listed as an endangered ecological community.

Table 12: Summary of Stakeholder Issues

	Protect Flora and Fauna	Upland Swamps	Protect Large Remnant Bushland Area	Aesthetic Value	Bushfire	Weed Management	Signage	Maintaining Access (including formalising legal access)	Continued Use of the Dam	Restricting the Number of Access Roads	4WD/Dirt Bike/Motorbike Use	Change Attitudes of Visitors/Education	Parking	Illegal Timber Collection	Rubbish Dumping	Soil Erosion	Vandalism	Human Waste	Passive Recreation	Dog Walking	Rock Climbing	Canyoning	Wants to be notified when draft PoM is prepared		
Each row represents one stakeholder response			✓	✓				✓	✓		✓	✓			✓					✓					
			✓	✓	✓			✓	✓		✓										✓				
			✓	✓				✓	✓		✓					✓				✓					
			✓	✓	✓			✓	✓	✓	✓									✓		✓			
			✓	✓				✓	✓	✓	✓									✓					
												No issues raised													
		✓	✓	✓			✓		✓	✓	✓	✓				✓									
						✓	✓				✓	✓				✓									
									✓	✓	✓					✓							✓	✓	
									✓	✓	✓			✓		✓							✓	✓	
									✓	✓	✓					✓							✓	✓	
									✓	✓	✓					✓							✓	✓	
									✓	✓	✓					✓							✓	✓	
		✓	✓	✓	✓				✓	✓	✓		✓							✓					
		✓	✓	✓	✓				✓	✓	✓		✓							✓					

Appendix C: Vegetation Community Descriptions

Mu 50 Newnes Plateau Shrub Swamp

This recently listed NSW Endangered Ecological Community (Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion) occurs on long gentle open drainage lines on the Newnes Plateau. It forms a dense, wet heath with an unevenly-textured, tussock sedge understorey. Trees are typically absent, although occasional eucalypts do occur where there is greater influence from incoming sediments. The main shrub species are *Baeckea linifolia*, *Boronia deanei*, *Grevillea acanthifolia*, *Epacris* and *Leptospermum* sp. The consistent feature of the groundcover is the Cyperoid species *Lepidosperma limicola*, and button grass (*Gymnoschoenus sphaerocephalus*) and *Empodisma* sp. Members of the Restionaceae, *Xyris*, the yellow flag, is also very common in the community (DEC, 2006).

This particular swamp community is restricted to the high elevations of the Blue Mountains. While some examples are likely to fall within the Blue Mountains Reserve system, the largest patches fall within the Newnes State Forest. It is estimated that there is approximately 650 ha of Newnes Plateau Shrub Swamp with only 160 ha protected within the Blue Mountains and Wollemi National Parks, with the remainder occurring on state forest or freehold land (Benson and Keith 1990).

For further information please see (DEC, 2006).

Mu 51 Newnes Plateau Hanging Swamp

Newnes Plateau Hanging Swamps share many species with the endangered community Newnes Plateau Shrub Swamp (MU50) however they occupy a different habitat niche. The Hanging Swamps occupy gully heads and ridgetop sites at points of water seepage where percolating groundwater travelling through the sandstone is forced outwards by impermeable shale layers. These form ephemeral wet peaty soils on which a range of swamp heath plants grows. The uppermost stratum, which may include mallees such as *E. gregsoniana* and tea tree (*Leptospermum juniperinum*) and *Banksias* are usually only a few metres above ground level and may only be sparse. By contrast the lowest stratum may be a metre off the ground or more, with coral fern (*Gleichenia*) and umbrella fern (*Sticherus*) combining with large saw-sedge (*Gahnia sieberiana*) to form a nearly impenetrable layer. Diversity is relatively low, but the species present are often restricted to wet habitats (DEC, 2006).

For further information please see (DEC, 2006).

Mu 3 Hillslope Talus Mountain Grey Gum –Brown Stringybark – Grey Gum – Broad-Leaved Hickory Moist Forest

A tall, moist forest often found along the steep Permian escarpment and ranges of the Wolgan and Capertee Valleys on sheltered slopes. It forms an open canopy of eucalypts – mainly mountain grey gum (*E. cypellocarpa*), grey gum (*E. punctata*), red box (*E. polyanthemos*) and brown stringybark (*E. blaxlandii*) above a broken, uneven canopy of wattles. The groundcover is often discontinuous, with areas of graminoids and forbs separated by areas of fallen litter or rockfall. In all cases the sites are moderately diverse, with microtopography inducing greater site variation (DEC, 2006).

For further information please see (DEC, 2006).

