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Dear Fellow Conservationist,

Thirty years ago in November 1982 my husband Peter Dykes finalised the purchase of a rural bush block containing a significant karst area which held the feature known as Tricketts Arch. Peter is a keen caver, speleologist and conservationist but above all he wanted to preserve the area and its unique karst and biodiversity values. At the time Peter was one of the first cavers in Australia to actually own a karst area.

Since then my family have grown to love and appreciate the property we call home. As an Aboriginal family we have endeavoured to keep our dream of preserving and conserving the property's cultural, karst and biodiversity values. With that in mind we have constantly sort ways to help us maintain and enhance the property's cultural and natural values.

Several years ago our family began working with staff from the Office of Environment and Heritage (OEH) on developing plans and strategies to conserve and enhance the unique cultural and natural values present on our property. The process has been long and very involved but we persevered and were extremely pleased to announce in November 2011 that it has all finally come to fruition, with our acceptance and signing of the formal agreement to the terms and conditions of Tricketts Arch Biobanking Conservation Agreement.

It is our family's hope that with the sale of the biobanking ecosystem credits that we will be able to finance a family vision of cultural programmes, employment opportunities and farm infrastructure improvements that will build on our dream of *Caring For Country* with *Caring For Our People*.

Three attachments to this letter summarise the property's values and the management actions agreed to as part Tricketts Arch Biobanking Conservation Agreement with our family's vision for country and people:

Attachment A	The Ngalina Vision for Country and People
Attachment B	Tricketts Arch Biobanking credits and ecological, cultural and heritage values
Attachment C	Tricketts Arch Biobanking management actions

As part of the Biobanking process an ecological report on the property's biodiversity valves was completed by the company Ecobiological. Their report was than assessed by staff from OEH for accuracy and thoroughness. A Biobanking Property Management Plan was than prepared and this forms the major component of the Biobanking Property Agreement which can be accessed, viewed and downloaded from the OEH website (nature conservation – biobanking web page). Also we prepared with the help of the members of the local Aboriginal community; members of the Australian Speleological Federation and members of the Local Landcare Group specific management plans and strategies for the Aboriginal, karst and pioneer mining heritage areas. These plans along with the ecological report and the OEH report form the major part of this presentation, namely:

Aboriginal tab	Tricketts Arch Aboriginal Cultural Heritage Management Plan
Karst tab	Tricketts Arch Karst Management Plan
Mining tab	Tricketts Arch Mining Heritage Management Plan
Ecological tab	Ecobiological – Tricketts Arch Biobanking Assessment Report
OEH Report tab	Office of Environment and Heritage assessment report

To date the Tricketts Arch Biobanking Conservation Site is the largest biobanking site declared in NSW and the very first NSW Aboriginal family owned conservation area. Our family is extremely proud of this special achievement and of the work and efforts of all our family members and friends who have made this possible.

Ngalina is a Murrawarri word meaning the "*two of us*" and for us it has come to symbolise not just the joining of two cultures to achieve this significant milestone but of the hopes and dreams of all of my extended family members for the future. As a proud Murrawarri woman from North Western NSW – (Weilmoringle & Brewarrina), I know that the Murrawarri and Wiradjuri family members share the vision that myself and my husband Peter have for our property "Tricketts Arch".

I sincerely think that you will also.

Yours in Unity

Sharon Ruby Dykes
8th March, 2015.

Biobanking Declaration Event – Saturday 12th November 2011

ATTACHMENT A

THE NGALINA VISION FOR COUNTRY AND PEOPLE

Our family like many Aboriginal families is a very large extended family with a high proportion of young people. Some live without hope of long-term employment and in an atmosphere of despair fuelled with drugs and alcohol. Our family vision is to use the opportunity that the sale of the biobanking ecosystem credits offers to help finance a way out of poverty with the prospect of real long-term employment, cultural renewal and working for country and people can offer.

We plan to tackle our family members' poverty with a strategy of cultural renewal; employment and caring for culture, country and people.

Cultural Renewal

Aboriginal People are very spiritual people and it is this spirituality that defines their culture, loss of culture means loss of one's spirit and this leads to loss of self-respect.

All through the biobanking process we made provision for the establishment of a cultural centre and bush camping ground. It is our intention to use proceeds from the biobanking ecosystem credit sale to fund the construction of both facilities and to use them to run school culture camps; drug and alcohol programmes and "artist in the bush" camps. Our dream is to see the youth in our family grow up strong with a sense of culture, respect and determination. Among our family members are a social worker; care providers, budding artists and a drug and alcohol counsellor. Using their skills and the proposed facilities we have received positive initial responses from the education sector, Department of Community Services and Elders Councils to establishing and operating culturally appropriate programmes.

Employment

Employment is the key to breaking out of the poverty. With secure employment Aboriginal people are able to participate in the broader Australian economy. For many of our family members employment is casual and never secure or long-term. With the biobanking opportunities we hope to break this cycle and replace it with not just employment, but with self-confidence and careers. We will be taking some of our family members out of their current situation of long-term unemployment and giving them a sense of hope and self-worth.

The sale of the biobanking ecosystem credits will facilitate the immediate employment of a farm ranger to undertake the management actions agreed to in the Tricketts Arch Biobanking Conservation Agreement. However it is our vision to go further and to use this position to help fund an additional two trainee Aboriginal land management positions in partnership with government and non-government agencies. Also the construction of the culture centre and camping ground along with an office and improvements to the exiting family residence will provide an addition two short-term construction positions. With the proposed cultural renewal activities we hope to also provide employment for 3 people on long-term basis. Among our extended family are many with land management and construction skills that would benefit from the employment that we would be able to offer.

Caring for Culture, Country and People

*Caring For Countr*y is a key Aboriginal value and a basic component in respect for culture and people. Working on country and looking after sites, plants and animals is something that gives Aboriginal people not just a job but a sense of respect for Elders, cultural values and tradition and a love for their people.

It is our hope to use some of the funds from the sale of the biobanking ecosystem credits to fund the purchase of additional bush blocks in the Jaunter and other areas where appropriate and to build a viable base of employment and opportunity for Aboriginal land management of country.

This is what the *Ngalina Vision* is all about.

ATTACHMENT B

TRICKETTS ARCH BIOBANKING CREDITS AND ECOLOGICAL, CULTURAL AND HERITAGE VALUES

Property Address:
Tricketts Arch
605 Jaunter Road, JAUNTER 2787

Location:
Tricketts Arch is located approx. 50 km southeast of Oberon by driving along the Shooter Hill Road; Mount Werong Road and Jaunter Road. The property is in the south-eastern corner of the Oberon – Gurnang Plateau surrounded by farmlands, pine plantations and National Park. To the east are the Kanangra Boyd National Park, Wildness Area and Greater Blue Mountains World Heritage Area. South and west are cleared farming lands, to the north is private property with native vegetation and NSW State Forest pine plantations. The property fronts the Tuglow River and has three creeks traversing it: Slys Creek, Chimney Creek and Arch Creek.

Tenure Details:
Tricketts is owned by Peter and Sharon Dykes
Lot 15 DP 661990
Lot 1 DP 1152451

Ecosystem Credits Available:

Biometric Vegetation Type (DECC 2008)	OEH Biometric No.	Vegetation Type Vegetation Western Blue Mountains – (DEC 2006)	Area (ha)	Ecosystem Credits
Eurabbie - stringybark shrubby woodland on limestone in the Jenolan Caves area, Sydney Basin	HN525	Limestone Karst (MU48)	19.71	216
Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	HN558	Montane Sheltered Narrow-leaved Peppermint Forest (MU6)	14.26	109
Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	HN572	Tableland Gully Snow Gum – Ribbon Gum Grassy Forest (MU11)	29.89	264
River Tussock - Tall Sedge - Kangaroo Grass moist grassland of the South Eastern Highlands	HN576	Mountain Hollow Grassy Fen (MU53)	1.12	9
Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands	HN590	Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest (MU14)	76.15	645
TOTALS			**141.13**	**1243**

Species Credits Available:

Botanical Name	Common Name	No of Individuals	Species Credits
Diuris aequalis	Buttercup Doubletail	431	910

Based on current information and surveys (2011) the BioBanking Site contains two-thirds of the known population of the rare orchid Buttercup Doubletail (*Diuris aequalis*).

Other Ecological Values:
The following animals listed as Vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995* have been recorded on the BioBanking Site:

Zoological Name	Common Name
Ninox strenua	Powerful Owl
Calocephalon fimbriatum	Gang Gang Cockatoo
Miniopterus schreibersii oceanensis	Eastern Bentwing Bat
Myotis macropus	Large-footed Myotis

The BioBanking Site has been identified as having potential habitat for the following animal listed as Endangered on Schedule 1 of the *Threatened Species Conservation Act, 1995*.

Zoological Name	Common Name
Petrogale penicillata	Brush-tailed Rock Wallabies

The BioBanking Site has been identified as having potential habitat for the following animals listed as Vulnerable on Schedule 2 of the *Threatened Species Conservation Act, 1995.*

Zoological Name	Common Name
Chalinolobus dwyeri	Large-eared Pied Bat
Dasyurus maculatus	Spotted-tailed Quoll
Cercartetus nanus	Eastern Pygmy Possum

The BioBanking Site vegetation community "*Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highland*" (OEH Biometric No HN572) forms part of the "*Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands*" which has recently been listed as an Endangered Ecological Community under the *Threatened Species Conservation Act, 1999*.

The following plants listed as ROTAP plants have been recorded on the BioBanking Site

Botanical Name	Common Name	No of Individuals
Discaria pubescens	Australian anchor Plant	3

The BioBanking Site contains significant riparian habitat along the Tuglow River, as well as its tributaries; Slys Creek, Chimney Creek and Arch Creek. The river and creeks are spring-fed permanent watercourses providing high quality fresh water into the Kowmung River Catchment as well as being important habitat for Platypus (*Ornithorhynchus anatinus*).

The biobank site contains a locally significant waterfall on Chimney Creek known locally as "*Chimney Creek Cascades*".

Aboriginal Cultural Values:
The BioBanking Site has been identified by members from the Gundungurra and Wiradjuri Peoples as an area with high cultural heritage values and contains numerous items of high Aboriginal cultural significance to the Gundungurra and Wiradjuri Peoples, including artefact scatters, scarred trees, stone arrangements, ochre sites, ceremonial areas and camp sites, acknowledged as Aboriginal objects and/or Aboriginal places as defined by the *National Parks and Wildlife Act 1974*. Our family has prepared in consultation with the traditional owners a Tricketts Arch Aboriginal Cultural Heritage Management Plan to help protect and conserve the property's Aboriginal cultural values.

Karst Values:
The BioBanking Site has been identified by members of the Australian Speleological Federation Inc. (ASF) as containing a nationally significant karst environment including extensive cave systems, cave decorations (speleothems), cave adapted fauna, cave sediments, fossils, surface solutional features and a limestone bridge known as "Tricketts Arch" which is an extremely rare karst feature (only a few are known to exist in NSW from the almost 6000 known features). Our family has prepared in consultation with the Australian Speleological Federation Inc. a Tricketts Arch Karst Heritage Management Plan to help protect and conserve the property's karst values.

Mining Heritage Values:
The BioBanking Site has been identified by members of the local community as containing areas and items of historical significance, including the old Tuglow Copper mine and associated workings and constructed stone water-races on Arch Creek. Our family has prepared in consultation with the Tuglow Landcare Group a Tricketts Arch Mining Heritage Management Plan to help protect and conserve the property's mining heritage values.

ATTACHMENT C

TRICKETTS ARCH BIOBANKING MANAGEMENT ACTIONS

The following passive management actions (those not requiring funds from the Biobanking Trust Account) are required to be undertaken from the date of registration of the Biobanking Agreement:

- Removal of domestic stock from the biobanking site.
- Management of human activities to avoid adverse effects on biodiversity values.
- Retention of regrowth and remnant native vegetation.
- Retention of dead timber (whether standing or fallen) except for the removal of firewood for one dwelling.
- Retention of native rock.
- Monitoring and reporting.

The following management actions are required to be undertaken once 80% of the Total Fund Deposit has been paid into the NSW Office of Environment and Heritage Biobanking Trust Account from the sale of biobanking credits. There are two types of actions; ones that are "one-off" (undertaken in the initial years) and ones that are on-going forever.

(a) One-off management actions (done in years 1 to 5):

- Erection of a stock proof boundary fence (replaced every 20 years)
- Ecological fire management – initial preparation of fire plan/s
- Bushfire management – construction of boundary fire break
- Property clean-up; remove old internal fences, clean up mine sites
- Undertake a property Aboriginal site survey and identify culturally appropriate management actions for individual Aboriginal sites
- Replanting programme for cleared areas – site preparation
- Replanting programme for cleared areas – planting grasses
- Replanting programme for cleared areas – trees and shrubs
- Rehabilitate old mine sites
- Property tracks erosion control
- Rehabilitate gully erosion in Arch Creek – intensive rehabilitation

(b) On-going Management Actions (undertaken every year or in designated years):

- Yearly maintenance of boundary fence to stock proof standard (replace every 20 years)
- Weed control – blackberry, serrated tussock, cherry laurel, Paterson's curse, thistle, English ivy
- Ecological fire management every 5 to 7 years – planning
- Ecological fire management every 5 to 7 years – burn
- Bushfire management – yearly maintenance of boundary fire break
- Bushfire management – reconstruction of boundary fire break every 5 years
- Replanting programme for cleared areas – maintenance for up to 10 years
- Vertebrate pest management – pig, fox, rabbit, deer, cat
- Rehabilitate gully erosion in Arch creek – on-going rehabilitation for first 10 years

ecobiological

survey & assessment

BioBanking Assessment Report for 605 Jaunter Road, Jaunter NSW.

BioBanking Assessment Report:

Tricketts Arch
605 Jaunter Road, Jaunter NSW

May 2010

Report prepared for Mr. & Mrs. P. Dykes.

This report was prepared for the sole use of the proponents, their agents and any regulatory agencies involved in the development application approval process. It should not be otherwise referenced without permission.

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Executive Summary

Ecobiological was commissioned by the Department of Environment and Climate Change (DECC) - Land Alive Projects to prepare a BioBanking Agreement Credit Report for 605 Jaunter Road, Jaunter (property known as Tricketts Arch) owned by Mr Peter and Mrs Sharon Dykes. Initial fieldwork was conducted in June 2009 and specific threatened species surveys, weed surveys and management planning and consultation was conducted in November 2009 and March 2010.

Data collected during field surveys revealed that the subject site supported 149 plant species (Appendix 1) within seven mapped vegetation communities. Two threatened flora species were recorded on the subject site: *Diuris aequalis* was recorded which is listed as Endangered under the NSW TSC Act and Vulnerable under the EPBC Act, and; *Discaria pubescens* which is listed as ROTAP 3RCa. One vegetation community; Mountain Hollow Grassy Fen (*Tableland Swamp Meadow on Impeded Drainage Sites of the Western Sydney Basin and South Eastern Highlands*) forms part of the *Montane Peatlands and Swamps* Endangered Ecological Community listed under the NSW TSC Act 1995.

Opportunistic fauna observations recorded a total of 33 fauna species, consisting of two amphibians, two reptiles, 15 birds, 8 insectivorous bats and 6 mammals. Of these, one is an introduced species (European Rabbit) and four are listed as vulnerable under the NSW TSC Act 1995 (powerful owl, gang gang cockatoo, eastern bentwing-bat and the large-footed myotis). Targeted amphibian surveys did not detect *Mixophes balbus* or other threatened frog species.

Ecosystem credits can be increased through the preparation of management plans for:

- Weed management
- Fire for Conservation
- Human Disturbance
- Retention of Regrowth
- Retention of Dead Timber
- Erosion Control
- Retention of Rock
- Vertebrate Pest Control (foxes and cats)
- Replanting or Supplementary Planting

The BioBanking Agreement Credit Report identifies six ecosystem credit groups, that when combined, earned a total of 972 ecosystem credits and 423 species credits. Management actions required on-site are detailed in a separate Management Plan.

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1 Introduction

1.1 Scope

Ecobiological was commissioned by DECC - Land Alive projects to prepare a BioBanking Agreement Credit Report (Appendix 1) for 605 Jaunter Road, Jaunter NSW (known as Tricketts Arch). Tricketts Arch lies within the Hawkesbury / Nepean CMA region (Oberon CMA Sub-region), and is located approximately 47km south of Oberon, NSW (Figure 1).

1.2 Local Context

Tricketts Arch is approximately 141.5 ha in area and is bound by rural properties to the east, south and west and by Tuglow River to the north. Tricketts Arch has been grazed by sheep with approximately 20ha ripped and pasture improved.

1.3 Description of the proposal

Of the 142.4 ha that makes up Tricketts Arch, only 140.18 ha will be included in the BioBanking Agreement (Figure 2). Areas that have previously been ripped and pasture improved, internal tracks, a power line easement and the homestead are excluded from the land assessed for the BioBanking Agreement Credit Report. These areas have been illustrated in red on Figure 2 and constitute approximately 20.7 hectares.