Mu 8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest

Newnes Sheltered Peppermint–Brown Barrel Shrubby Forest is a tall forest (c. 35 metres) that occupies steep protected slopes and gorges that dissect the outer areas of the Newnes Plateau. The principal canopy species are *Eucalyptus piperita*, *E. radiata* and *E. fastigata* while *E. oreades*, *E. cypellocarpa* and *E. dalrympleana* subsp. *dalrympleana* occur less frequently. One of the characteristic features of this community is the moderately dense mid stratum of shrubs and small trees that includes *Leptospermum polygalifolium*, *Leucopogon lanceolatus*, *Monotoca scoparia* and *Polyscias sambucifolia*. Moist sites include taller mesic species such as *Callicoma serratifolia*. The ground cover features a consistently occurring mix of graminoids such as *Lomandra longifolia*, the distinctive *Dianella tasmanica* and an abundance of small ferns such as *Pteridium esculentum* and *Sticherus flabellatus* var. *flabellatus* (DEC, 2006).

For further information please see (DEC, 2006).

Mu 26 Newnes Plateau Narrow-Leaved Peppermint – Silvertop Ash Layered Open Forest And MU26a Newnes Plateau Gum Hollows Variant – Brittle Gum – Mountain Gum, Scribbly Gum – Snow Gum Shrubby Open Forest

A highly variable eucalypt forest and woodland found on the Newnes Plateau. This map unit unites a range of similar sclerophyllous shrub dominant assemblages found on shallow soils. The shrub layer is diverse and moderately dense and is dominated by *Proteaceae*, legumes and *Boronia*. The tree species vary with soil depth and appear as identifiable combinations in the field. In gentle depressions (Map Unit 26a) a combination of twisted white-stemmed gums are prominent such as *E. mannifera*, *E. sclerophylla*, and *E. dalrympleana* often with *E. dives*. More commonly the ridges support a forest that is taller with *E. blaxlandii*, *E. radiata* and *E. sieberi* replacing the former species (Map Unit 26). The conspicuous straight white stems of *E. oreades* are inconsistently found throughout this map unit (DEC, 2006).

The lowest storey varies in its density, but is usually of moderate cover, dominated by tussock grasses (*Austrostipa*, *Poa* and *Joycea*) and graminoids such as lomandras, *Patersonia* and *Dianella*. A diverse range of small herbs also occupies the groundcover stratum. The diversity leads to a number of identifiable layers in the structure, which it appears is more pronounced with increasing time since fire (DEC, 2006).

The distribution of the unit appears to be restricted to the Newnes Plateau and other small areas of high elevation enriched sandstone soils between Blackheath and Mount Victoria. These forests are poorly Reserved only small areas are found within the adjoining Wollemi National Park (Bell 1998 in DEC, 2006).

For further information please see (DEC, 2006).

Mu 28 Sandstone Plateau And Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland

A community found on the shallow soils and rocky sites across the upper Blue Mountains sandstones. It is usually an open forest or woodland community that is characterised by a diverse midstratum that may be quite dense. The shrub layer is a diverse range of species from legumes (*Acacia* and *Bossiaea*) and epacrids (*Leucopogon* and *Monotoca* mainly) to *Proteaceae* (*Hakea*, *Persoonia* and *Lomatia*) and *Myrtaceae* (especially *Leptospermum*). *Boronia microphylla* is a common member of the community and with the other species a springtime flowering in this community is a spectacular sight. The canopy is

dominated by silvertop ash (*E. sieberi*) and scribbly gum (*E. sclerophylla*), although other species are occasionally present. The groundcover is also quite diverse, and is dominated by legumes and graminoids, particularly sedges and flag iris (*Patersonia*). The community is well conserved throughout the Blue Mountains and Wollemi National Parks (DEC, 2006).

For further information please see (DEC, 2006).

Mu 29 Sandstone Slopes Sydney Peppermint Shrubby Forest

Semi sheltered sandstone slopes and deeper soils on ridges on lower elevation of the Newnes Plateau carry a taller forest often solely dominated by Sydney peppermint (*E. piperita*), but sometimes including brown stringybark (*E. blaxlandii*). It delineates the grade between the ridgetop woodlands and in the protected gully forests that gain more narrow-leaved peppermint (*E. radiata*) in the canopy. The midstratum is often dense, dominated by wattles, Proteaceae and epacrids, particularly *Leucopogon*, *Monotoca* and *Persoonia*. The groundcover layer is often relatively sparse, although the ground is well covered by litter and plant debris. The main species in the groundcover reflect the more sheltered position and include the native broom (*Amperea*), flax-lilies (*Dianella*), Lomandras and bracken fern (*Pteridium*). The community is widespread throughout the Blue Mountains and Wollemi National Parks (DEC, 2006).