Figure 1 Tricketts Arch Locality Plan

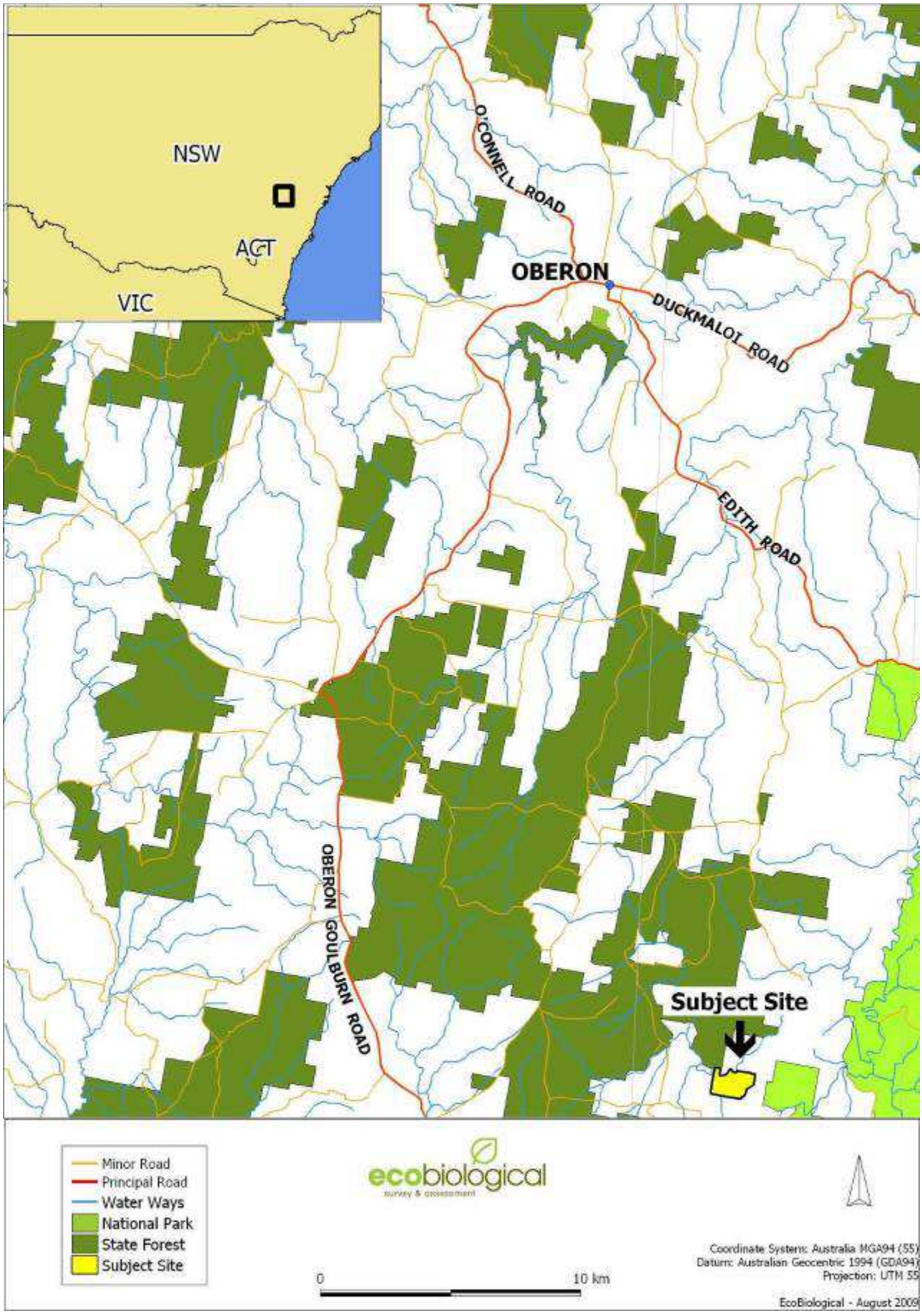
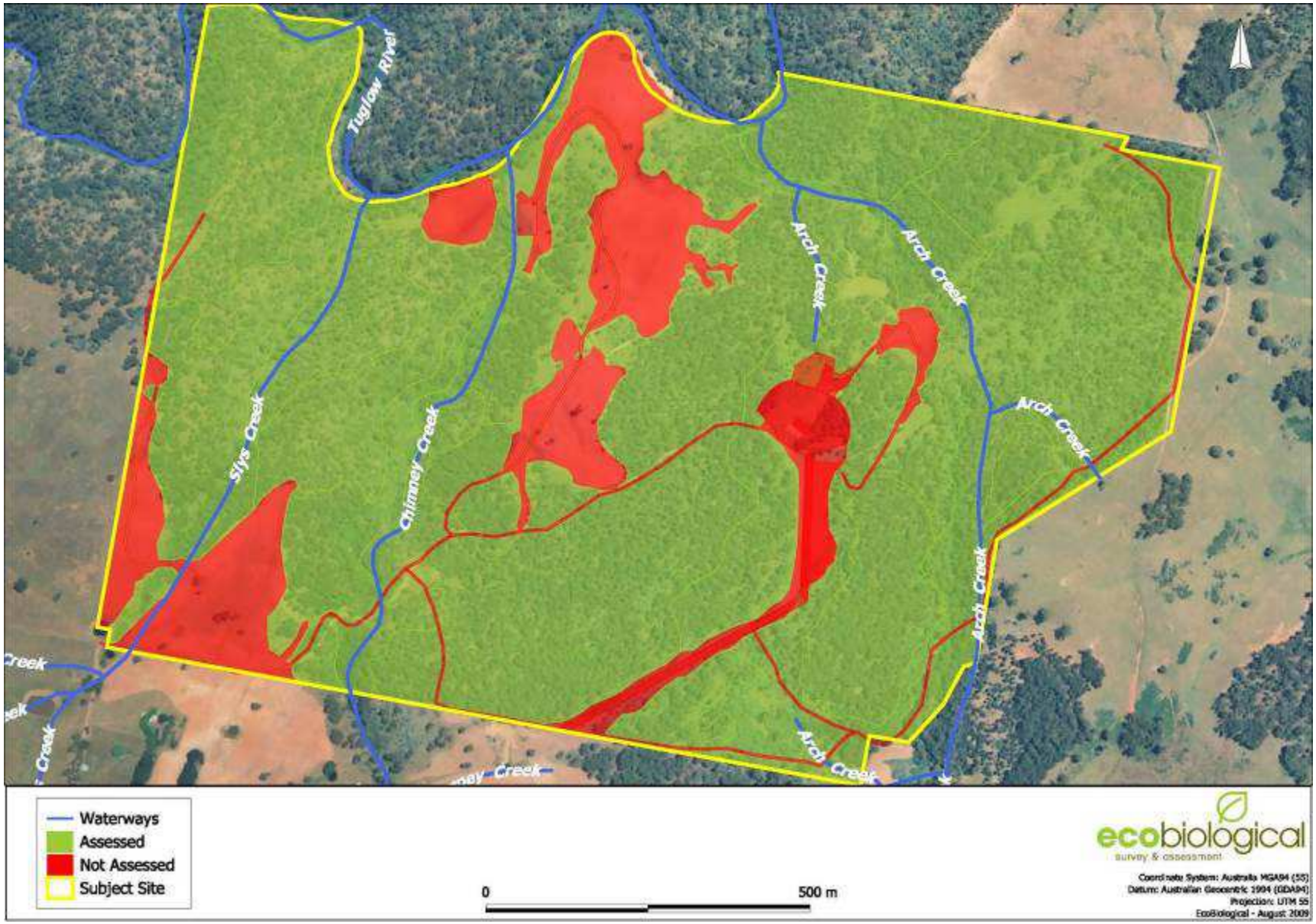


Figure 2 Portion of Tricketts Arch assessed and not assessed as part of the BioBanking Agreement



2 Methods

Tricketts Arch was surveyed between 1- 5 June 2009 and 16-18 November 2009. The June surveys were conducted to achieve ecosystem credits and the November surveys were conducted specifically to achieve species credits. The month of November was identified as the key period to survey for threatened flora and fauna species.

The data collected for entry into the BioBanking calculator was collected in accordance with the "BioBanking Assessment Methodology and Credit Calculator Operational Manual" (DECC 2009).

2.1 Ecosystem Credits

The vegetation community profile were derived from the community structure, the dominant species present in the over-storey, shrub and ground layers, and soils (substrate). Vegetation community profile determinations for the subject site were made with reference to the Vegetation of Western Blue Mountains: Volume 2 Vegetation Community Profiles (DECC 2006).

2.2 Species Credits

Targeted surveys conducted over the property for species that were identified in the Oberon and the NPWS Wildlife Atlas which may generate species credits for Trinketts Arch.

Surveys focussed on chosen species considered as likely to be present or having potential suitable habitat on the property.

2.2.1 Flora

Threatened flora species searches involved plot surveys in June 2009 and random meanders over both survey periods. In June 2009, approximately 30 hours of random meanders were conducted in conjunction with data collection for the ecosystem credit. In November 2009, 30 hours of specific threatened species searches for species credits was conducted.

Flora surveys identified all species collected and observed. Floristic identification and nomenclature was based on Harden (1992, 1993, 2000, 2002) with subsequent revisions as published on PlantNet (http://plantnet.rbgsyd.nsw.gov.au). Plants listed under the ROTAP scheme (Briggs and Leigh 1996) were also considered in this assessment along with species and vegetation deemed to be of local conservation significance.

A list of the results of the flora surveys is provided in Appendix 1.

2.2.2 Fauna

Fauna assessments were undertaken in June and November 2009 and included:

- Opportunistic fauna sightings (June and November 2009);
- Anabat II insectivorous bat recordings (November 2009;
- Owl call playback (June and November 2009); and
- Targeted amphibian surveys. The site has the potential to support the species *Mixophyes balbus* which was surveyed in November 2010 using call playback and nocturnal habitat searches.

A list of the results of the fauna assessment is provided in Appendix 2.

3 Results

3.1 Vegetation Community Mapping

Twenty four vegetation transects/plots were undertaken across Tricketts Arch within seven defined vegetation communities. Table 1 shows the vegetation communities mapped across Tricketts Arch with the corresponding DECC - Database Vegetation Type, formation (Keith), class (Keith), area and the quadrat numbers surveyed in each vegetation community. A brief vegetation community description and photograph (Plates 1 – 7) is provided in section 3.1.1 for each of the seven vegetation communities mapped on Tricketts Arch. A detailed list of flora species identified on Tricketts Arch is provided in Appendix 2. Figure 3 shows the vegetation community map and Figure 4 shows the survey effort undertaken during the vegetation mapping.

Table 1 Vegetation Community Mapping Results

Vegetation Type (DEC 2006)	Vegetation (Biometric) Type (DECC 2008)	Class (Keith)	Area (ha_ moderate-good condition	Area (ha) low condition	Quadrat
Lithgow / Abercrombie Grassy Woodland (MU12)	Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands	Southern Tableland Grassy Woodlands	48.81	8.53	2, 8, 11, 23
Limestone Karst (MU48)	Eurabbie - stringybark shrubby woodland on limestone in the Jenolan Caves area, Sydney Basin	Central Gorge Dry Sclerophyll Forests	17.77	-	10, 17, 21, 22
Montane Sheltered Narrow-leaved Peppermint Forest (MU6)	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	Southern Escarpment Wet Sclerophyll Forests	14.28	-	1, 5, 6, 20
Tableland Gully Snow Gum / Ribbon Gum Grassy Forest (MU11)	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	Tableland Clay Grassy Woodlands	22.16	5.88	4, 12, 19, 24
Tableland Mountain Gum / Snow Gum / Daviesia Montane Open Forest (MU14)	Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands	Southern Tableland Wet Sclerophyll Forests	16.04	0.99	3, 7, 13, 14, 15
#Mountain Hollow Grassy Fen (MU53)	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	Montane Bogs and Fens	0.72		9
Disturbed/Cleared			5.0		

Mountain Hollow Grassy Fen (MU53) – This community forms part of the Montane Peatlands and Swamps Endangered Ecological Community as listed under the NSW TSC Act 1995.

3.2 Vegetation Community Descriptions

3.2.1 Lithgow / Abercrombie Grassy Woodland (MU12)

Plate 1: Typical Lithgow / Abercrombie Grassy Woodland vegetation structure found on Tricketts Arch

The Lithgow / Abercrombie grassy woodland description is determined as the closest fit for the grassy woodland vegetation community found on the granitic rolling hills at Tricketts Arch. The defining species at the subject site were Snow Gum (*E. pauciflora*), Mountain Gum (*E. dalrympleana*) and scattered Black Sally (*E. stellulata*). The mid storey was typically absent and there was an abundant and diverse ground cover dominated by Snow Grass (*Poa sieberiana*), Biddy Biddy (*Acaena novae –zelandiae*), Asteraceae species and, in areas, Bracken Fern (*Pteridium esculentum*).

The floristic composition is closely related to other communities including Tableland Gully Snow Gum – Ribbon Gum Grassy Forest (MU10) and is part of the Southern Tableland Grassy Woodlands of Keith (2004).

This community is more widespread than is mapped in the Vegetation of the Western Blue Mountains (DEC 2006). The delineation of this community has recognised the granite geology as a unique landscape feature. DEC2006 also notes that the community type has been heavily cleared and few examples of this community, if any, are located within reserves.

3.2.2 Limestone Karst (MU48)

Plate 2: Typical Limestone Karst vegetation structure found on Tricketts Arch

Limestone Karst vegetation had a dense thicket low scrub among the exposed limestone outcrops. The scrub had scattered Mountain Gum (*E. dalrympleana*) over dense Box Thorn (*Bursaria spinosa*) and Tree Violet (*Melicytus dentatus*). The outcrop crevices had Stinging Nettle (*Urtica incisa*) and Blackberry (*Rubus fruticosis*) and in open areas, a grassy groundcover.

This community forms part of the Central Gorge Dry Sclerophyll Forests of Keith (2004).

3.2.3 Montane Sheltered Narrow-leaved Peppermint Forest (MU6)

Plate 3: Typical Montane Sheltered Narrow-leaved Peppermint Forest vegetation structure found on Tricketts Arch

Montane Sheltered Narrow-leaved Peppermint Forest is a tall open grassy forest on sheltered slopes and on the upper slopes around drainage lines. The occurrence of this community on the subject site was identified through the obvious canopy dominance of Narrow-leaved Peppermint (*E. radiata*) and less common Mountain Gum (*E. dalrympleana*). The mid stratum was relatively sparse with scattered patches of Silver Wattle (*Acacia dealbata*). The ground cover was moderate and had a diverse composition of grasses, herbs and forbs.

This community is known to mark the gradient between exposed slopes and ridges and the gully ecosystems. This community is well protected and an estimated 35-55% of the original extent remains. It is included within the Cool Montane Wet Forests of DEC 2006 and the Wet Sclerophyll Forests of Keith (2004).

3.2.4 Tableland Gully Snow Gum / Ribbon Gum Grassy Forest (MU11)

Plate 4: Typical Tableland Gully Snow Gum / Ribbon Gum Grassy Forest vegetation structure found on Tricketts Arch

This community is similar in composition to the mapped Lithgow / Abercrombie Grassy woodlands; however, a higher presence of Ribbon Gum (*E. viminalis*), Candle bark (*E. rubida*) and preference for the steep gullies and watercourses separated this community. The shrub stratum was more notable on the steep slopes and the open areas had a dense grassy understorey, typically of Poa species and Weeping Grass (*Microlaena stipoides*).

Clay loams were the main soil type. This forest type equates to Tableland Clay Grassy woodlands in Keith (2004). This forest type has been significantly cleared for agriculture, and is poorly protected in the reserve system.

3.2.5 Tableland Mountain Gum / Snow Gum / Daviesia Montane Open Forest (MU14)

Plate 5: Typical Tableland Mountain Gum / Snow Gum / Daviesia Montane Open Forest vegetation structure found on Tricketts Arch

This forest type has been separated from the Lithgow / Abercrombie Woodlands as it is located on the more exposed slopes and ridges on the western portion of the subject site, and the forest structure and composition was significantly different. The dominant trees forming an uneven and discontinuous canopy were Mountain Gum (*E. dalrympleana*) and Black Sally (*E. stellulata*). The shrub stratum was relatively dense and had patches of Silver Wattle (*Acacia dealbata*), Box Thorn (*Bursaria spinosa*), and where large areas were covered by the Fabaceae species *Hovea purpurea*, potentially replacing the niche where *Daviesia latifolia* would otherwise occupy. The ground cover was broken and in open areas Snow Grass (*Poa sieberiana*) was common.

This unit would be part of the Subalpine Woodland of Keith (2004), and reservation levels are considered poor. The less desirable areas for clearing (rocky slopes and crests) are retained however; these areas are highly fragmented and isolated.

3.2.6 Mountain Hollow Grassy Fen (MU53)

Plate 6: Typical Mountain Hollow Grassy Fen vegetation structure found on Tricketts Arch

A narrow gully at the northeastern end of the subject, entering into the Tuglow River, had a unique open tussocky grass structure and deep alluvial soils which were indicative of a fen. The community had no tree canopy, which ceased at the perimeter of the mapped fen. The trees at the perimeter were typically Black Sally (*E. stellulata*). The ground was strongly dominated by Tussock Grass (*Poa labillardierei*) with Carex species and other graminoids present in the dense sward. The species composition was comprised of inundation tolerant herbs and the site was impacted by feral pig wallowing.

The substrate had deep alluvium to 2m, consisting of alluvial peats and clay loams. The site showed signs of long term saturation however, a deep narrow gorge was dissecting the fen where the water was flowing below the fen surface. This is likely to be a result of water erosion and the narrow gorge is dominated by Blackberry and other weeds.

This community matches Montane Bogs and Fens unit of Keith (2004). This community would form part of the *Montane Peatlands and Swamps* Endangered Ecological Community listed under the NSW TSC Act 1995.

3.2.7 Cleared / Severely Disturbed (MU62)

Plate 7: Typical cleared land found on Tricketts Arch. The cleared land areas reflect the areas shown in Figure 4 as having been ripped, depicted by the obvious exposure of red / brown soils across the property.

Portions of the subject site have been cleared and are considered severely disturbed. The species composition was low and comprised of exotic pasture and weed species. The cleared areas have few native species and had been grazed over a long period of time. Historical photographs have shown these areas to be ripped, ploughed and pasture improved for agricultural purposes, such that they are unlikely to regenerate naturally.

Figure 3 Vegetation Community Map of Tricketts Arch with Locations of Diuris aequalis

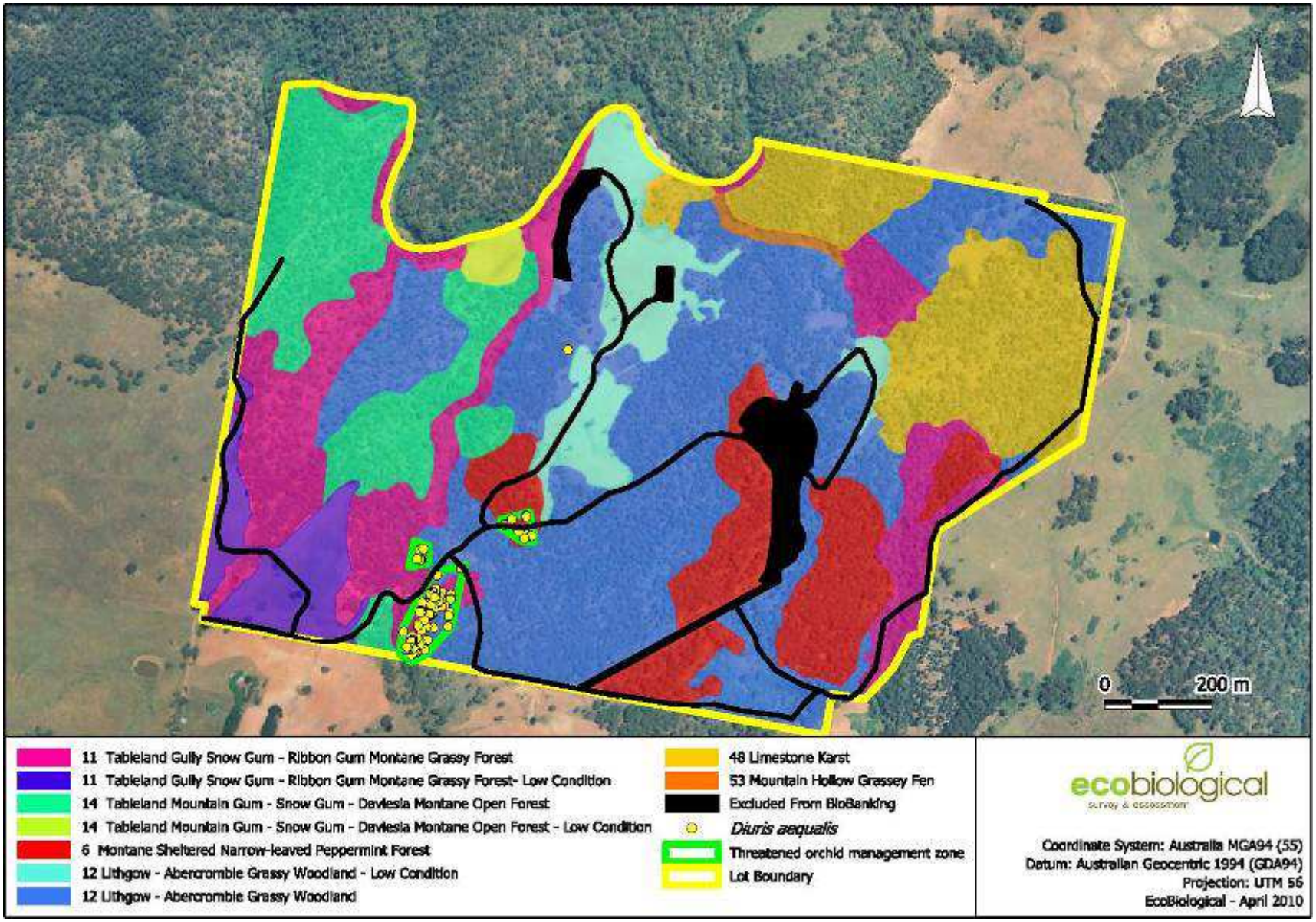
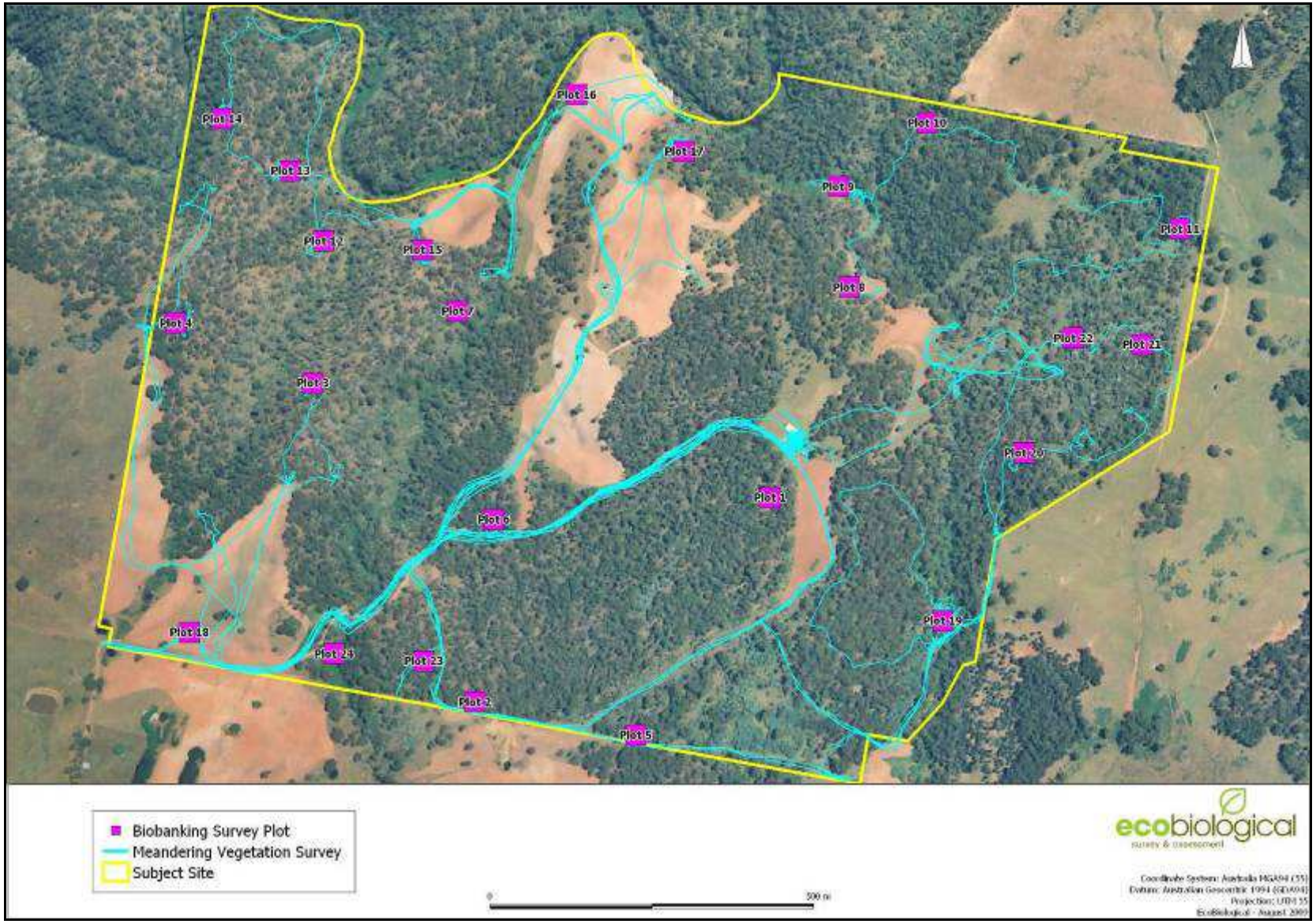


Figure 4 Survey Effort Undertaken During the Vegetation Mapping of Tricketts Arch



3.3 Threatened Species

3.3.1 Flora

Data collected during field surveys revealed that the subject site supported at least 149 plant species (Appendix 1) within the seven mapped vegetation communities. The threatened flora species surveys targeted the species detailed in Table 2 below.

Table 2 Threatened Flora from the Subject Site Locality

Famiy	Species	Common	Surveyed
Apiaceae	Trachymene saniculifolia	Mountain Trachymene	Yes - Potential Habitat
Cyperaceae	Carex klaphakei		Yes - Potential Habitat
Fabaceae (Faboideae)	Dillwynia tenuifolia		No - Unsuitable Habitat
Fabaceae (Mimosoideae)	Acacia clunies-rossiae	Kowmung Wattle	Yes - Suitable Habitat
Myrtaceae	Kunzea cambagei		No - Unsuitable Habitat
Orchidaceae	Diuris aequalis	Doubletail Buttercup	Yes - Suitable Habitat
Orchidaceae	Diuris pedunculata	Small Snake Orchid	Yes - Suitable Habitat
Restionaceae	Baloskion longipes	Dense Cord-rush	No - Unsuitable Habitat
Rutaceae	Boronia deanei	Deane's Boronia	No - Unsuitable Habitat

Specific surveys for species that are considered as having suitable habitat were conducted over the subject site. Two threatened flora species were recorded on the subject site:

- *Diuris aequalis* (Buttercup Doubletail) which is listed as Endangered under the NSW TSC Act and Vulnerable under the EPBC Act, and;

- *Discaria pubescens* (Australian Anchor Plant) which is listed as ROTAP 3RCa.

The locations of the threatened species are shown in Figure 3. In total 201 individual *Diuris aequalis* plants were recorded in Grassy Woodland vegetation with a *Eucalyptus pauciflora dominated* canopy *Daviesea latifolia* shrubby layer and *Poa sieberiana* ground stratum. The common flowering plants were *Gompholobium huegelii, Hibbertia obtusifolia, Dillwynia phylicoides, Bulbine bulbosa, Diuris sulphurea* and *Diuris lanceolata*. The population was located on a west face slope, on gravelly clay soils, and has been subject to a 10 year cool burn fire cycle since 1985.

Plate 8: Diuris aequalis

Three *Discaria pubescens* (Australian Anchor Plant) plants were found on the subject site on rocky locations on Limestone Karst and at the Tuglow River bank.

3.3.2 Fauna

Opportunistic fauna observations recorded a total of 33 fauna species, consisting of two amphibians, two reptiles, 15 birds, 8 insectivorous bats and 6 mammals (Appendix 3).

Of the 33 fauna species recorded one is an introduced species (European Rabbit) and four are listed as vulnerable under the NSW TSC Act 1995 (Powerful Owl *Ninox strenua*, Gang Gang Cockatoo *Callocephalon fimbriatum*, Eastern Bentwing-bat *Miniopterus oceanensis* and the Large-footed Myotis *Myotis macropus*). Breeding habitat for the latter two bat species exists on Trinketts Arch, generating species credits for the Biobank Site.

Targeted amphibian surveys did not detect *Mixophes balbus* or other threatened species.

3.4 GIS Drafting

GIS drafting was undertaken to complete the remainder of the data collection. Figures 5 and 6 show the 100 ha and 1000 ha circles and Threatened Species Sub-zones (TSSZ) respectively.

Figure 5 **100 ha and 1000 ha Circles in Accordance with the "BioBanking Assessment Methodology and Credit Calculator Operational Manual" (DECC 2009).**

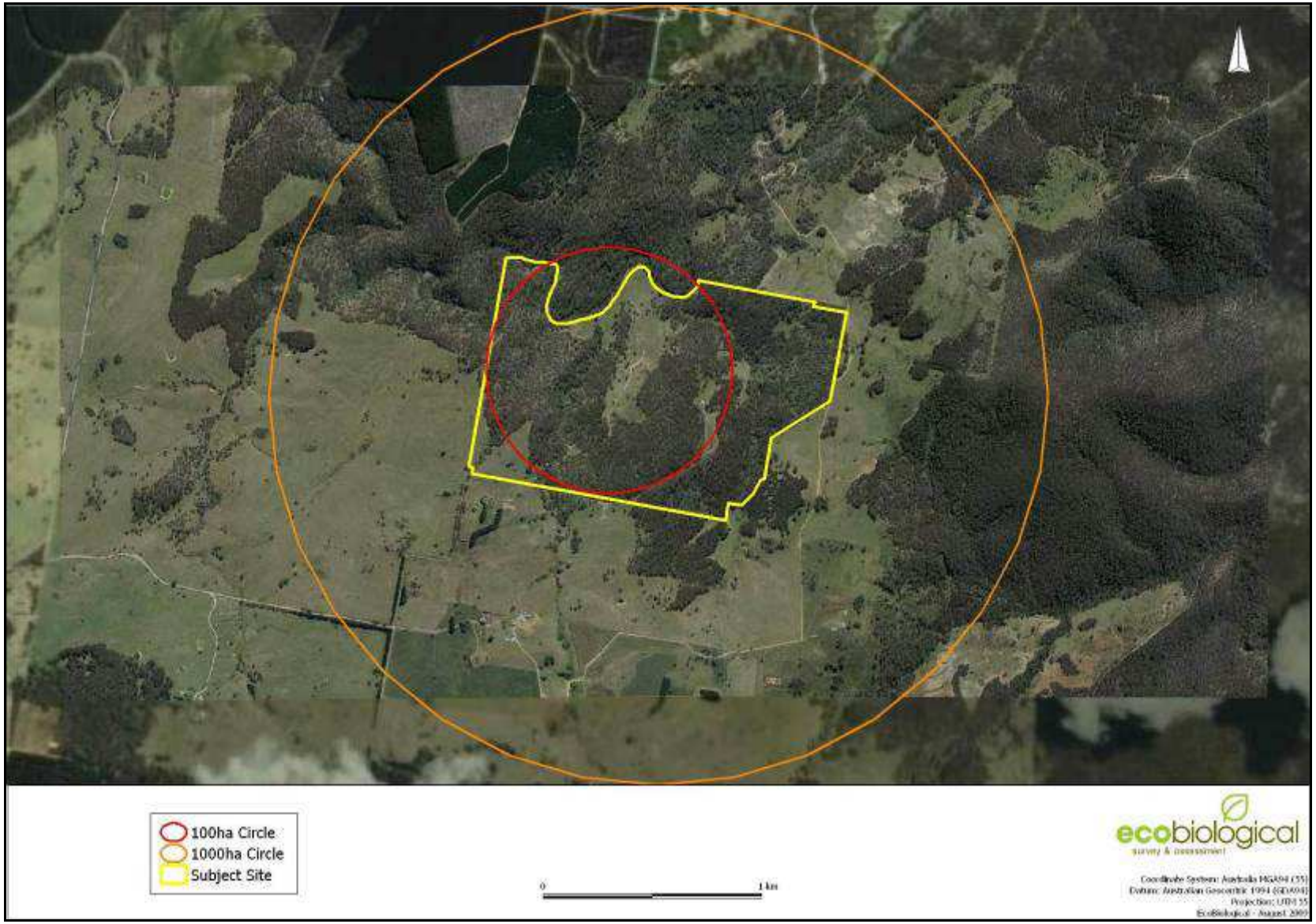
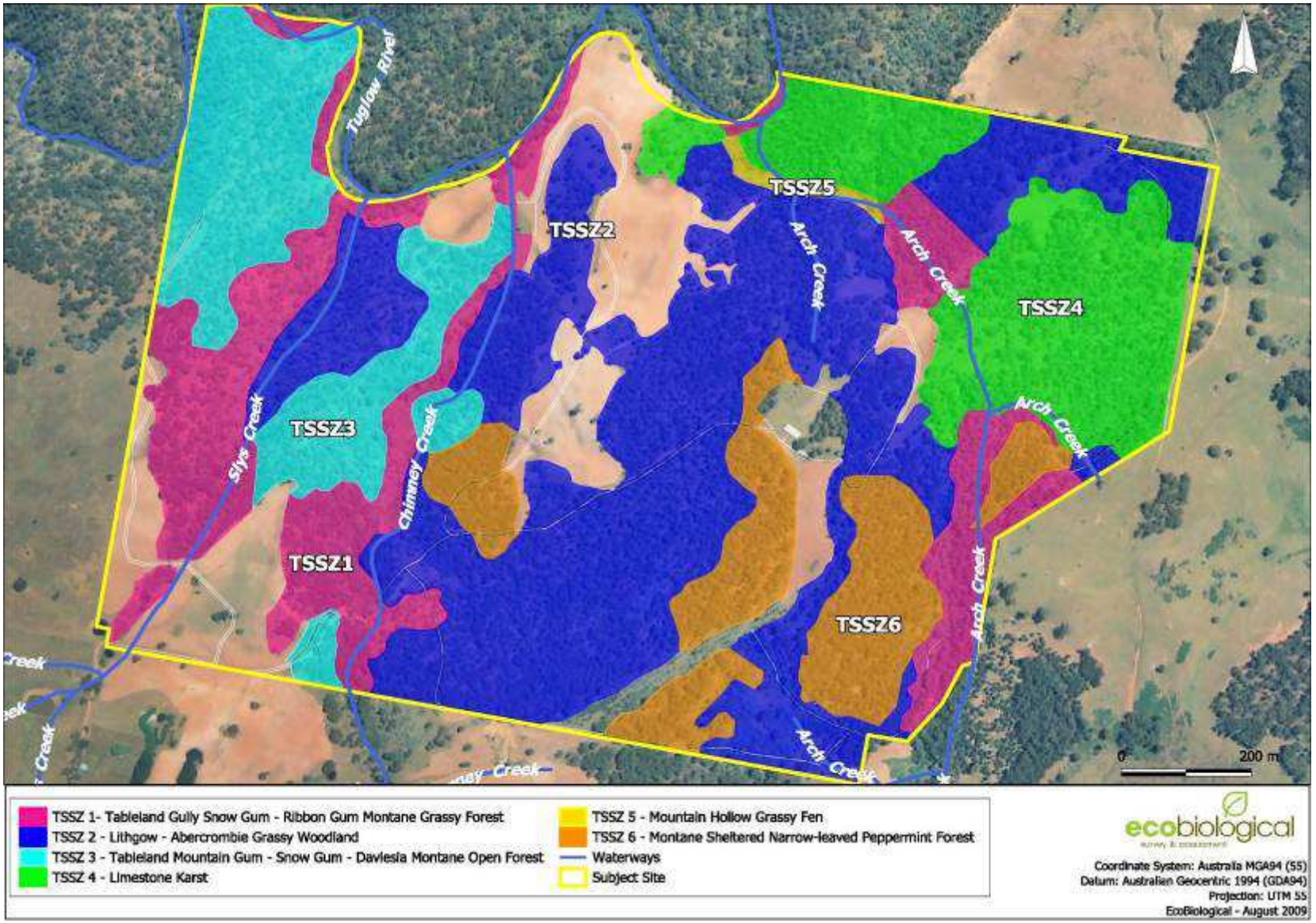


Figure 6 Threatened Species Sub-Zones (TSSZ) mapped over Tricketts Arch



4 BioBanking Agreement Credit Report summary

The Biobanking Agreement Credit Report calculated a total of 972 ecosystem credits earned across 6 vegetation types within the area being assessed on Tricketts Arch. Table 3 lists the vegetation types, areas of each vegetation type and credits created (Appendix 5).