For further information please see (DEC, 2006).

Mu 30 Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland

A very common vegetation community of the broad sandstone ridges found across extensive areas of the Blue Mountains region. This moderately tall forest of less than 20 metres in height is usually dominated by two eucalypt species *E. piperata* and *E. sieberi*. The shrub layer is typically rich in legumes, epacrids and members of the Proteaceae family. Taller shrubs such as *Leptospermum* and *Hakea* are also a distinctive component of the mid-stratum. The groundcover is typically sparse, and dominated by tough-leaved plants such as the smaller Lomandras and the leafless small shrub *Amperea*. It grades into Map Unit 29 on the adjoining sheltered upper sandstone slopes. The community is extensively distributed to the north, south and east of the study area throughout the more elevated areas of the Blue Mountains and Wollemi Reserves (DEC, 2006).

For further information please see (DEC, 2006).

Mu 43 Pagoda Rock Sparse Shrubland

This map unit is one of several heath communities that grow in and around sandstone rock outcrops known as 'pagodas'. The consistent heath species found in this unit are *Calytrix tetragona*, *Leptospermum parvifolium* and *L.arachnoides* and *Leucopogon muticus*. Exposed rock makes up a large proportion of each of the sites and as result total vegetation cover is variable. Some sites include scattered *Callitris* pines or low stunted eucalypts.

Data analysis suggests that this heath is a different complex to those found elsewhere in the Blue Mountains. It is most prominent on the drier western escarpment. While it may loosely be considered a component of Blue Mountains Heath of Tindall *et al.* (2004) and Sydney Montane Heaths of Keith (2004) it is perhaps better considered as a unique feature of pagoda systems in this region. The community is found extensively throughout Gardens of Stone and western Wollemi National Park (DEC, 2006).

For further information please see (DEC, 2006)..

Mu 44 Sandstone Plateaux Tea Tree – Dwarf Sheoak – *Banksia* Rocky Heath

The Newnes Plateau and adjoining sandstone escarpments support a low heath community that grows on rock plates and rock terraces amongst rock pagodas and cliff edges. This patchy though widespread community is characterised by three consistently occurring species; dwarf she oak (*Allocasuarina nana*), *Banksia ericifolia*, and tea tree (*Leptospermum arachnoides*). The groundcover is rarely more than localised in nature, with sedges (particularly *Lepidosperma*) being the dominant cover, and the small shrub *Platysace linearifolia* also common. The dwarf triggerplant (*Stylidium lineare*) is a ubiquitous member of the community (DEC, 2006).

The community is part of the Blue Mountains Heath of Tindall *et al.* (2004), and as such is part of the Sydney Montane Heath of Keith (2004). Extensive areas are included within the Blue Mountains Reserve system (DEC, 2006).

For further information please see (DEC, 2006)..

Mu 46 Newnes Plateau Dwarf Sheoak – *Banksia* Heath

In the east of the Newnes Plateau there are extensive patches of a dense, low heath dominated by dwarf she oak *Allocasuarina nana* with a range of dwarf Myrtaceae (*Micromyrtus*, *Darwinia*, *Calytrix*), Rutaceae (*Philotheca*) and Proteaceae (*Banksia*, *Isopogon*). Occasional mallee and mallee-form eucalypts (the uncommon *E. gregsoniana* as well as *E. stricta*, *E. mannifera*) and tall *Banksia ericifolia* and *Leptospermum trinervium* may also occur. The groundcover is mainly herbaceous, with *Goodenia bellidifolia* and *Lindsaea linearis* joining the wiry grass *Entolasia* and the sedges *Lepidosperma* and *Schoenus*. *Stylidium lineare*, the dwarf triggerplant, may also form a prominent part of the groundcover (DEC, 2006).

For further information please see (DEC, 2006).

Appendix D: Management Actions for Threatened Flora

Species	Relevant actions from PAS
<i>Acacia bynoeana</i> [^]	<ul style="list-style-type: none"> • Conduct surveys to determine the status of Southern Highlands and Upper Blue Mountains sites • Ensure that sites on crown land are appropriately managed for conservation of species • Incorporate appropriate fire regime into land management practices • Incorporate site specific threat abatement measures for the species into Plan of Management for sites in council or crown reserves • Increase the level of legislative protection for sites through land-use planning mechanisms and conservation agreements. • Retain vegetative linkages between sites where possible • Public authorities undertaking road, trail, or easement maintenance activities in potential habitat are to ensure that planning and maintenance staff are aware of the species and that processes are in place to avoid impacting upon it • Restrict access to sites, where necessary • Undertake targeted bush regeneration works, where required
<i>Acacia flocktoniae</i> [^]	<ul style="list-style-type: none"> • Identify and survey potential habitat • Ensure personnel planning and undertaking hazard reduction work can identify species and its habitat • Investigate increasing the legislative protection of sites through land use planning mechanisms or conservation agreements • Investigate optimal fire regime • Mark known sites and potential habitat onto maps used for planning hazard reduction work

<i>Acacia meiantha</i>	No PAS
<i>Astrotricha crassifolia</i> [^]	<ul style="list-style-type: none"> Record location of sites accurately on the NSW Wildlife Atlas Identify, map and survey potential habitat Liaise with landowners to ensure the effective implementation of threat abatement measures Prepare management plans for off-park sites, in consultation with landowners Survey recorded sites to determine status and document threats
<i>Atkinsonia ligustrina</i>	No PAS
<i>Baloskion longipes</i> [^]	<ul style="list-style-type: none"> Conduct further survey in areas where populations have been recorded Continue to control feral pigs where a threat
<i>Boronia deanei</i> [^]	Ascertain population extent and status in Newnes Plateau area
<i>Carex klaphakei</i>	<ul style="list-style-type: none"> Identify and survey potential habitat Increase protection status of sites outside conservation reserves using land use planning mechanisms or conservation agreements Negotiate with private landholders to prepare and implement site management statements to address threats on private land
<i>Darwinia peduncularis</i>	<ul style="list-style-type: none"> Identify and survey potential habitat, particularly in the Blue Mountains Implement sympathetic habitat management in crown reserves where the species occurs, particularly addressing fire management and weed invasion Liaise with RFS to relocate any turning circles that are located on rock platforms in its habitat and ensure RFS staff have processes in place such that any future trails or turning circles avoid these areas Where possible, close trails in areas that pass through populations

<i>Derwentia blakelyi</i>	<ul style="list-style-type: none"> • Undertake targeted survey to verify distribution and population status • Identify threats to known populations and implement management actions to ameliorate them • Liaise with landholders/stakeholders and facilitate the implementation of site management specific monitoring and threat abatement measures • Monitor impact of fire on populations to inform OEH/ RFS/ Lithgow Council • Monitor known populations annually to determine changes to site and population status
<i>Euphrasia bowdeniae</i> [^]	<ul style="list-style-type: none"> • Identify, map and survey potential habitat during flowering period to establish distribution • Monitor known sites for the operation of threats and for changes in population status. • Provide map of known occurrences to RFS and seek inclusion of mitigation measures on Bush Fire Risk Management Plan(s), risk register and/or operation maps • Reserve fire management strategy to include operational guidelines to protect this species from fire • Undertake targeted bush regeneration works, where required. (Medium priority) • Where possible, restrict access to sites through fencing or re-routing tracks. • Install signage along tracks near recorded locations that explain the sensitive nature of this species' habitat
<i>Grammitis stenophylla</i>	No PAS
<i>Grevillea evansiana</i> [^]	<ul style="list-style-type: none"> • Survey for potential habitat to verify distribution • Ensure that any personnel undertaking hazard reduction activities near known populations or habitat are aware of the fire sensitivity of this species • Provide map of known occurrences to RFS and seek inclusion of fire frequency >7 years on Bush Fire Risk Management Plan(s), risk register and/or operation maps.
<i>Haloragodendron lucasii</i> [^]	<ul style="list-style-type: none"> • Implement drainage works to manage impacts from runoff

	<ul style="list-style-type: none"> • Implement weed control measures • Monitor impact of fire on populations to inform OEH/ RFS/ Lithgow Council • Restrict access to sites through track relocation and erect fencing
<i>Lastreopsis hispida</i>	<ul style="list-style-type: none"> • Confirm sightings and establish status of population • Identify and survey potential habitat taking care not to trample through fragile fern habitats • Protect habitat around known populations from weeds using best practice bush regeneration methods taking care not to adversely affect this species or damage its habitat • Report any new records to the Department of Environment, Climate Change and Water
<i>Leionema sympetalum</i> [^]	<ul style="list-style-type: none"> • Conduct further surveys to confirm known records and search similar habitat for new populations • Install signage or fencing, or equivalent, to prevent trackwork from impacting on populations of the species
<i>Leucopogon fletcheri</i> subsp. <i>Fletcheri</i>	Conduct surveys in likely habitat
<i>Persoonia acerosa</i> [^]	<ul style="list-style-type: none"> • Undertake surveys of potential habitat • Ensure agencies undertaking road and easement maintenance works are aware of the species and have processes in place to prevent habitat destruction or degradation • Ensure personnel undertaking hazard reduction burns are able to identify the species and are aware of its habitat and habitat requirements, particularly in regard to fire intervals • Investigate whether the addition to OEH estate of Crown Lands between Blue Mountains suburbs and NP is possible and would reduce fragmentation of population
<i>Persoonia hindii</i>	<ul style="list-style-type: none"> • Undertake targeted survey for this species in potential habitat to establish distribution • Assess size & extent of each population, select key ones for monitoring, & establish monitoring system