Table 3 BioBanking Agreement Ecosystem Credit Report Summary

Vegetation Type (DECC 2008)	Area	Credits Created
Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands	49.76ha	351
Eurabbie - Stringybark shrubby woodland on limestone in the Jenolan Caves area, Sydney Basin	17.87ha	194
Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	14.04ha	106
Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	22.36ha	196
Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands	16.14	119
Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	0.72ha	6

Table 4 BioBanking Agreement Species Credit Report Summary

Species	Credits Created
Diuris aequalis	423

5 On-site Management Required

In total ten standard Management Actions are required at Tricketts Arch. An additional two have been required as a result of the BioBanking Agreement Credit Report. Table 5 lists the Management Actions and there relevance to Tricketts Arch. A Management Plan for Tricketts Arch has been prepared.

Table 5 Management Actions Required at Tricketts Arch

Management Actions	Discussion
Manage grazing for conservation	All areas mapped as cleared / severely disturbed (which includes all internal roads, pasture improved areas, power line easement and the residence) will need to be fenced to prevent grazing and disturbance of the BioBanking areas.
Weed Control	A weed management plan will be required for the control of weed infestation from edge effects associated with grazing of the pasture improved areas and to remove the weed infestations that are present in the majority of drainage lines.
Manage fire for conservation	The site may require the preparation of a fire management plan which will establish a natural fire cycle for back burning and prevent a catastrophic fire event which may result in severe impact to the ecology of the site. The Fire Management Plan would also help to ensure fire dependant flora species are able to survive in the long term on the property.
Manage human disturbance	Human access across Tricketts Arch will need to be limited to the area mapped as cleared / severely disturbed.
Retain regrowth and remnant native vegetation	Self explanatory (however does exclude the clearing of native vegetation within the BioBanking area that would normally be allowed to be cleared under the Native Vegetation Act for routine agricultural purposes if classified as regrowth) .
Replant / supplementary planning	Tricketts Arch is expected to have a viable seed bank that will regenerate in the BioBanking areas once grazing is stopped and the shrub layer and mid-storey will re-established itself naturally. Limited replanting / supplementary planting will be required in the current BioBanking area.
Retain dead timber	Self explanatory (does exclude the collection of fire wood for uses in the Arch residence)
Nutrient control	Self explanatory (prevent run off of fertilizers if they are used on the pasture improved area into the BioBanking areas)
Erosion Control	Self explanatory
Retention of rocks	Self explanatory

6 Conclusion

Field surveys conducted from 1-5 June 2009 and 16-18 November 2009 on Tricketts Arch revealed that:

- The subject site supports at least 149 plant species within seven mapped vegetation communities;
- One vegetation community; the Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands forms part of the *Montane Peatlands and Swamps* Endangered Ecological Community listed under the NSW TSC Act 1995;
- One threatened flora species were recorded on the subject site: *Diuris aequalis* (Buttercup Doubletail) which is listed as Endangered under the NSW TSC Act and Vulnerable under the EPBC Act, in addition, *Discaria pubescens* (Australian Anchor Plant) was also detected which is listed as ROTAP 3RCa.
- Opportunistic fauna observations recorded a total of 33 fauna species, consisting of two amphibians, two reptiles, 15 birds, 8 insectivorous bats and 6 mammals;
- Of the 33 fauna species recorded one is an introduced species (European Rabbit) and four are listed as vulnerable under the NSW TSC Act 1995 (Powerful Owl, Gang Gang Cockatoo, Eastern Bentwing-bat and the Large-footed Myotis); and
- Targeted amphibian surveys did not detect *Mixophes balbus* or other threatened species.

Biodiversity Credits generated by the BioBanking Credit Calculator amount to the following:

- 972 ecosystem credits generated
- *Diuris aequalis* generated 423 species credits

7 References

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Appendix 1 Flora Species Recorded on Tricketts Arch

Family Name	Scientific Name	Common Name	1	2	3	4	5	6	7
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair			*				
Adiantaceae	*Adiantum hispidulum*					*			
Adiantaceae	*Cheilanthes sieberi*	Mulga Fern			*				
Adiantaceae	*Pellaea falcata*	Sickle Fern				*			
Apiaceae	*Daucus glochidiatus*	Native Carrot	*	*	*	*			
Apiaceae	*Hydrocotyle laxiflora*		*		*	*			
Apiaceae	*Oreomyrrhis eriopoda*	Australian Carraway	*		*	*			
Apiaceae	*Xanthosia tridentata*	Rock Xanthosia						*	
Araliaceae	**Hedera helix*	English Ivy			*				
Aspleniaceae	*Asplenium flabellifolium*	Necklace Fern	*				*	*	
Asteraceae	**Aster* sp.		*			*	*		
Asteraceae	**Cirsium* sp	Black Thistle	*	*	*	*	*		*
Asteraceae	**Conyza* sp.	Tall Fleabane	*		*		*		
Asteraceae	**Euchition calviceps*				*	*			
Asteraceae	**Hypochaeris radicata*	Catsear	*	*	*	*	*	*	
Asteraceae	**Sonchus oleraceus*	Milk Thistle	*		*				*
Asteraceae	**Taraxacum officinale*	Dandelion							*
Asteraceae	*Asteraceae* sp.				*	*		*	
Asteraceae	*Cymbonotus lawsonianus*	Bears-ear	*	*	*	*		*	
Asteraceae	*Epaltes australis*	Spreading Nut-heads				*			
Asteraceae	*Euchiton collinus*		*	*		*		*	
Asteraceae	*Euchiton gymnocephalus*		*		*				
Asteraceae	*Helichrysum* sp.		*						
Asteraceae	*Lagenifera stipitata*	Blue Bottle Daisy	*	*					
Asteraceae	*Senecio prenanthoides*		*	*	*	*		*	
Asteraceae	*Senecio* sp.		*					*	
Asteraceae	*Vernonia cinerea*		*	*	*	*		*	
Boraginaceae	**Echium plantagineum*	Paterson's Curse		*		*	*		
Boraginaceae	**Echium vulgare*	Vipers Bugloss	*			*			*
Campanulaceae	*Wahlenbergia luteola*				*				
Carophyllaceae	*Stellaria pungens*	Prickly Starwort	*	*	*	*		*	
Chenopodiaceae	*Atriplex* sp.				*	*			
Chloanthaceae	*Chloanthes stoechadis*				*				
Clusiaceae	*Hypericum gramineum*	St Johns Wort		*		*		*	
Convolvulaceae	*Dichondra repens*	Kidney Weed	*	*		*		*	
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop	*						
Cyperaceae	*Carex appressa*		*				*		
Cyperaceae	*Carex incomitata*	Tall Sedge	*	*		*	*	*	
Cyperaceae	*Cyperus* sp.		*	*	*			*	
Cyperaceae	*Gahnia* sp.						*		
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern	*	*	*			*	
Dilleniaceae	*Hibbertia obtusifolia*			*				*	

Family Name	Scientific Name	Common Name	1	2	3	4	5	6	7
Ericaceae - Styphelioideae	*Brachyloma daphnoides*	Daphne Heath		*					
Ericaceae - Styphelioideae	*Leucopogon juniperinus*	Beard heath		*					
Euphorbiaceae	**Euphorbia peplus*	Petty Spurge			*				
Fabaceae (Faboideae)	**Trifolium dubium*	Yellow Suckling Clover	*		*		*		*
Fabaceae (Faboideae)	**Trifolium fragiferum*	Strawberry Clover	*	*		*			*
Fabaceae (Faboideae)	**Trifolium repens*	White Clover	*	*		*			*
Fabaceae (Faboideae)	*Bossiaea prostrata*				*				
Fabaceae (Faboideae)	*Daviesea latifolia*			*					
Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil	*	*	*	*		*	
Fabaceae (Faboideae)	*Glycine clandestina*		*	*	*	*			
Fabaceae (Faboideae)	*Glycine microphylla*		*	*				*	
Fabaceae (Faboideae)	*Gompholobium huegelii*	Pale Wedge Pea		*				*	
Fabaceae (Faboideae)	*Hovea purpurea*			*	*				
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle	*	*	*	*		*	
Fabaceae (Mimosoideae)	*Acacia melanoxylon*	Blackwood	*	*		*		*	
Geraniaceae	*Geranium graniticola*		*		*	*			
Geraniaceae	*Geranium homeanum*	Cranesbill	*	*		*		*	
Geraniaceae	*Geranium solanderi* var *solanderi*	Native geranium	*	*	*	*	*	*	*
Halgoraceae	*Gonocarpus tetragynus*	Raspwort	*	*	*			*	
Juncaceae	*Juncus bufonius*		*						
Lamiaceae	*Ajuga australis*	Austral Bugle	*					*	
Lamiaceae	*Mentha satureioides*	Creeping Mint					*		
Lamiaceae	*Plectranthus parviflorus*		*	*	*				
Lomandraceae	*Lomandra confertifolia* subsp. *pallida*			*	*			*	
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Mat Rush		*		*			
Lomandraceae	*Lomandra glauca*			*	*			*	
Lomandraceae	*Lomandra longifolia*	Mat Rush	*		**	*		*	
Lomandraceae	*Lomandra multiflora*			*		*		*	
Malvaceae	**Modiola caroliniana*	Redflower Mallow		*					*
Myrtaceae	*Eucalyptus dalrympleana*	Mountain Gum	*	*	**	*		*	
Myrtaceae	*Eucalyptus pauciflora*	Snow Gum	*	*	*	*			
Myrtaceae	*Eucalyptus radiata*	Narrow-leaf Peppermint						**	
Myrtaceae	*Eucalyptus rubida*	Candlebark	*	*					
Myrtaceae	*Eucalyptus stellulata*	Black Sally	*		*	*			
Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum	**						
Oleaceae	*Notelaea neglecta*		*					*	
Orchidaceae	*Acianthus fornicatus*	Pixie Caps		*					
Orchidaceae	*Chiloglottis* sp.	Bird Orchid		*				*	
Orchidaceae	*Corybas fimbriatus*	Fringed Helmet Orchid		*				*	
Orchidaceae	*Pterostylis reflexa*	Greenhood orchid		*				*	
Orchidaceae	*Pterostylis* sp.			*	*	*			
Oxalidaceae	*Oxalis excilis*		*	*	*	*		*	*

Family Name	Scientific Name	Common Name	1	2	3	4	5	6	7
Phormiaceae	*Dianella revoluta*	Flax lily			*				
Phormiaceae	*Dianella tasmanica*	Tasman Flax lily		*					
Phyllanthaceae	*Poranthera microphylla*			*				*	
Pittosporaceae	*Bursaria spinosa*	Box Thorn	*	*	*	**	*		
Pittosporaceae	*Bursaria spinosa* subsp *macrophylla*		*		*	*			
Plantaginaceae	**Plantago lanceolata*	Lambs Tongue				*			
Plantaginaceae	*Plantago deblis*		*	*	*	*		*	
Poaceae	**Agrostis capillaris*	Browntop Bent		*	*	*			
Poaceae	**Ehrharta erecta*	Panic Veldtgrass	*						
Poaceae	**Nassella trichotoma*	Serrated Tussock		*					*
Poaceae	**Phalaris aquatica*	Phalaris	*	*			*		*
Poaceae	**Phalaris minor*	Lesser Canary Grass			*				
Poaceae	**Unidentified grass* sp.		*	*		*	*		*
Poaceae	*Austrostipa* sp.								*
Poaceae	*Dichelachne inaequiglumis*		*	*	*	*		*	
Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass		*	*			*	
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass			*			*	
Poaceae	*Lachnagrostis aemula*			*					
Poaceae	*Microlaena stipoides*	Weeping Grass	*	*	*	*		*	
Poaceae	*Poa induta*					*			
Poaceae	*Poa labillardieri*	Tussock Grass	*	*	*		*	*	*
Poaceae	*Poa meionectes*				*			*	
Poaceae	*Poa sieberiana* var. *sieberiana*	Snow Grass	*	**	*	**		**	
Poaceae	*Themeda australis*	Kangaroo Grass	*	*	*	**			
Poaceae	**Festuca elatior*								*
Poaceae	**Festuca asperula*								*
Poaceae	*Austrodanthonia bipartita*	Wallaby Grass		*	*	*		*	
Polygonaceae	**Acetosella vulgaris*	Sheep Sorrel	*	*	*				
Polygonaceae	**Rumex brownii*	Dock	*		*	*			
Proteaceae	*Lomatia myricoides*	River Lomatia	*	*	*	*			
Ranunculaceae	*Clematis aristata*	Old Mans Beard	*		*			*	
Ranunculaceae	*Ranunculus lappaceus*	Common Buttercup	*			*			
Rosaceae	**Rubus fruticosus*	Blackberry	*	*	*	*	*		
Rosaceae	*Acaena novae-zelandiae*	Biddy Biddy	*	*	*	*		*	*
Rosaceae	*Rubus parvifolius*	Native Raspberry	*	*	*				
Rubiaceae	**Galium aparine*	Cleavers		*	*			*	
Rubiaceae	*Asperula gunnii*	Common Woodruff	*	*	*	*			
Rubiaceae	*Galium propinquum*	Maori Bedstraw	*	*	*	*		*	
Rutaceae	*Boronia* sp.							*	
Salicaceae	**Salix babylonica*	Weeping willow	*						
Scrophulariaceae	*Derwentia derwentiana* subsp. *subglauca*				*	*			
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell	*	*	*	*		*	

Family Name	Scientific Name	Common Name	1	2	3	4	5	6	7
Thymelaeaceae	*Pimelea* sp.			*					
Urticaceae	*Urtica incisa*	Scrub Nettle	*		*	*	*	*	
Violaceae	*Melicytus dentatus*	Tree Violet	*	*		*	*		
Violaceae	*Viola betonicifolia*	Native violet	*	*	*	*		*	

Appendix 2 Additional Flora Species

ADDITIONAL SPECIES (not recorded in quadrats)		
Family Name	***Scientific Name***	**Common Name**
Santalaceae	*Exocarpos strictus*	Dwarf Cherry
Myrtaceae	*Leptospermum trinervium*	Flakey-barked Teatree
Fabaceae (Faboideae)	*Dillwynia sericea*	
Fabaceae (Faboideae)	*Gompholobium uncinatum*	Red Wedge Pea
Dicksoniaceae	*Dicksonia antarctica*	Soft Treefern
Poaceae	*Austrofestuca eriopoda*	
Proteacae	*Banksia marginata*	Silver Banksia
Phormiaceae	*Dianella prunina*	
Onagraceae	*Epilobium billardiereanum*	
Anthericaceae	*Dichopogon fimbriatus*	Nodding Chocolate Lily
Myrtaceae	*Leptospermum obovatum*	
Asteraceae	*Helminthotheca echioides*	
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed
Caryophyllaceae	*Scleranthus biflorus*	Knawel
Asteraceae	*Senecio pinnatifolius* var. *pleiocephalus*	
Asteraceae	*Senecio diaschides*	
Cyperaceae	*Carex fascicularis*	
Scrophulariaceae	*Gratiola peruviana*	Australian Brooklime
Orchidaceae	*#Diuris aequalis*	#Buttercup Doubletail

* denotes an introduced species
\# denotes threatened species
1 Tableland Gully Snow Gum – Ribbon Gum Grassy Forest
2 Lithgow – Abercrombie Grassy Woodland
3 Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest
4 Limestone Karst
5 Mountain Hollow Grassy Fen
6 Montane Sheltered Narrow-leaved Peppermint Forest
7 Cleared / Severely Disturbed

Appendix 3 Fauna Species Recorded on Tricketts Arch

Scientific Name	Common Name	
Amphibians		
Limnodynastes tasmaniensis	Spotted Grass Frog	
Pseudophryne bibronii	Brown Toadlet	
Reptiles		
Lamproholis guichenoti	Grass Skink	
Drysdalia coronoides	White-lipped Snake	
Physignathus lesueurii	Eastern Water Dragon	
Tiliqua nigrolutea	Blotched Blue-tongued Lizard	
Tiliqua scincoides	Eastern Blue-tongued Lizard	
Pseudechis porphyriacus	Red-bellied Black Snake	
Birds		
Acanthiza pusilla	Brown Thornbill	
Corvus coronoides	Australian Raven	
Colluricincla harmonica	Grey Shrike-thrush	
Cormobates leucophaea	White-throated Treecreeper	
Dacelo novaeguineae	Laughing Kookaburra	
Vanellus miles	Masked Lapwing	
Callocephalon fimbriatum	#Gang-gang Cockatoo	
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	
Petroica boodang	Scarlet Robin	
Corcorax melanorhamphos	White-winged Chough	
Ninox novaeseelandiae	Southern Boobook	
Ninox strenua	#Powerful Owl	
Platycercus elegans	Crimson Rosella	
Platycercus eximius	Eastern Rosella	
Strepera graculina	Pied Currawong	
Aquila audax	Wedge-tailed Eagle	
Mammals		Confidence level (Anabat analysis)
Chalinolobus gouldii	Gould's Wattled Bat	probable
Chalinolobus morio	Chocolate Wattled Bat	probable
Miniopterus oceanensis	# Eastern Bent-wing-bat	confident
Myotis macropus	# Large-footed Myotis	confident
Nyctophilus sp.	Unidentified Long-eared Bat	probable
Rhinolopus megaphyllus	Eastern Horseshoe-bat	confident
Vespadelus darlingtoni	Large Forest Bat	confident
Vespadelus vulturnus	Little Forest Bat	probable
Trichosurus vulpecula	Common Brushtail Possum	
Vombatus urinus	Common Wombat	
Ornithorhynchus anatinus	Platypus	
Tachygossus aculeatus	Echidna	
Rattus fuscipes	Bush Rat	
Macropus giganteus	Eastern Grey Kangaroo	
Wallabia bicolor	Swamp Wallaby	
Macropus rufogriseus	Red-necked Wallaby	
Macropus robustus	Common Wallaroo	
Oryctolagus cuniculus	*European Rabbit	

* denotes an introduced species

\# denotes a threatened species under the NSW TSC Act 1995

Appendix 4 Contributions and Qualifications of Ecobiological Staff

Name	Qualification	Title	Contribution
Dan Pedersen	B. Sc.	Botanist	Flora species ID, vegetation community mapping.
Adam Blundell	B. Env Sc. (Hons)	Senior Environmental Scientists and Accredited Biobanking Assessor (0006)	Floristic surveys, preliminary fauna surveys, BioBanking calculations, report writing
David Paull	M Res Sc	Senior Ecologist	Report preparation
Kristy Peters	B. Park Mgt.	Ecologist (Ornithologist)	Anabat analysis, report review.
Dianna Brettschneider	B. App Sc.	GIS Manager	Preparation of map layouts for report.