	<ul style="list-style-type: none"> • Ensure personnel undertaking utility maintenance and other works in known locations are aware of this species, its habitat requirements and that they do not undertake actions that may negatively impact this species • Monitor impact of fire on populations to inform OEH/ RFS/ Lithgow Council
<i>Persoonia hirsuta</i> [^]	<ul style="list-style-type: none"> • Carry out targeted surveys in potential habitat, particularly freehold land and Crown land that may be alienated • Develop and implement site-awareness and protection procedures for use by land owners/managers and public utilities and their contractors when undertaking road, trail, or easement maintenance • Fence sites and exclude livestock and/or feral animals, where required • Incorporate best knowledge regarding appropriate fire regime into land management practices • Prepare and implement site management plans for sites that are located on public land outside the NPWS estate • Restrict vehicular and pedestrian access to sites, where necessary • Review classification of Crown land where sites occur to ensure appropriate classification and management for nature conservation • Undertake targeted bush regeneration works, where required
<i>Persoonia marginata</i> [^]	<ul style="list-style-type: none"> • Develop and implement habitat management strategies, including a fire management strategy, management of recreational use, prevention of rubbish dumping, weed control • Ensure personnel planning and undertaking road maintenance activities are able to identify the species and are aware of its habitat • Include or review the hazard reduction conditions on the Threatened Species Hazard Reduction List
<i>Philothea ericifolia</i> [^]	<ul style="list-style-type: none"> • Conduct baseline surveys to locate new populations • Monitor all known populations
<i>Prostanthera cryptandroides</i> [^]	<ul style="list-style-type: none"> • Control access (people, domestic/feral/native herbivores) to reduce trampling & grazing impacts at priority sites • Identify, map and survey potential habitat as per advice from Miller 2000.

	<ul style="list-style-type: none"> • Liaise with landholders/stakeholders and facilitate the implementation of site management specific monitoring and threat abatement measures, including weed removal and fencing • Opportunistically monitor populations after wildfire to determine fire ecology • Provide map of known occurrences to RFS and seek a fire frequency >8 years on Bush Fire Risk Management Plan(s), risk register and/or operation maps • Undertake restoration works at sites where access-related degradation of habitat has occurred
<i>Prostanthera stricta</i> [^]	<ul style="list-style-type: none"> • Identify, map and survey potential habitat during flowering season (winter-spring), as per recommendations in Miller 1999. • Implement an annual monitoring program at priority sites • Prepare and implement fire management guidelines, including recommended fire interval > 8yrs • Restrict vehicular access
<i>Pultenaea aristata</i> [^]	<ul style="list-style-type: none"> • Confirm location details of existing records. • Provide map of known occurrences to RFS and seek inclusion of mitigation measures in Bush Fire Risk Management Plan, risk register and/or operation map(s). • Reserve Fire Management Strategy to include operational guidelines to protect this species from fire.
<i>Pultenaea glabra</i> [^]	<ul style="list-style-type: none"> • Provide map of known occurrences to RFS and seek inclusion of mitigation measures in Bush Fire Risk Management Plan, risk register and/or operation map(s). • Undertake appropriate weed control activities where necessary • Ensure personnel undertaking road maintenance activities on roadsides where this species occurs can identify it, are aware of its presence and do not undertake any activities that may negatively impact on it. • Monitor impact of fire on populations to inform OEH/ RFS/ Lithgow Council • Monitor known populations for changes in population status and potential threats