NSW GOVERNMENT | Environment, Climate Change & Water

Our reference: DOC11/17381

Mr Peter Dykes
605 Jaunter Road
JAUNTER NSW 2878

Dear Mr Dykes

I am writing to confirm that ecosystem and species credits for your proposed biobank site have been recalculated by the Office of Environment and Heritage (OEH).

The credit calculations were based on the recommendations of OEH staff to better reflect environmental conditions/biodiversity values on your property.

For your information I have attached a summary of the revised credit calculations. The summary is included as Attachment 1. As a result of the revised credit calculations ecosystem credits increased from 1122 to 1243 and Buttercup Doubletail species credits increased from 423 to 910.

I would like to thank you for your assistance during the review. Your insight and local knowledge of the ecology and karst environments on your property has been very useful.

Should you have any questions regarding the progress of your application please contact Andrew Remnant, who is coordinating the review process, on 02 9995 6759.

Yours sincerely

Althea Kannane 12/4/11

Althea Kannane
Manager, Biodiversity and Vegetation Programs

The Department of Environment, Climate Change and Water is now known as the Office of Environment and Heritage, Department of Premier and Cabinet

PO Box A290 Sydney South NSW 1232
59-61 Goulburn St Sydney NSW 2000
Tel: (02) 9995 5000 Fax: (02) 9995 5999
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Revised credit calculations for the proposed Tricketts Arch biobank site

The Office of Environment and Heritage (OEH) visited the proposed Tricketts Arch biobank site from August 9 to 11 2010 and November 29 to 30 2010 to review the BioBanking assessment undertaken by Eco Biological Pty Ltd (Eco Biological).

The review assessed the following aspects of BioBanking assessment;

- Biobank site area and boundaries
- Biometric vegetation type and condition identification; and
- Threatened species surveys.

The following methodology was used to review the Eco Biological report:

- Discussions were held with the landowner to check the extent and boundaries of excluded areas
- An overall assessment of the property's ecology and biodiversity was achieved by travelling along all property tracks and visiting each management zone
- All mapped vegetation communities were visited and checked to determine their equivalent biometric vegetation type. Comparisons were then made to the vegetation zone descriptions in the report and to that of '*Vegetation of Western Blue Mountains*' (DEC 2006) from which the mapping units in the report were derived
- Several Eco Biological survey plots were examined to check consistency with vegetation mapping units
- The number and extent of the threatened orchid species, Buttercup Doubletail (*Diuris aequalis*) was checked at peak orchid flowering time late in November 2010.

OEH staff identified more appropriate biometric vegetation types that better represented the vegetation at Tricketts Arch. Subsequently, after obtaining the landowners approval, credits were recalculated. The revised credit calculations addressed the matters summarised below;

Biobank site boundary

Ecosystem credits were recalculated to include the property tracks that had previously been excluded from the proposed site. The present and proposed configurations of property tracks are essential for weed and pest control and do not significantly degrade the biodiversity values of the site.

Ecosystem credits were recalculated based on the advice provided by the applicant that the previous credit calculations did not represent the final plans for the proposed biobank site because; (1) the size of the areas designated for a camping site and a cultural centre were initially over estimated, (2) the location of the cultural centre had changed and (3) the Asset Protection Zone (APZ) around the homestead area included areas that were originally intended to be part of the biobank site.

These changes required new maps for the biobanking agreement. The maps were revised by the applicant and approved by OEH. The biobanking agreement includes the revised mapping.

Vegetation mapping

Of the six vegetation zones mapped in the Eco Biological report all but one was consistent with the results of observations and sampling conducted during the review. OEH observations and sampling do not support the existence of the Lithgow Abercrombie Grassy Woodland community identified by Eco Biological. Based on species composition and vegetation structure OEH officers were of the opinion that the area should have been mapped as Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest (MU14).

Eco Biological agreed that the mapping of community was borderline and that OEH's assessment was more valid. Credits have been recalculated based on our recommendation that areas initially mapped as Lithgow Abercrombie Grassy Woodland should be remapped as Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest vegetation type.

Four additional species not listed in Eco Biological report were identified from samples collected during the November field trip, namely;

- Tiger Orchid (*Diuris sulphurea*)
- Musky Caladenia (*Caladenia gracilis*)
- Southern Leek Orchid (*Prasophyllum australe*)
- A grevillea (*Grevillea juniperina* subsp. *trinervis*)

OEH would like to note that whilst the Eurabbie - stringybark shrubby woodland on limestone in the Jenolan Caves area biometric type is the closet match for the vegetation initially mapped as limestone karst vegetation type it does not easily fit into the Biometric vegetation type mainly because of the different canopy species and the lack of many of shrub species. The changes required a new vegetation community map which is shown on Figure 2.

Species credits for the Buttercup Doubletail (*Diuris aequalis*)

During the fieldwork undertaken in November 2010, OEH staff confirmed the presence of the orchid Buttercup Doubletail (*Diuris aequalis*) in larger numbers and over a greater area than previously mapped. A total of 431 individuals at 57 sites were recorded. The Orchid Management Zone was adjusted for the increased number of individuals. The location of the Butter Doubletail and the Orchid Management Zone are shown on Figure 2.

Final ecosystem and species credits

As a result of the revised credit calculations ecosystem credits increased from 1122 to 1243 and Buttercup Doubletail species credits increased from 423 to 910 credits. The final ecosystem credits calculated for your proposed biobank site are included in the table below.

Group 1: 216 credits	
Vegetation type	Eurabbie - stringybark shrubby woodland on limestone in the Jenolan Caves area, Sydney Basin
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	>100ha

Total area of vegetation zone	19.71 hectares
Group 2: 109 credits	
Vegetation type	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	>100ha
Total area of vegetation zone	14.26 hectares
Group 3: 206 credits	
Vegetation type	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	>100ha
Total area of vegetation zone	23.19 hectares
Group 4: 58 credits	
Vegetation type	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	0-5ha
Total area of vegetation zone	6.7 hectares
Group 5: 9 credits	
Vegetation type	River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	>100ha
Total area of vegetation zone	1.12 hectares
Group 6: 547 credits	
Vegetation type	Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon

Surrounding vegetation cover	31-70%
Patch size including low condition	>100ha
Total area of vegetation zone	64.85 hectares
Group 7: 98 credits	
Vegetation type	Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands
CMA region / CMA sub region	Hawkesbury Nepean \ Oberon
Surrounding vegetation cover	31-70%
Patch size including low condition	0-5ha
Total area of vegetation zone	11.3 hectares

ABORIGINAL CULTURAL HERITAGE MANAGEMENT PLAN

TRICKETTS ARCH

NGALINA the two of us

LandAlive
Aboriginal land management
for biodiversity

Contents

Cover: Scarred tree – possible coffin tree (photo Peter Dykes Feb 2011).

1 Context

Peter and Sharon Dykes are the Landowners of "Tricketts Arch", a property composed of Lot 15 in Deposited Plan number 661990 also referred to as Lot 15 Parish Abercorn, County Westmoreland and Lot 1 in Deposited Plan number 1152451.

The rural address for the property is:
605 Jaunter Road
JAUNTER NSW 2787

The Landowners have decided to enter into a BioBanking Agreement with the Office of the Environment and Heritage (OEH) under Part 7a Division 2 of the *Threatened Species Conservation Act 1995*. The Landowners may at a future date also enter into a Conservation Agreement with the Office of the Environment and Heritage (OEH) under Part 4 Division 12 of the *National Parks and Wildlife Act 1974*.

Refer Map 1 showing property boundary, tenure details and BioBanking site.

Two reports were prepared on the property as part of the process to achieving a BioBanking Agreement. These are:

1. An ecological assessment by a registered ecological assessor (refer Blundell & Pedersen 2010) and checked for accuracy by OEH (refer Kannane 2011).
2. A property management plan for the BioBanking site using an OEH template (refer Dykes 2010) which is incorporated into the BioBanking Agreement.

2 Purpose of the Tricketts Arch Aboriginal Cultural Heritage Management Plan

The BioBanking Property Management Plan is solely directed at conserving and improving biodiversity values. It does not address other cultural and heritage values of this site in any detail.

The BioBanking Property Management Plan contains management actions required to contain and limit human disturbance to the BioBanking site. Point 3.1 and 3.4 acknowledge that "t*he biobank site contains places and objects of Aboriginal cultural heritage significance to the Gundungurra and Wiradjuri Peoples"* and that the landowner "*has prepared specific management plans for Aboriginal cultural heritage, karst areas and mining heritage*". Implied in this point is the recognition that the ongoing management and conservation of Aboriginal sites/objects is beyond the scope of the BioBanking Agreement but nonetheless important in preserving and conserving the BioBanking site.

The Tricketts Arch Aboriginal Cultural Heritage Management Plan has been developed in consultation with important stakeholder groups, namely members of the Traditional Custodians from the Gundungurra and Wiradjuri Peoples to provide a management plan for the Tricketts Arch Aboriginal sites/objects.

The Tricketts Arch Aboriginal Cultural Heritage Management Plan is meant to complement the actions and provisions contained in the BioBanking Property Management Plan and Agreement. Where conflict may arise between the two plans, unless resolved by mediation between all interested parties, the BioBanking Property Management Plan and Agreement will take precedence over the Tricketts Arch Aboriginal Cultural Heritage Management Plan.

3 Background

Tricketts Arch lies on the south eastern edge of the Oberon – Gurnang Plateau, just east of the Great Dividing Range. The property is located along the boundary of two Aboriginal language groups (tribal areas); the Gundungurra to the east and the Wiradjuri to the west. It is more accurate to say that Tricketts Arch is in "*shared country*". It is worth noting that the property's eastern boundary is along the top of the Tuglow Range which is the focal point of an ecological variation (or divide) resulting from differing rock types and soils in the region. To the east are sedimentary deposits of sandstone and shales supporting vegetation communities and species similar to those of the Blue Mountains and to the west are volcanic soils, supporting vegetation communities and species similar to those of the Oberon – Gurnang Plateau. Landscape alterations were used traditionally by the Aboriginal people to identify land ownership and tribal boundaries.

For the Gundungurra People their traditional lands are that of the Lower Coxs River, the Kowmung River and Wollondilly catchment. Theirs is the "*sandstone country*" of deep valleys, majestic escarpments and rugged mountain tops.

The Wiradjuri People are a large nation of central western NSW occupying the valleys and floodplains of the Wambuul (Macquarie River), Galari (Lachlan River) and Marrambidya (Murrumbidgee River). Theirs is the "*possum country*" of mountains and floodplains of which the Oberon – Gurnang Plateau with its volcanic soils of Mountain Gum, Brown Barrel, Ribbon Gum and Snow Gum forests were part of the eastern boundary (pers. comm. by Bill Allen to landowner).

Tricketts Arch is strategically located between Jenolan (approx. 10 km north) and Wombeyan (approx 70 km south) both important Aboriginal sites/places to the Aboriginal People particularly the local Gundungurra and Wiradjuri People. These sites also form an overall part of song lines for Dharawal and Durga Peoples - "*Gurangutch dreaming from Bangalee country along the Shoalhaven River*" (information from LandAlive staff OEH). To the west are Evans Crown; Silent Creek and Abercrombie Caves, all very important traditional sites/places. There are several dreaming tracks and songlines leading off from each of these sites/places and the Jaunter area and in particular Tricketts Arch is likely to have formed an integral component (pers. comment by Bill Allen to landowner 2003). The area surrounding Tricketts Arch also has a quite a number of place names of Aboriginal origin, such as:

Jaunter	name used for locality, road, creek, property, mountain
Tuglow	name used for locality, road, river, property, mountain, bluff, caves, mountain range, falls
Gurnang	name used for locality, State Forest
Gingkin	name used for locality, road, creek, property, State Forest
Werong	name used for locality, road, fire trail
Kowmung	name used for river, fire trail
Morong	name used for creek, falls, canyon
Kanangra	name used for locality, national park
Budthingeroo	name used for creek, clearing

Karst environments play an important role in Aboriginal cultural heritage in setting ceremonial activities into spiritual context. They are traditionally used to identify sacred areas associated with specific creation beings and stories. It is through these connections to specific places that Aboriginal people make and maintain a "*connection to country*".

The two preliminary surveys carried out on the property (Allen 2003, Landalive 2010) identified a wealth of sites and objects including: scarred trees, camping grounds, ceremonial grounds, gender specific areas, stone arrangement, ochre sites and artefact scatters. The overall diversity of sites and objects indicate the array of traditional land use practices in this area, and the importance of Tricketts Arch karst environments to Aboriginal people.

4 Aboriginal Values

Aboriginal people understood and managed the property's landscape diversity. This is evidenced by identified Aboriginal heritage objects and sites found on the Tricketts Arch property. These values reflects upon the landscape in its entirety, and are discussed in the following sections

4.1 Sites:

- Refer to Table 1 showing an extract from NPWS AHIMS Database listing sites currently on the register.
- Large number of site types – camping grounds, scarred trees, ceremonial grounds, stone arrangement, ochre sites, walking trails and artefact scatters.
- Within some site types there is also a wide range e.g scarred trees – boundary maker, site makers, possible coffin tree, ceremonial site gateway, coolamon trees.
- Sites are interconnected to each other providing a broad perspective on traditional life, e.g camping ground, ceremonial grounds, ochre site, boundary marker.
- Sites are located mainly in their natural surroundings and in reasonable condition – traditional context is still clearly visible.
- On a local scale the number and range of sites gives the property a very high cultural significance.
- Note as the property has had no archaeological survey it therefore represents a significant opportunity for the Traditional Custodians to survey and present a cultural interpretation free of any academic bias.

4.2 Dreaming Tracks and Songlines:

- The property is strategically located between Jenolan, Wombeyan, Abercrombie, Evans Crown and Silent Creek.
- Boyd Plateau and Kanangra Walls are just to the north and northeast – major traditional access route from the lower Kowmung – Burragorang Valleys to the Oberon – Gurnang Plateau.
- Other significant karst areas in the region Jenolan, Wombeyan and Abercrombie formed integral components to dreaming tracks of the Wiradjuri and Gundungurra, and it is reasonable to believe that the Tricketts Arch karst was also part of a dreaming track / songline.

4.3 Plants:

- Refer to Table 2 showing plants found on the property having a Wiradjuri cultural value.
- Scarred trees are mainly Mountain Gum (*E. dalrympleana*) and Manna / Ribbon Gum (*E. viminalis*) and this may indicate a cultural preference/value to these trees.
- The presence of a camping ground on the property indicates that the flora and fauna of the area was able to sustain a reasonable group of people.

4.4 Animals:

- Refer to Table 3 showing animals found on the property likely to hold Wiradjuri cultural significance.
- There is an abundance of Brushtail Possums in the area – for the Bathurst Wiradjuri, possum coats were a distinct form of dress. They were decorated with art so they could be used to teach and learn about country.
- The presence of a camping ground on the property indicates that the flora and fauna of the area was able to sustain a reasonable group of people.

4.5 Landscape Factors:

- The combination of a deep mountain valley with adjoining karst areas and plateau highlands give an opportunity to visualise what traditional cultural life would have been like before settlement and to understand the term "mountain people" which was applied by earlier settlers to Aboriginal people of the Oberon – Blue Mountains area.
- Karst environments and their likely association with boundaries and song lines.

Table 1. Listing of Aboriginal Sites/Objects on AHIMS Database (2010)*

AHIMS Site Id	Site Name	Site Type	Recorder	Date Recorded
44-6-0106			Bill Allen	
44-6-0107			Bill Allen	
44-6-0108			Bill Allen	
44-6-0109			Bill Allen	

***** Information source Sharon Riley, NPWS Aboriginal Cultural Heritage Officer, Katoomba

Table 2. Plants of Wiradjuri Cultural Value found on Property*

Family Name	Scientific Name	Common Name	Use Category**	Wiradjuri Name/s
Asteraceae	*Sonchus oleraceus*	Milk Thistle	Fo, M	Yulung:Yulumban, Yulung:Yulumbuwu
Chenopodiaceae	*Atriplex nummularia*	Saltbush - Old Man	Fo, H	Bulaguy, Miranggul
Cyperaceae	*Cyperus* spp.	Grass - Nut, Sedges	Fo,	
Fabaceae (Mimosoideae)	*Acacia dealbata*	Gum Tree	Fo, H, I	
	Acacia dealbata	Gum Tree - Gum		Dhani
Fabaceae (Mimosoideae)	*Acacia melanoxylon*	Blackwood Tree	Fo, I, M	Diggu, Digu, Mumbil
Fabaceae (Mimosoideae)	*Acacia* spp.	Wattles	Sa, O	Muddamuddag, Mudhamudhang, Garal
		Wattles (Flowers)		Barrinang
		Wattles (Gum)		Dhani
Lamiaceae	*Mentha* spp.	Native Pennyroyal	Gf, M	Buddainbuddain, Buddumbuddain
Lomandraceae	*Lomandra* spp.	Mat Rush	Fo, I	
Myrtaceae	*Eucalyptus viminalis*	Manna Gum, Ribbon Gum	C, H, M	Marrung, Ganinggaran
Poaceae	*Danthonia* spp.	Grass - Wallaby	Fo, H	Buguin, Buguwiny, Gungil
		Grass – Wallaby (Seeds)		Buonung, Galge
Poaceae	*Stipa* spp.	Grass - Spear, Plains,	H, Sh	Buguin, Buuguwiny, Gungil
		Grass - Spear, Plains (Seeds)		Wuyul
Poaceae	*Themeda australis*	Grass - Kangaroo	Fo, H, Sh	Mullawar, Gayman
		Grass - Kangaroo (Seeds)		Buonung, Galge
Polygonaceae	*Rumex brownii*	Slender Dock		Bilili
Proteaceae	*Banksia marginata*	Honeysuckle	C, Fo, H, I	
Rosaceae	*Rosa rubiginosa*	Sweet Briar	Fo, I, M	
Rosaceae	*Rubus discolor*	Blackberry	Fo, I	
Rosaceae	*Rubus parvifolius*	Native Raspberry	Fo, I	Gumba, Gamalang
Santalaceae	*Exocarpos strictus*	Possum Berry	Fo, H	
Urticaceae	*Urtica incisa*	Stinging Nettle	Fo, M	Baabin
Urticaceae	*Urtica urens*	Stinging Nettle	Fo, M	Baabin

***** Information source Dykes et al (2006) and Grant & Rudder (2005)

****** Use categories:

C = ceremonial
Fo = food
Gf = gender specific (women)
H = habitat
I = implement
M = medicinal
O = other
Sa = spiritual association
Sh = shelter

Table 3. Animals of Wiradjuri Cultural Value found on Property*

Scientific Name	Common Name	Wiradjuri Name/s
Water Animals		
Chera destructor	Yabby	Yabi, Yinga, Nyingaa
	Eel	galindulin
	Fish (general term0	Guya
Reptiles		
Pseudechis porphyriacus	Black Snake - Red-bellied	Gibirrngaan, Galingdhuliiny
trachydosaurus rugosus	Lizard - Eastern Blue-tongued	Bagaay, Balawagirr, Galuwaa
Physignathus lesueurii	Lizard - Eastern Water Dragon	Ngarrang, Nharrang, Bidyiwang
Birds		
Corvus coronoides	Australian Raven, Crow	Waagan, Wandyu
Ninox novaeseelandiae	Bookook Owl, Mopoke	Ngugug, Bugbug, Wangi, Mugii, Gugug
	Cockatoo	Wayimaa
Callocephalon fimbriatum	Cockatoo - gang-gang	Ganggang
Calyptorynchus funereus	Cockatoo - Yellow-tailed Black	Bilirr, Garadiil, Niyaran
Dacelo novaequineae	Kookaburra	Gugubarra
Strepera graculina	Pied Currawong	Wuyung, Wiibagang, Buragurabang
Platycercus elegans	Rosella - Crimson	Bulanbulan
Platycercus eximius	Rosella - Eastern	Mulbirrang
Aquila audax	Wedge-tailed Eagle	Maliyan, Yibaay, Bagadda
Mammals		
	Bat	Ngarradan
Tachyglossus aculeatus	Echidna	Wandayali, Wandhayirra, Ganyi, Ginaginbaany, Guwandiyala, Wambiyala
Macropus giganteus	Kangaroo - Eastern Grey	Wambuwuny
Ornithorhyncus anatinus	Platypus	Biladurang, Wamul, Dyimalang, Dungindany
Trichosurus vulpecula	Possum - Brushtail	Wilay
	Possum - Brushtail (male)	Gidyay
	Possum - Brushtail (old)	Balagirin
	Possum (meat)	Dyiny wilay
	Possum (skin, the hairy side of the outside)	Gidayanguwur
Dasyurus viverrinus	Quoll - Eastern	Mabi, Babila, Mugiiny-nabi
Petrogale penicillata	Wallaby - Brush-tailed Rock	Wirrang, Barrbay
Macropus rufogriseus	Wallaby - red-necked	Warriyan, Buliyang, Barradhaany
Wallabia bicolor	Wallaby - Swamp	Gunirr, Gundhirrwa
Macropus robustus	Wallaroo - Common	Walarru, Yulama
	Wallaroo - Common (female)	Baamany
Vombatus ursinus	Wombat	Wambad, Dhaygang, Gulang, Yuriyuri
	Wombat (burrow)	Gulun

* Information source Grant & Rudder (2005)

5 Management Issues

5.1 Access

- Members of the Gundungurra and Wiradjuri Traditional Custodians may wish to have regular and/or intermittent access to the sites and the property as a whole – who, how and when issues.
- Who is the appropriate person that can "*speak for country*"?
- Present landowners include family members who identify with the Wiradjuri nation; do they have a custodial responsibility?
- Some sites that have been identified from preliminary surveys indicate that they are gender specific sites (men/women sites); need for specific access conditions.

5.2 Cultural Connection

- There is a strong desire by local Wiradjuri (Bathurst/Lithgow) to maintain a cultural connection through access and cultural activities on property.
- Continued use of some sites for cultural purposes; ochre collection; ceremony, camping.
- Possible scarring of new trees to replace some significant scarred trees that have fallen or died as a way of continued connection to country.

5.3 Fire

- Poses a significant threat to scarred trees, particularly those that are dead but still standing and those that have fallen and are lying on the ground.
- Need for precautionary action prior to undertaking an ecological burn to avoid damage or destruction.

5.4 Knowledge Gaps

- Lack of a comprehensive cultural survey to identify all sites and area of interest to Aboriginal People hinders management planning and decision making - who, how and when issues.
- Lack of detailed cultural information/values on plants and animals for Gundungurra and Bathurst district Wiradjuri means the full ecological cultural significant of the property remains unknown.
- Lack of detailed information on Wiradjuri and Gundungurra dreaming tracks and songlines makes it difficult to determine the property's sites/places significance within the cultural landscape.

5.5 Site Preservation

- Need to liaise with Traditional Custodians and NPWS Aboriginal Cultural heritage Officers on site/object preservation management matters.
- Each site is likely to present its own management preservation issues.
- Some sites require immediate action and decision making on preservation issues; e.g significant scarred trees that have died and/or fallen are they to be left to rot and decay or should some preservation or documentation action be undertaken? - who, how, when and where issues.
- Objects such as artefacts that may be subject to erosion by the elements. Should they be collected and stored somewhere on the property to ensure their preservation? - who, how, when and where issues.
- Use of sites for education and/or other activities – who, how and when issues.

5.6 Speleological Activity

- Potential conflict with speleologists over activities in or around sites (access, gender and type of speleological activity).

5.7 Weeds and Feral Pests

- Pig diggings have potential to seriously damage some sites, e.g artefact scatters
- Weeds (Blackberry and serrated tussock) can degrade the context of sites.

6 Management Actions

6.1 Access

- Explore the possibility of entering into a Memorandum of Understanding with the Gundungurra and Wiradjuri Traditional Custodians regarding access arrangements and cultural activities on the property.

6.2 Cultural Connection

- Encourage access by the Traditional Custodians for educational and cultural activities.
- Investigate with Traditional Custodians the possibility of having a ceremony to scar new trees to replace significant fallen or dead scarred trees.

6.3 Fire

- Identify specific Aboriginal cultural heritage sites and management actions, to minimise the impact should ecological burns be carried out on site.
- Specific management actions may include hand removal of litter up to a distance of 5 m and/or the use of a small back-burn for 20 m around the site, prior to more wider-scale burning activity.
- Seek the assistance from NPWS, the Aboriginal Cultural Heritage Staff and Traditional Custodians, if required and where appropriate, in undertaking ecological burns in culturally sensitive areas.

6.4 Knowledge Gaps

- Liaise with the Traditional Custodians to seek funding for a comprehensive cultural survey.
- Liaise with the Traditional Custodians and NPWS Aboriginal Cultural Heritage Staff to prepare and maintain a listing of Aboriginal sites/objects located on the property - to include data on the site type, location, cultural heritage value, specific access requirements and any other management issues.
- Seek additional information on Gundungurra and Bathurst/Oberon Wiradjuri plant and animal values.
- Should any additional sites/objects be identified, add them to the above listing and advise NPWS Aboriginal Cultural Heritage Staff, for addition to the NPWS Aboriginal Heritage Information Management System (AHIMS) Database.

6.5 Site Preservation

- Liaise with the Traditional Custodians, NPWS and Aboriginal Cultural Heritage Staff on site/object preservation issues.
- Identify sites/objects requiring specific or immediate management preservation actions.
- Liaise with Traditional Custodians, NPWS and Aboriginal Cultural Heritage Staff on the possible collection and storage on the property of objects subject to environmental damage.
- Liaise with Traditional Custodians on the use of site/objects for educational and other cultural activities.
- Sites and areas identified as gender specific are only to be visited by persons of the appropriate gender.
- Where there is a conflict between the preservation of a mining heritage sites/objects/infrastructure and Aboriginal cultural heritage values, which is unable to be resolved by mediation/negotiation, then the Aboriginal cultural heritage values and customs will take precedence over mining heritage values.

6.6 Speleological activity

- Where there is a conflict between a speleological activity/s and Aboriginal cultural heritage values, which is unable to be resolved by mediation, then the Aboriginal cultural heritage values and customs will take precedence over the speleological activity.
- Implement management actions related to speleological activity contained in Section 6.8 of Tricketts Arch Karst Management Plan.

6.7 Weeds and Feral Pest

- Implement the *BioBanking Property Weed Management Plan*.
- Implement the *BioBanking Property Management Plan to Control Feral and Overabundant Native Herbivores*.
- Liaise with the NSW Game Council to assist in the control of pigs and foxes.

7 Interested Parties

The Office of Environment and Heritage (OEH) has for the last 2 years been working with the Landowners to develop a BioBanking Agreement for the property "Tricketts Arch" and is a principal party to the Biobanking Agreement No 33. The Minister and the Director General for OEH are regarded as interested parties to this Property Aboriginal Cultural Heritage Management Plan.

The Minister and the Director General of The Office of Environment and Heritage may nominate any departmental officer or departmental unit as an interested party to this Property Aboriginal Cultural Heritage Management Plan.

The Gundungurra and Wiradjuri People regard the property "Tricketts Arch" as lying within an area that is traditionally shared between members of both language groups.

The Mingaan Aboriginal Corporation represents Wiradjuri Traditional Custodians in the Lithgow, Bathurst, Oberon and Mudgee districts. On an overall language group basis the Wiradjuri Council of Elders is regarded as the peak coordinating group for cultural and land management matters. Their contact details are:

Wiradjuri Council of Elders
C\- Mr Robert Clegg
Cultural and Heritage Officer
3 Lorreta Place
GLEN DENNING NSW 2761
Ph (02) 9995 5440
Mobile 0450 530 920
robert.clegg@environment.nsw.gov.au

Mingaan Aboriginal Corporation
C\- Mrs Helen Riley
Secretary
38 Tweed Road
Lithgow NSW 2790
Ph (02) 6352 2473
mingaan.lithgow@ymail.com

The Gundungurra Tribal Council represents Gundungurra People. Their contact details are:

Gundungurra Tribal Council
C\- Mrs Sharon Brown
Chairperson
14 Oak Street,
Katoomba NSW 2780
Ph (02) 4782 2413
sharonbrown@gundungurra.org.au

Tricketts Arch is within the area covered by the Pejar Local Aboriginal Land Council. Their contact details are:

Pejar Local Aboriginal Land Council
P.O. Box 289,
GOULBURN NSW 2580
Ph 4822 3552
pejar1@goulburn.net.au

8 Monitoring

The BioBanking Agreement has provisions for monitoring the BioBanking Property Management Plan through regular reporting to OEH and on-site inspections. It is not intended to supplant these provisions but rather to provide addition and specific monitoring to complement OEH monitoring through the assistance of stakeholder groups.

With respect to Aboriginal sites/objects and areas, the Traditional Custodians will be invited to regularly monitor aspects of this Aboriginal Cultural Heritage Management Plan and to maintain links to the area. To facilitate monitoring, the Traditional Custodians will be allowed to establish monitoring resumes at Aboriginal sites and areas.

To facilitate the Traditional Custodians involvement in carrying out management actions as identified throughout in the plan, the Landowners may enter into a Memorandum of Understanding with all or some of the Traditional Custodians' representative bodies. The Memorandum of Understanding will cover property access arrangements, access levels to maintain links to the area; access for cultural activities; consultation on management issues and monitoring times and methodologies.

9 Timeframes

This, "The Aboriginal Cultural Heritage Management Plan" will take effect the day the Trickett Arch BioBanking Agreement is signed.

10 Plan Review

This Aboriginal Cultural Heritage Management Plan may, with the consent of the Landowners, OEH and interested parties, be reviewed at any time. However every 10 years in consultation with the Landowners, OEH and interested parties there will be a formal review of the provisions and operation of the plan. After review, any necessary amendments will be made.

11 References

Blundell, Adam and Pedersen, Dan (2010) *Biobanking Assessment Report 605 Jaunter Road Jaunter NSW*. Ecobiological Survey and Assessment, Warners Bay.

Dykes, Peter, Howard, Linton, Sullivan, Phillip, Burns, Will, Chatfield, Joan and Brown, Cathy (2006) *Integration of cultural education with native vegetation management.* DNR Central West Region, Orange.

Grant, Stan and John Rudder (2005) *A first Wiradjuri dictionary English to Wiradjuri, Wiradjuri to English*, Restoration House. O'Connor ACT.

Kannane Althea (2011) *OEH BioBanking Assessment Report: Tricketts Arch*. Unpublished report prepared by OEH, Dubbo.

Stockton, Eugene (1993) *Blue* Mountains dreaming: *the Aboriginal heritage*. Three Sisters Publication, Winmalee.

Gundungurra Tribal Council (c 2009) *Gundungurra Series*: Volume 1 and 2. C\- Jim Smith 65 Fletcher Street, Wentworth Falls.

12 Maps

Figure 1. **Tricketts Arch Conservation Area:**
Biobanking Site Boundary

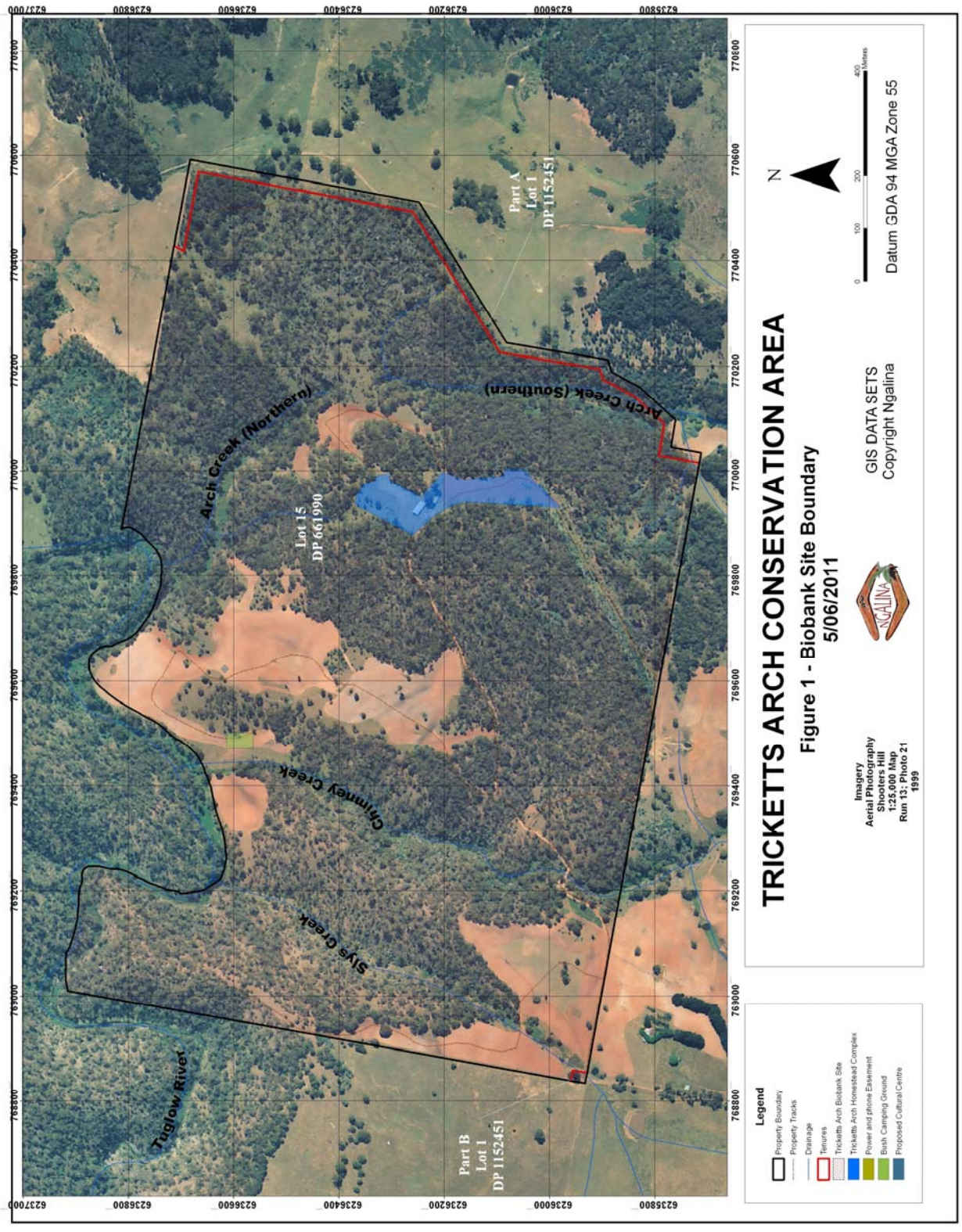
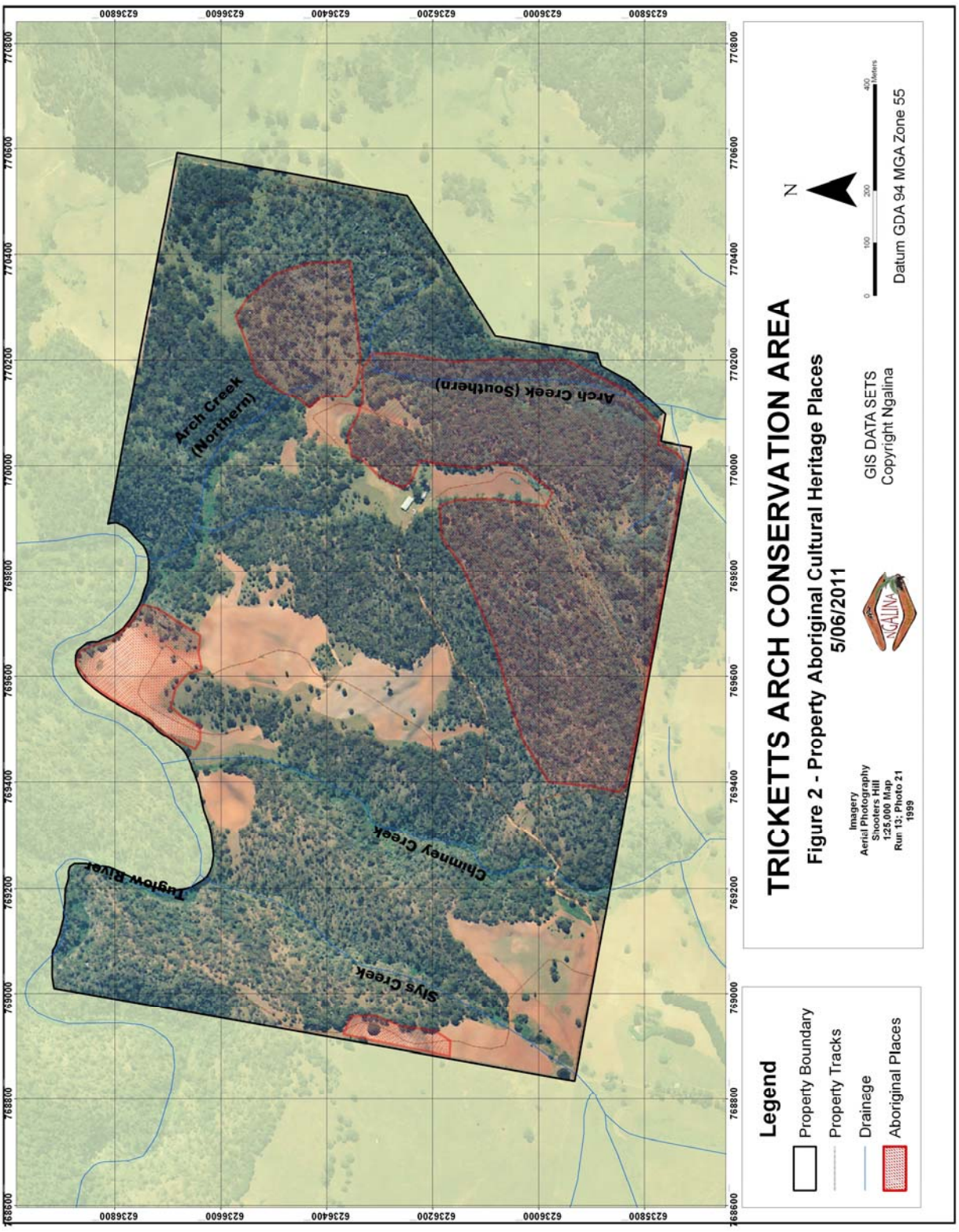