Appendix E: Management Actions for Threatened Fauna

Common Name	Recovery Plans	Relevant actions from PAS
BIRDS		
Brown Treecreeper <i>Climacteris picumnus</i>	No recovery plan	<ul style="list-style-type: none"> Implement sympathetic habitat management in conservation reserves, council reserves and crown reserves where the species occurs. Undertake surveys for threatened woodland birds in new and existing conservation reserves containing suitable habitat to assess the species' conservation status and identify key breeding and foraging habitat
Eastern Bristlebird <i>Dasyornis brachypterus</i>	No recovery plan	<ul style="list-style-type: none"> Close and regenerate tracks in known habitat, other than those used for fire and other management purposes Control foxes and cats where bristlebirds are vulnerable to predation, particularly after large-scale fire Encourage environmental protection zones to be assigned to important habitat and linking areas at each location Encourage private landholders with bristlebird habitat to undertake VCAs Monitor habitat and its response to fire
Flame Robin <i>Petroica phoenicea</i>	No recovery plans	<p>No PAS but the following recovery information for the species is relevant:</p> <ul style="list-style-type: none"> Retain dead timber on the ground in open forest and woodland areas Avoid the use of exotic berry-producing shrubs in landscape and garden plantings in areas adjacent to Flame Robin habitats
Gang Gang Cockatoo <i>Callocephalon fimbriatum</i>	No recovery plans	<ul style="list-style-type: none"> Identify important nesting habitat on public lands Increase landholder and public awareness of status, threats and priority actions Negotiate management agreements and covenants over important areas of habitat

Common Name	Recovery Plans	Relevant actions from PAS
		<ul style="list-style-type: none"> • Provide input to National Parks and local bushfire mgt. plans to minimise impacts of fire on critical resources
Glossy Black Cockatoo <i>Calyptorhynchus lathami</i>	No recovery plans	<ul style="list-style-type: none"> • Encourage the restoration of foraging habitat that has been cleared or degraded by previous impacts • Identify and map key breeding and foraging habitat, similar to the mapping done by Robinson (2004) at St Georges Basin • Increase landholder and public awareness and interest in Glossy Black Cockatoo conservation and habitat management • Provide incentives for landholders to fence and manage key sites • Utilise the Glossy Black Cockatoo as a flagship threatened species for woodland and forest conservation education and awareness programs
Ground Parrot <i>Pezoporus wallicus wallicus</i>	No recovery plans	<ul style="list-style-type: none"> • Implement habitat management strategies proposed by Baker (1996) and B&ES (1996) on Beecroft Peninsula • Provide map of known occurrences to Rural Fire Service and seek inclusion of mitigative measures on Bush Fire Risk Management Plan(s), risk register and/or operation maps • Reserve Fire Management Strategies to include operational guidelines to protect this species from fire.
Hooded Robin <i>Melanodryas cucullata</i>	No recovery plans	<ul style="list-style-type: none"> • Conduct annual monitoring of key populations that are managed under property agreements or are within OEH estate, conservation reserves, council reserves and crown reserves • Implement sympathetic habitat management in conservation reserves, council reserves and crown reserves where the species occurs • Provide stewardship payments, develop property agreements and apply other land management incentives for the protection and enhanced management of priority woodland vegetation that is used by the Hooded Robin
Powerful Owl <i>Ninox strenua</i>	No recovery plans	Encourage private landholders to undertake management options to conserve and/or actively manage forest owl habitat
Scarlet Robin <i>Petroica boodang</i>	No recovery plan	<p>No PAS but the following recovery information for the species is relevant:</p> <ul style="list-style-type: none"> • Retain dead timber on the ground in open forest and woodland areas.

Common Name	Recovery Plans	Relevant actions from PAS
		<ul style="list-style-type: none"> • Keep domestic cats indoors at night
Turquoise Parrot <i>Neophema pulchella</i>	No recovery plans	<ul style="list-style-type: none"> • Control feral cats and foxes near high density populations • Control feral goats and pigs of known or potential habitat • Control weeds at priority sites • Identify sites where the species is commonly observed and target for incentives and habitat management • Implement sympathetic habitat management in conservation reserves, council reserves and crown reserves where the species occurs
MAMMALS		
Eastern Pygmy Possum <i>Cercartetus nanus</i>	No recovery plans	<ul style="list-style-type: none"> • Conduct field surveys using "Elliot" traps in trees and on the ground and pitfall traps to further delineate distribution and key populations. Avoid periods of cold weather • Control and monitor abundance of feral predators, especially cats, where there are known populations of EPP in areas of high quality habitat and encourage night-time curfews for cats on urban fringes adjacent to these habitats • Control feral predators and rabbits • Avoid frequent burning of habitat • Provide map of known occurrences to Rural Fire Service and seek fire frequency of >10 years on Bush Fire Risk Management Plan(s), risk register and/or operation map(s) • Reserve fire management strategies to include operational guidelines to protect this species from fire, with fire frequency of >10 years
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	No recovery plans	<ul style="list-style-type: none"> • Enhance and sustain the vegetation of camps critical to the survival of Grey-headed Flying-foxes • Protect roosting habitat critical to the survival of Grey-headed Flying-foxes, for example through management plans, local environmental plans and development assessments, and through volunteer conservation programs for privately owned land