Figure 2. **Tricketts Arch Conservation Area:**
Property Cultural and Heritage Areas



13 Photos

Photo 1. Fallen scarred tree – boundary marker tree

(Photo Peter Dykes Mar 2011)

Photo 2. Possible ochre site

(Photo Peter Dykes Mar 2011)

Photo 3. Artefact scatters along Tuglow River

(Photo Peter Dykes Mar 2011)

Photo 4. Camping ground site on the Tuglow River

(Photo Peter Dykes Mar 2011)

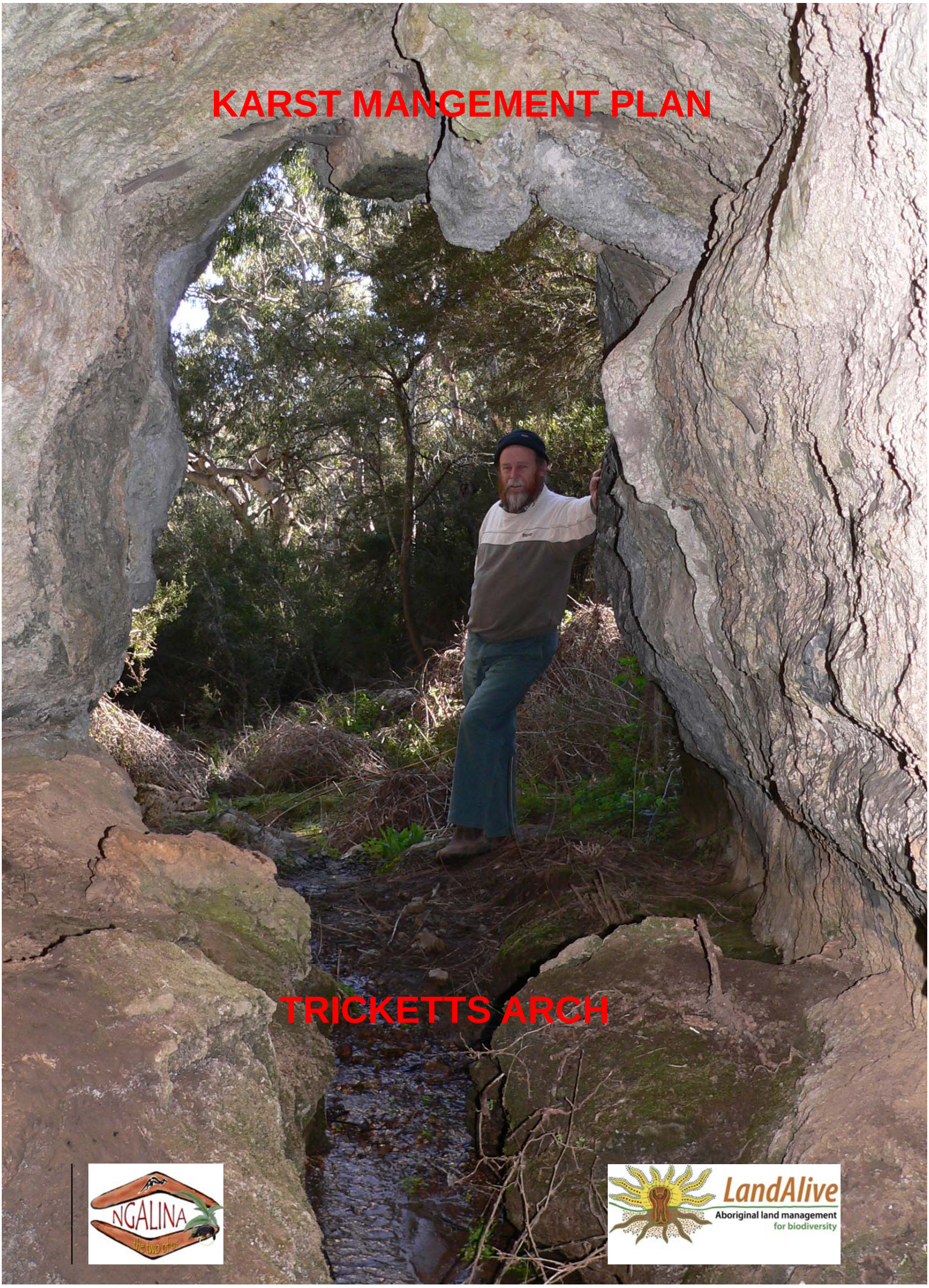
Photo 5. Men's ceremonial site

(Photo Peter Dykes Mar 2011)

Photo 6. Scarred tree – women's site marker

(Photo Peter Dykes Mar 2011)

KARST MANGEMENT PLAN



TRICKETTS ARCH

NGALINA
the two of us

LandAlive
Aboriginal land management
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CONTENTS

Cover: Northern Tricketts Arch Cave (JA-2) – looking out through entrance (Photo Matt Church Aug 2009)

1 Context

Peter and Sharon Dykes are the Landowners of "Tricketts Arch", a property composed of Lot 15 in Deposited Plan number 661990 also referred to as Lot 15 Parish Abercorn, County Westmoreland and Lot 1 in Deposited Plan number 1152451.

The rural address for the property is:
605 Jaunter Road
JAUNTER NSW 2787

The Landowners have decided to enter into a BioBanking Agreement with the Office of the Environment and Heritage (OEH) under Part 7a Division 2 of the *Threatened Species Conservation Act 1995*. The Landowners may at a future date also enter into a Conservation Agreement with the Office of the Environment and Heritage (OEH) under Part 4 Division 12 of the *National Parks and Wildlife Act 1974*.

Refer Map 1 showing property boundary, tenure details and BioBanking site.

Two reports were prepared on the property as part of the process to achieving a BioBanking Agreement. These are:

1. An ecological assessment by a registered ecological assessor (refer Blundell & Pedersen 2010) and checked for accuracy by OEH (refer Kannane 2011).
2. A property management plan for the BioBanking site using a OEH template (refer Dykes 2010) which is incorporated into the BioBanking Agreement.

2 Purpose of the Tricketts Arch Karst Management Plan

The BioBanking Property Management Plan is solely directed at preserving and improving biodiversity values such that other cultural and heritage values are either ignored or not addressed in any detail in the management plan.

The BioBanking Property Management Plan contains management actions required to contain and limit human disturbance to the BioBanking site. Point 3.2 and 3.4 acknowledge that "*The biobank site contains a nationally significant karst environment including extensive cave systems, cave decoration (speleothems), cave sediments, surface solutional features and a limestone bridge known as Tricketts Arch"* and that the landowner "*has prepared specific management plans for Aboriginal cultural heritage, karst areas and mining heritage*". Implied in this point is the recognition that the ongoing management and conservation of Aboriginal sites/objects is beyond the scope of the BioBanking Agreement but nonetheless important in preserving and conserving the BioBanking site.

The Tricketts Arch Karst Management Plan has been developed in consultation with important stakeholder groups, namely members of the Australian Speleological Federation (ASF) and the Traditional Custodians from the Gundungurra and Wiradjuri Peoples, to provide a management plan for the Tricketts Arch karst areas.

The Tricketts Arch Karst Management Plan is meant to complement the actions and provisions contained in the BioBanking Property Management Plan and Agreement. Where conflict may arise between the two plans, unless resolved by mediation between all interested parties, the BioBanking Property Management Plan and Agreement will take precedence over the Tricketts Arch Karst Management Plan.

3 Background

The karst found on Tricketts Arch property is part of a belt of limestone made up of small lens and occasionally large outcrops referred by Lishmund et al. (1986) as the Tuglow and Hollanders River Limestone Deposits (Locality No. 231). The belt extends from the northern reaches of the Hollanders River south across Tuglow Flats and up the Tuglow River to its southern extremity in the vicinity of the Tricketts Arch property (refer Figure 3). A quite impressive bluff of the limestone belt is located on the Kowmung River in which the Tuglow Caves are found and another is located on the Tuglow River just north of Tricketts Arch. A very small lens is also found on Tuglow Hole Creek, several kilometres to the east of the Tricketts Arch property.

The limestone is of Late Silurian age and is present as series of pod-shaped (lenticular) outcrops mainly along the valley floor of the Tuglow and Hollanders Rivers. Only on the Kowmung River and in the upper parts of the Tuglow River do the deposits extend onto the ridge line and plateau area above the river valley floor. The surrounding rocks are acid tuffs and fine-grained sediments of the Late Silurian Kildrummie Formation, mainly shales and volcanics.

Throughout the limestone belt there are a range of karst features (caves, shafts, springs, dolines, grikes). Two caves in particular, Tuglow Main (T-1) and Tugelella Cave (JA-32) have mapped passage lengths well in excess of one kilometre and are regarded as being of state and national significance. For the purposes of speleological documentation the limestone belt is divided into three cave areas each with a prefix code used to identify and record karst features:

1. The limestone found in the Hollanders River catchment is documented under the Hollanders River cave area (HR).
2. The limestone in the Tuglow River catchment (including the Tricketts Arch property) is documented under the Jaunter cave area (JA).
3. The limestone in the Kowmung River catchment is documented under the Tuglow cave area (T).

With a few larger exceptions, most caves found in the Jaunter area are fairly small. These are still regarded by speleologists as having very high conservation values because they are in an almost pristine state with very little human disturbance to their subterranean environments. The surface environment of the Jaunter area karst has not been as fortunate; much of the northern outcrops along Tuglow Flats and Sheep Station Creek have been highly degraded through clearing, grazing and weed infestation, particularly blackberry. The vegetation on the southern outcrops around Tricketts Arch has fared considerably better and is in a more natural state.

The karst on Tricketts Arch property presents as two large outcrops with a series of small lens along the Southern Arch Creek (refer Figure 2). Because the area has had minimal human disturbance to both the surface and subterranean environments the karst is regarded by speleologists as having a reasonably high conservation value. The lack of human disturbance to the caves is the result of the current and previous owners' restricted access policy.

4 Karst Values

The karst on Tricketts Arch property has a wide range of values which when combined give it a very high conservation value. Briefly these values are discussed in the following sections.

4.1 Aboriginal Heritage:

- The karst areas have not been extensively surveyed, however preliminary investigation by Bill Allen, NPWS Aboriginal Sites Officer in 2003 and OEH Landalive staff in October 2010 have identified 2 caves as possible Aboriginal sites (women's sites).
- There is also a stone arrangement running from a men's ceremonial site down onto the top of the Arch (pers. information provided by Bill Allen to owner).
- There are several areas and features on the Arch outcrop that merit further investigation.
- Tricketts Arch is also strategically located between the major Aboriginal cultural sites of Jenolan, Colong, Wombeyan, Silent Creek, Kowmung and Abercrombie Rivers and may have been part of a dreaming track connecting these sites (pers. information provided by Bill Allen to owner)

4.2 Cultural and Historical Heritage:

- The Jaunter caves have been known to European setters since at least the 1870s. The arch is recorded on a map in Oliver Trickett's 1899 report showing the location of Tuglow Caves.
- JA-3 has several signatures dating from the late 1890s and early 1900s from members of the Bourchier, Arnold and Hanrahan families, all pioneer families in the Jaunter area.
- The limestone bridge is named after Oliver Trickett, one of the earliest speleologists to formally document NSW cave and karst features.
- Just downstream of JA-2 re-resurgence on Arch Creek there is a series of water races and stone walls associated with Tuglow Copper Mine. A much smaller section of stone wall is also found on the southern side of the Arch along Southern Arch Creek.

4.3 Ecological:

- The vegetation on the Tricketts Arch karst has been identified as unique to the karst (refer Blundell & Pederson 2010 ecological assessment report).
- Most of the vegetation on karst in the Jaunter area has been severely modified while the Tricketts Arch karst has had little modification, making the area an important refugia for flora and fauna.
- The Tricketts Arch karst provides habitat for Eastern Bentwing Bats (*Miniopterus schreibersii oceanensis*) and Large-footed mouse-eared bats (*Myotis macropus*) listed as Vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995* as well as potential habit for Brush-tailed Rock Wallabies *(Petrogale penicillata)*.
- Observations over 40 years indicate that the cave system JA-67/68 is occupied by a permanent colony of Brushtail Possums (*Trichosurus vulpecula*), a fairly uncommon occurrence in NSW caves.
- A jaw bone found in the dirt removed from a dig in JA-13 has been identified as belonging to Hasting River Mouse (*Pseudomys oralis*) (information provided to landowner by Fred Ford CSIRO 2009)

4.4 Cave Fauna:

- The Jaunter cave area has had two cave fauna surveys, one in the late 1970s and early 1980s (Smith 1982) and another in the early 1990s (Eberhard & Spate 1995)
- A total of 41 taxa were recorded (Smith 1982 – 4 taxa; Eberhard & Spate 1995 – 37 taxa)
- Several caves in the Tricketts Arch karst were surveyed by Eberhard & Spate (1995) and identified as having cave invertebrate fauna, and samples were collected (JA-1, JA-2, JA-9, JA-67).
- While most of the specimens collected remain to be identified, Eberhard & Spate (1995) note that "*NSW cave communities are unique. There is an extraordinary degree of endemism and isolation"*.

4.5 Geological and Karst Features:

- Over 50 karst features, representing a wide range of types (caves, dolines, grikes, springs, inflow caves), are known to exist in the Tricketts Arch karst (refer Table 1 and Photos 1 – 6 for examples of karst features).
- The limestone bridge known as Tricketts Arch is one of only a few known to exist in NSW and therefore has state significance.
- The Tricketts Arch karst has a "granite plug' around which limestone has been deposited, a unique feature in NSW karst.
- The caves contain a wide range of decoration feature types (stalactites, stalagmites, shawls, rimstone pools, and helictites) with very little, if any, damage by humans.

4.6 Speleological:

- Highland Caving Group (HCG) and Central West Caving Group (CWCG) regard the Jaunter cave area and, in particular the Tricketts Arch karst, as a "reference area" (an area where speleological research rather than adventure caving is undertaken) and have used the area for speleological research for over 40 years, developing extensive records on the geology and karst features.
- There is some speleological evidence to suggest that the source of the water in the spring in Tuglow Hole Creek is in the Tricketts Arch karst, and if eventually proven, this will represent a significant discovery.
- There is potential for some shafts and dolines in the Tricketts Arch karst to open into larger karst system through "digging".

Table 1. List of Karst Features Found on the Property*

Feature No.	Name	Feature Type	X Reference
JA-1	Southern Tricketts Arch	Limestone bridge; blind valley; inflow cave	JA-74, JA-145
JA-2	Northern Tricketts Arch	Resurgence; cave	
JA-3	Bourchiers Cave	Cave	
JA-4	Bone Cave	Cave	
JA-5	Luths Hole	Cave	JA-6
JA-6		Cave	JA-5
JA-7	Snake Cave	Cave	
JA-8	River Cave	Cave	
JA-9		Spring; cave	
JA-10		Shaft	
JA-11	The Box	Cave	
JA-12	The Grike	Shaft	
JA-13		Cave	JA-15
JA-14	Greg's Cave	Cave	
JA-15		Cave	JA-13
JA-16		Cave	JA-7
JA-17	Kayaka Cave	Doline; cave	JA-18
JA-18		Cave	JA-17
JA-66		Shaft	
JA-67		Cave	JA-68
JA-68		Cave	JA-67
JA-69		Doline	
JA-70		Doline; shaft	
JA-71		Doline; shaft	
JA-72		Doline; cave	

JA-73		Solution tube	
JA-74		Cave	JA-1, JA-145
JA-75		Doline	
JA-76		Doline; stream channel	
JA-77		Shaft	
JA-78		Shaft	
JA-79		Shaft	
JA-80		Grike	
JA-143		Doline	
JA-144		Doline	
JA-145	Brown Finger	Doline; cave	
JA-146		Doline; cave	
JA-147		Doline; cave	
JA-148		Doline	
JA-149		Inflow shaft	
JA-150		Solution Doline	

Feature No.	**Name**	**Feature Type**	**X Reference**
JA-X1			
JA-X2		Doline	
JA-X3		Doline; cave	
JA-X4		Doline; shaft	
JA-X5		Solution hole	
JA-X6			
JA-X6		Shaft	
JA-X7			
JA-X8		Shaft	
JA-X9		Shaft	
JA-X10		Solution doline	
JA-X11		Slot	

*****Information supplied from records held by CWCG and HCG

5 Management Issues

5.1 Aboriginal Heritage:

- Preliminary surveys indicate that there are Aboriginal sites/objects on the karst areas.
- Some of these sites have also been preliminarily identified as gender specific sites (women's sites).
- Potential conflict with speleologists over activities in or around sites (access, gender and type of speleological activity).