Common Name	Recovery Plans	Relevant actions from PAS
		<ul style="list-style-type: none"> • Provide educational resources to improve public attitudes toward Grey-headed Flying-foxes
Koala <i>Phascolarctos cinereus</i>	Approved NSW Recovery Plan should be consulted if the species is present http://www.environment.nsw.gov.au/threatenedspecies/recoveryplans.htm	<ul style="list-style-type: none"> • No relevant PAS but the following recovery information for Koala applied if this species is present: • Undertake feral predator control • Apply low intensity, mosaic pattern fuel reduction burns in or adjacent to Koala habitat • Protect populations close to urban areas from attacks by domestic dogs
Long-nosed Potoroo <i>Potorous tridactylus</i>	No recovery plans	<ul style="list-style-type: none"> • Control weeds, particularly those that affect the understorey layer, in Long-nosed Potoroo habitat • Prevent the spread of Phytophthora sp. • Seek formal protection of all remaining areas of known habitat under voluntary conservation agreements, joint management agreements or as critical habitat • Undertake control burn using a mosaic pattern to ensure adequate vegetation cover • Undertake fox control in priority Long-nosed Potoroo sites as per Fox TAP • Using survey methods such as hair-tubing, trapping, scat analysis and the abundance of diggings, estimate the population sizes and relative densities of populations
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	No recovery plans	<ul style="list-style-type: none"> • Conduct systematic monitoring at key sites. Monitoring sites will be distributed across the NSW range of the Spotted-tailed Quoll and within different habitat types such as Kosciusko NP, Limeburner's Creek NR, northern tablelands and the Blue Mountains • Develop a communication strategy to raise public awareness of the Spotted-tailed Quoll, compile education resources and distribute to identified target audience. Support community participation in survey and monitoring programs • Liaise with key aboriginal groups and document understanding of Spotted-tailed Quoll's local distribution, abundance, ecology and threats

Common Name	Recovery Plans	Relevant actions from PAS
		<ul style="list-style-type: none"> Reserve Fire management Strategy(s) include operational guidelines that protect rocky outcrops and riparian zones within areas of known habitat
Squirrel Glider <i>Petaurus norfolcensis</i>	No recovery plans	Conduct surveys and assessments of less known sites to confirm presence of species and negotiate, develop and implement conservation management agreements for high priority sites
Yellow-bellied Glider <i>Petaurus australis</i>	No recovery plans	<ul style="list-style-type: none"> Community awareness Consider species in reserve management and planning to protect and enhance habitat and connection corridors Identify significant populations and identify management issues. Support monitoring of populations and where possible implement appropriate management Provide map of known occurrences to Rural Fire Service and seek inclusion of mitigative measures on Bush Fire Risk Management Plan(s), risk register and/or operation map(s) Stakeholder awareness of species habitat requirements, ecology and management
REPTILES		
Blue Mountains Water Skink <i>Eulamprus leuraensis</i>	National Recovery Plan to be consulted for management of species if found at the site http://www.environment.gov.au/biodiversity/threatened/publications/recovery/blue-mtns-water-skink/index.html	<ul style="list-style-type: none"> Control invasion of Pinus species into sites within or adjoining State Forest pine plantations Control pigs impacting on swamp sites, particularly on the Newnes Plateau. Control weeds at sites adjoining urban areas or impacted by runoff from the Great Western Highway. Carry out weed control using bush regeneration techniques that do not damage the sensitive swamp habitat of this species Develop and implement strategies to reduce impacts of urban runoff on upland swamps. Impacts include erosion and channelisation, sedimentation, changes in water quality and spread of weeds Ensure that developments upstream of swamps containing this species maintain, and if possible improve, water quality exiting the site Identify and map potential habitat and undertake targeted survey to assess potential habitat for presence of skinks

Common Name	Recovery Plans	Relevant actions from PAS
		<ul style="list-style-type: none"> • Liaise with relevant landholders at freehold sites containing this species about the significance of this species and how best to manage it. Provide incentives to promote best practice management • Maintain gates and barriers to prevent vehicular, particularly recreational 4WD and trail bike, access to fire trails that access swamps with records of this species • Manage fire trails and unsealed roads to reduce sedimentation impacts on this species' habitat • Undertake a community education and involvement program in conjunction with existing landcare and bushcare groups and other catchment based programs • Undertake rehabilitation and restoration works as required on this species' habitat to repair damage such as sedimentation, erosion and channelisation, as well as weed invasion • Where impacts of bushwalkers or use of informal trails are a problem install signage that conveys the significance of this species and the sensitive nature of its habitat
Rosenberg's Goanna <i>Varanus rosenbergi</i>	No recovery plans	<ul style="list-style-type: none"> • Develop and undertake community education strategy that reduces demand for bush rock as landscaping material and provides/promotes alternatives • Identify key habitats or areas for protection and enhanced management on private land through management agreements and incentives • Identify suitable habitat across the range of the species with reference to satellite imagery and vegetation surveys • Implement management strategies that reduce the prevalence of bush rock removal, including surveillance • Provide map of known occurrences to Rural Fire Service and seek protection of rocky outcrops and riparian zones on Bush Fire Risk Management Plan(s), risk register and/or operation map(s) • Undertake surveys for the species within identified suitable habitat
AMPHIBIANS		
Giant Burrowing Frog	No recovery plans	<ul style="list-style-type: none"> • Determine priorities for regions and populations to be included in a gene bank to provide an assurance for populations that

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<i>Heleioporus australiacus</i>		<p>may decline and disappear in the future</p> <ul style="list-style-type: none"> • Determine the threats and other management issues affecting all key populations identified for this species • Encourage and support community projects that benefit the conservation of the Giant Burrowing Frog. Ensure records from surveys and assessments are entered on the Atlas of NSW Wildlife • Once a monitoring protocol is developed, incorporate it into all site management plans • Prepare and implement site specific management plans to protect key Giant Burrowing frog populations from identified threats. Source funding to implement these plans
Littlejohn's Tree Frog <i>Litoria littlejohni</i>	No recovery plans	<ul style="list-style-type: none"> • Investigate opportunities to remove exotic fish or attenuate chytrid infection if identified in known breeding areas • Maintain hydrological regimes and protect water flows and water quality around the upper reaches of streams and perched swamps • Undertake survey in some of the less surveyed parts of the species distribution such as the Blue Mountains
Red-crowned Toadlet <i>Pseudophryne australis</i>	No recovery plans	<ul style="list-style-type: none"> • Develop a guide to fire trail, track and road construction and maintenance that includes details of microhabitat manipulation likely to be beneficial to the species. • Develop a preferred habitat fire regime and mosaic burn, heap burn and other burn strategies that reduce impacts on the species • Develop best practice habitat management strategies that reduce bushrock removal from important habitat areas • Develop best practice management strategies that buffer and protect important headwater/ridge top breeding sites from changes to water flow, flow regimes and water quality changes • Develop educational strategies and raise awareness of actions land owners can take to reduce impact on the species • Prepare guide to creating, rehabilitating or augmenting habitat for the species; this might include provision of rock/log ground cover, diversion of water, provision of breeding/nesting sites and material.

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INVERTEBRATES		
Giant Dragonfly <i>Petalura gigantea</i>	No recovery plans	<ul style="list-style-type: none"> • Assess known sites for threats, monitor changes in site condition, and develop and implement strategies to address threats • Control invasion of Pinus species into swamp habitat within or adjoining Newnes SF and control weeds at sites adjoining urban areas • Develop and implement strategies to reduce impacts of urban runoff on upland swamps. Impacts include erosion and channelisation, sedimentation, changes in water quality and spread of weeds • Ensure that developments upstream of swamps containing this species maintain, and if possible improve, water quality exiting the site • Exclude pigs from areas containing actual and potential breeding habitat • Identify and map potential habitat and undertake targeted survey to assess potential habitat for presence of dragonfly • Liaise with relevant landholders at freehold sites containing this species about the significance of this species and how best to manage it. Provide incentives to promote best practice management • Maintain gates and barriers to prevent vehicular, particularly recreational 4WD and trail bike, access to fire trails that access swamps with records of this species • Maintain hydrological regimes of swamp habitats and and protect water flows and water quality • Manage fire trails and unsealed roads to reduce sedimentation impacts on this species' habitat • Undertake a community education and involvement program in conjunction with existing landcare and bushcare groups and other catchment based programs • Undertake rehabilitation and restoration works as required on this species' habitat to repair damage such as sedimentation, erosion and channelisation, as well as weed invasion • Where impacts of bushwalkers or use of informal trails are a problem install signage that conveys the significance of this

Common Name	Recovery Plans	Relevant actions from PAS
		species and the sensitive nature of its habitat



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