5.2 Access

- Members of the ASF and its affiliated clubs, particularly CWCG and HCG, may wish to have regular and/or intermittent access to the karst and the property as a whole – who, how and when issues.

5.3 Cultural and Historical Heritage:

- Potential for speleological activities in caves to damage and/or degrade historic pioneer signatures.
- Historic mining infrastructure on Upper Arch Creek adjacent to Tricketts Arch subject to erosion after heavy rain events.

5.4 Erosion

- Soil erosion from the cleared paddocks in the Southern Arch Creek catchment (Clover Hills Property) poses a significant threat to Tricketts Arch Cave ecosystem (JA-1/2), particularly for JA-1.
- Periodic heavy rain and subsequent run-off poses erosion issues along section of Southern Arch Creek.
- Heavy sedimentation in the entrance chamber of JA-1 has blocked passages and caused internal damage to the cave system.
- Periodic heavy rain and subsequent run-off poses a threat to the historic mining infrastructure (stone walls) on Southern Arch Creek adjacent to Tricketts Arch.

5.5 Feral Pest:

- Pig diggings causing the spread of Paterson's Curse (*Echium plantagineum*) and Vipers Bugloss (*Echium vulgare*) as well as providing the potential habitat for new weed species. Southern Arch Creek area is a known breeding area for pigs.
- Foxes using karst features as dens and preying on native fauna.

5.6 Fire

- There has been discussion within the speleological community about fire being an inappropriate management tool on karst areas, and likely to have very negative impacts on the karst, leading to long-term degradation of both the surface karst environment and underground ecosystems (Holland 1994; McBeath, c2006; Spate 2003a and Spate 2003b).
- The main study often quoted is a WA study (McBeath, c2006) which has vegetation, geology and soil types substantially different to that found in the Blue Mountains Region, particularly the Jaunter area.
- Based on the above, there is a general tendency to place a fire exclusion policy over karst areas, regardless of the impact on, or needs of, local native karst vegetation.
- Vegetation on the Tricketts Arch karst is not uniform. Some large areas include ground cover species that require fire as a component of their life cycle e.g Kangaroo Grass (*Themeda australis*).
- What fire regime is appropriate to Tricketts Arch karst?

5.7 Knowledge Gaps

- Lack of a comprehensive cultural survey to identify all sites and area of interest to Aboriginal People hinders management planning and decision making.
- Lack of a current listing (as at 2011) of all karst features – several recently discovered features remain untagged and documented (refer Table 1) hindering management planning and decision making.
- One feature (JA-73) tagged in the early 1970s, well before the use of GPS, has not being re-located.
- Lack of a comprehensive mining heritage survey to identify all mine sites and mining heritage infrastructure hinders management planning and decision making.
- Several caves have only low grade cave surveys, hindering management planning and decision making.

5.8 Speleological Activity:

- Nature and type of speleological activities that will be allowed generally and for specific karst features.
- Potential for speleological activity to degrade interior of karst features through over use and/or inappropriate use.
- Current (2011) cave digs exist in JA-13 and JA-10 – issues with "spoil", collection, storage and identification of animal bones found in extracted cave soil.
- Impact of speleological activity on cave fauna and Brushtail Possum colony in JA-67

5.9 Weeds:

- Blackberry (*Rubus fruticosus*) infestation on karst areas, particularly in dolines and around shafts, grikes and cave entrances, has been sprayed (2007/2008) but the area is subject to on-going re-infestation - a major weed on the karst and adjacent riparian areas.
- Sweet Briar (*Rosa rubiginosa*) present as isolated individuals – a minor weed on the karst.
- Cherry Laurel (*Prunus laurocerasus*) present as isolated individuals – a minor weed on the karst, but a major issue for native vegetation areas on the property.
- Paterson's Curse (*Echium plantagineum*) and Vipers Bugloss (*Echium vulgare*) present in scattered areas across Tricketts Arch karst usually on disturbed areas such as pig digging – a minor weed on the karst but a major issue for native vegetation areas on the property.

6 Management Actions

6.1 Aboriginal Values:

- Implement management actions as required under Tricketts Arch Aboriginal Cultural Heritage Management Plan for all Aboriginal sites and areas located on or adjacent to karst areas.
- Sites and areas identified as gender specific will only be visited by persons of the appropriate gender.
- Where there is a conflict between a speleological activity/s and Aboriginal cultural heritage values, which is unable to be resolved by mediation, then the Aboriginal cultural heritage values and customs will take precedence over the speleological activity.

6.2 Access

- Explore the possibility of entering into a Memorandum of Understanding with ASF regarding access arrangements and speleological activities on the property by members of its affiliated clubs.

6.3 Cultural and Historical Values:

- Implement management actions as required under Tricketts Arch Mining Heritage Management Plan for all mining heritage sites located adjacent to karst areas.
- Undertake management actions on Arch Creek to reduce erosion to mining heritage infrastructure (stone walls).
- Seek the assistance of speleological groups to document the location and details of all pioneer signatures found within caves.
- Manage access to caves identified as containing pioneer signatures to ensure there is no damage to the signatures.

6.4 Erosion

- Liaise with neighbouring landowners to reduce erosion in the Arch Creek catchment through minimal human disturbance of the groundcover layer.
- Place barriers along Southern Arch Creek to impede the movement of soil into the entrance chamber of JA-1.
- Investigate and implement soil conservation control measures for the banks along Southern Arch Creek to reduce soil erosion into the entrance chamber of JA-1.

6.5 Feral Pest:

- Implement the *BioBanking Property Management Plan to Control Feral and Overabundant Native Herbivores*.
- Liaise with the NSW Game Council to assist in the control of pigs and foxes.

6.6 Fire

- Liaise with the speleological community and other research institutions to undertake a study to determine the appropriate fire regime for Tricketts Arch karst taking into consideration the vegetation, individual species requirements and the impacts on karst landforms.
- Incorporate the recommendations from the study into any review of environment effects (REF) document prepared for any ecological burn covering part or all of the karst.

6.7 Knowledge Gaps

- Liaise with the ASF and its interested member clubs (HCG and CWCG) to prepare and maintain a comprehensive listing of karst features located on the karst areas - the listing to include data on the type of feature, location, conservation value, specific access requirements and any other management issues.
- Liaise with ASF and speleological researchers to develop a speleological advisory panel to provide expertise advice, assistance and direction on speleological research priorities, management issues and funding avenues.
- Liaise with the Gundungurra and Wiradjuri Traditional Custodians to seek funding for a comprehensive cultural survey of the property and in particular karst areas.
- Liaise with local community groups to seek funding for a comprehensive mining heritage survey of the property and in particular areas along and adjacent to Arch Creek.

6.8 Speleological Activity:

- Karst features will be documented, and tagged if appropriate. –Tagging will adhere to the ASF Code for Cave and Karst Numbering.
- Basic information on the karst features is to be recorded in the ASF's web-based Karst Index Database (KID) with more extensive information recorded in ASF's off-line GIS-based Australian Karst Database (OzKarst) and available only to speleological researchers.
- No speleological activity is allowed on karst areas unless as part of an official caving trip by a recognised caving club holding full membership status or its equivalent with the ASF.
- As a general guiding principle the karst areas will be preserved as "reference areas" such that any speleological activity should have a speleological research basis. "Adventure caving" will in general not be permitted.
- Speleological research activities may include, but not be limited to, cave surveying; cave tagging and documentation; exploring new discoveries; research on cave fauna, geology, cave sediments, cave decorations, karst vegetation and karst ecosystems.
- Digging to find new cave passage may be permitted as a speleological activity, provided it adheres to the following general principles:
    a. After a reasonable case has been made to the ASF Conservation Commission for undertaking a dig, permission may be sought from the Office of the Environment and Heritage (OEH)
    b. The environmental impacts on the karst feature and karst areas are minimised.
    c. The soil removed can be placed in a location that minimises erosion and environmental impacts.
    d. Any bones found in the soil are documented and stored for scientific identification and research.
    e. Where a dig results in opening access to new cave passage, the impact on cave fauna and the general cave environment is immediately considered and any appropriate action taken, such as installation of a gate.
    f. Should any Aboriginal objects be found in the soil, speleological activity on the dig ceases immediately and action is taken as required under the Tricketts Arch Aboriginal Cultural Heritage Management Plan and relevant state legislation.
- Caves shall not be entered or used for tourism or commercial purposes.
- The owner and owner's guests may only enter caves if accompanied and guided by a member of a caving club holding full membership status, or its equivalent, with the ASF.
- All caving activity to adhere to ASF codes of conduct, including: Code of Ethics, Safety Code, Conservation Code, Minimal Impact Caving Code and the Minimal Impact Code of Ethics for Scientific Investigation in Caves and Karst.

6.9 Weeds:

- Implement the *BioBanking Property Weed Management Plan*.
- Herbicide use on karst is to be avoided or minimised, and restricted to chemicals suitable for aquatic and riparian zones e.g Roundup Bioactive. Hand removal of weeds on karst should be undertaken where possible.
- In general herbicide should not to be applied near cave entrances or on highly fissured karst sites - hand or mechanical removal of weeds is to be undertaken in these situations.

- Where dense infestations of Blackberry occur near cave entrances or on highly fissured karst sites such that hand removal is impractical and/or poses significant occupational health and safety issues spraying with herbicide will be permitted.

7 Interested Parties

The Office of Environment and Heritage (OEH) has for the last 2 years been working with the Landowners to develop a BioBanking Agreement for the property "Tricketts Arch" and is a principal party to the BioBanking Agreement No 33. The Minister and the Director General for OEH are regarded as interested parties to this Property Karst Management Plan.

The Minister and the Director General of The Office of Environment and Heritage may nominate any departmental officer or departmental unit as an interested party to this Property Karst Management Plan.

The Jaunter karst area has been extensively documented by Highland Caving Group and Central West Caving Group for over 40 years. Both clubs hold full membership status with the Australian Speleological Federation Inc. (ASF) the national speleological organisation. The two clubs have worked together to document over 200 karst features in the Jaunter area and together their members have very detailed knowledge about the caves and the karst environment. Their contact details are;

Highland Caving Group (HCG)
P O Box 54
Georges Hall, NSW 2198
Australia
http://hcg.org.au/contact/

Central West Caving Group (CWCG)
C\- Tricketts Arch
605 Jaunter Road
JAUNTER 2787
ngalina@activ8.net.au

The Australian Speleological Federation and its state coordinating body the New South Wales Speleological Council have for the purposes of this management plan accepted the role of coordinating with the landowner its implementation and on-going monitoring. Their contact details are;

Australian Speleological Federation Inc
P.O. Box 388
BROADWAY NSW 2007
www.caves.org.au

New South Wales Speleological Council
P.O. Box 388
BROADWAY NSW 2007

The Gundungurra and Wiradjuri People regard the property "Tricketts Arch" as lying within an area that is traditionally shared between members of both language groups. The Mingaan Aboriginal Corporation represents Wiradjuri Traditional Custodians in the Lithgow, Bathurst, Oberon and Mudgee districts. On an overall language group basis the Wiradjuri Council of Elders is regarded as the peak coordinating group for cultural and land management matters. Their contact details are:

Wiradjuri Council of Elders
C\- Mr Robert Clegg
Cultural and Heritage Officer
3 Lorreta Place
GLEN DENNING NSW 2761
Ph (02) W 9995 5440
Mobile 0450 530 920
robert.clegg@environment.nsw.gov.au

Mingaan Aboriginal Corporation
C\- Mrs Helen Riley
Secretary
38 Tweed Road
Lithgow NSW 2790
Ph (02) 6352 2473
mingaan.lithgow@ymail.com

The Gundungurra Tribal Council represents Gundungurra People. Their contact details are;

Gundungurra Tribal Council
C\- Mrs Sharon Brown
Chairperson
14 Oak Street,
Katoomba NSW 2780
Ph (02) 4782 2413
sharonbrown@gundungurra.org.au

Tricketts Arch is in the area covered by the Pejar Local Aboriginal Land Council whose contact details are:

Pejar Local Aboriginal Land Council
P.O. Box 289,
GOULBURN NSW 2580
Ph 4822 3552
pejar1@goulburn.net.au

8 Monitoring

The BioBanking Agreement has provisions for monitoring the BioBanking Property Management Plan through regular reporting to OEH and on-site inspections. It is not intended to supplant these provisions but rather to provide addition and specific monitoring to complement OEH monitoring through the assistance of stakeholder groups.

ASF will be invited to regularly monitor aspects of this Karst Management Plan and to maintain links to the area. To facilitate the monitoring ASF will be allowed to establish monitoring sites on the karst and within caves.

With respect to Aboriginal sites and areas located on the karst the Traditional Custodians will be invited to regularly monitor aspects of this Karst Management Plan and to maintain links to the area. To facilitate the monitoring The Traditional Custodians will be allowed to establish monitoring resumes at Aboriginal sites and areas.

To facilitate the involvement of ASF and the Traditional Custodians in the management of the karst areas and the monitoring of this plan, the Landowners may enter into a Memorandum of Understanding with the ASF and the Traditional Custodians. The Memorandum of Understanding will cover property access arrangements, visitation levels to maintain links to the area; access for speleological research and cultural activities; consultation about management issues, monitoring times and methodologies.

9 Timeframes

This Karst Management Plan shall have effect from the day the Trickett Arch BioBanking Agreement is signed.

10 Plan Review

This Karst Management Plan may, with the consent of Landowners, OEH and interested parties be reviewed at any time. However every 10 years in consultation with the Landowners, OEH and interested parties there will be a formal review of the provisions and operation of the plan. After review, any necessary amendments will be made.

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12 Maps

Figure 1. Tricketts Arch Conservation Area:
BioBanking Site Boundary

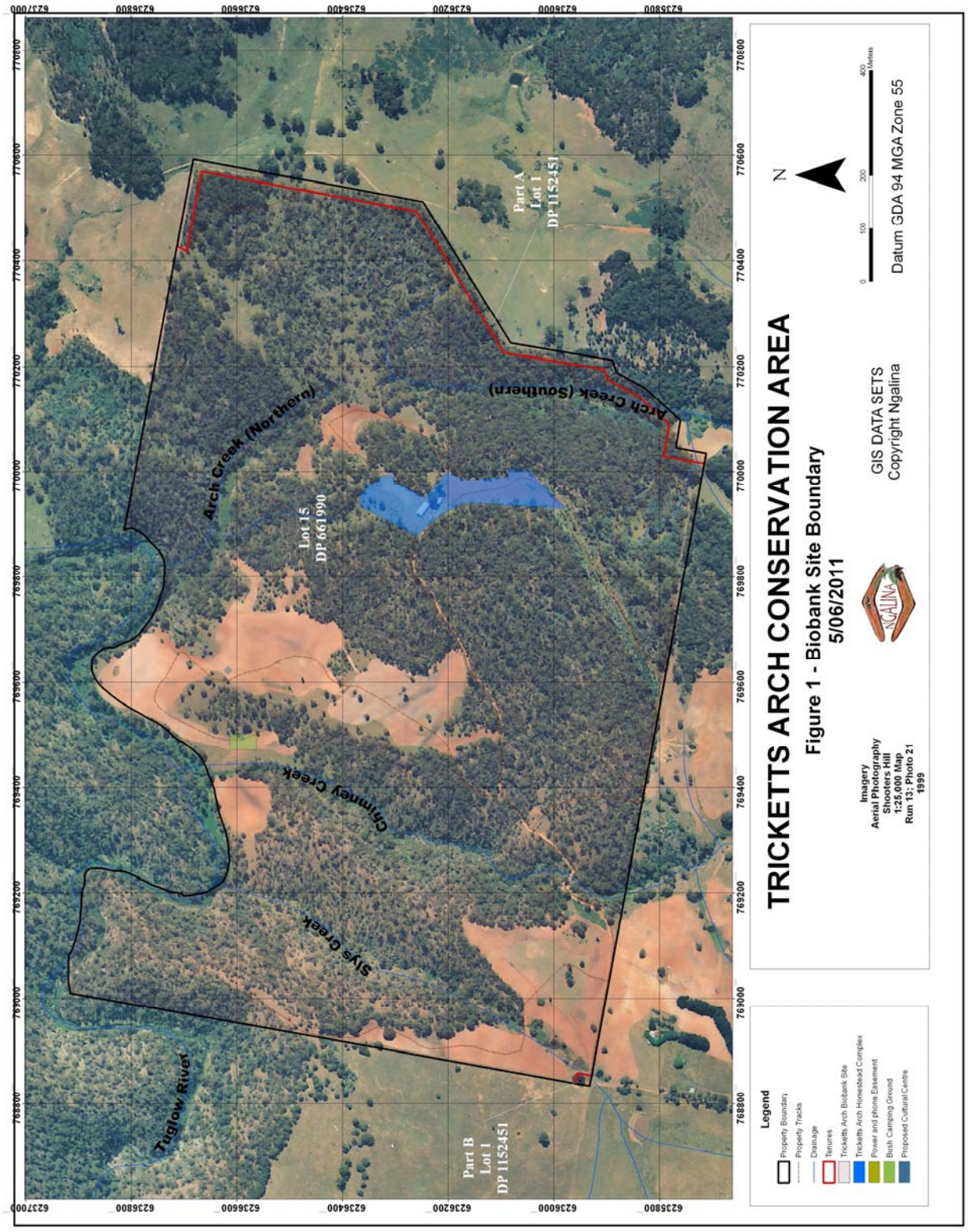
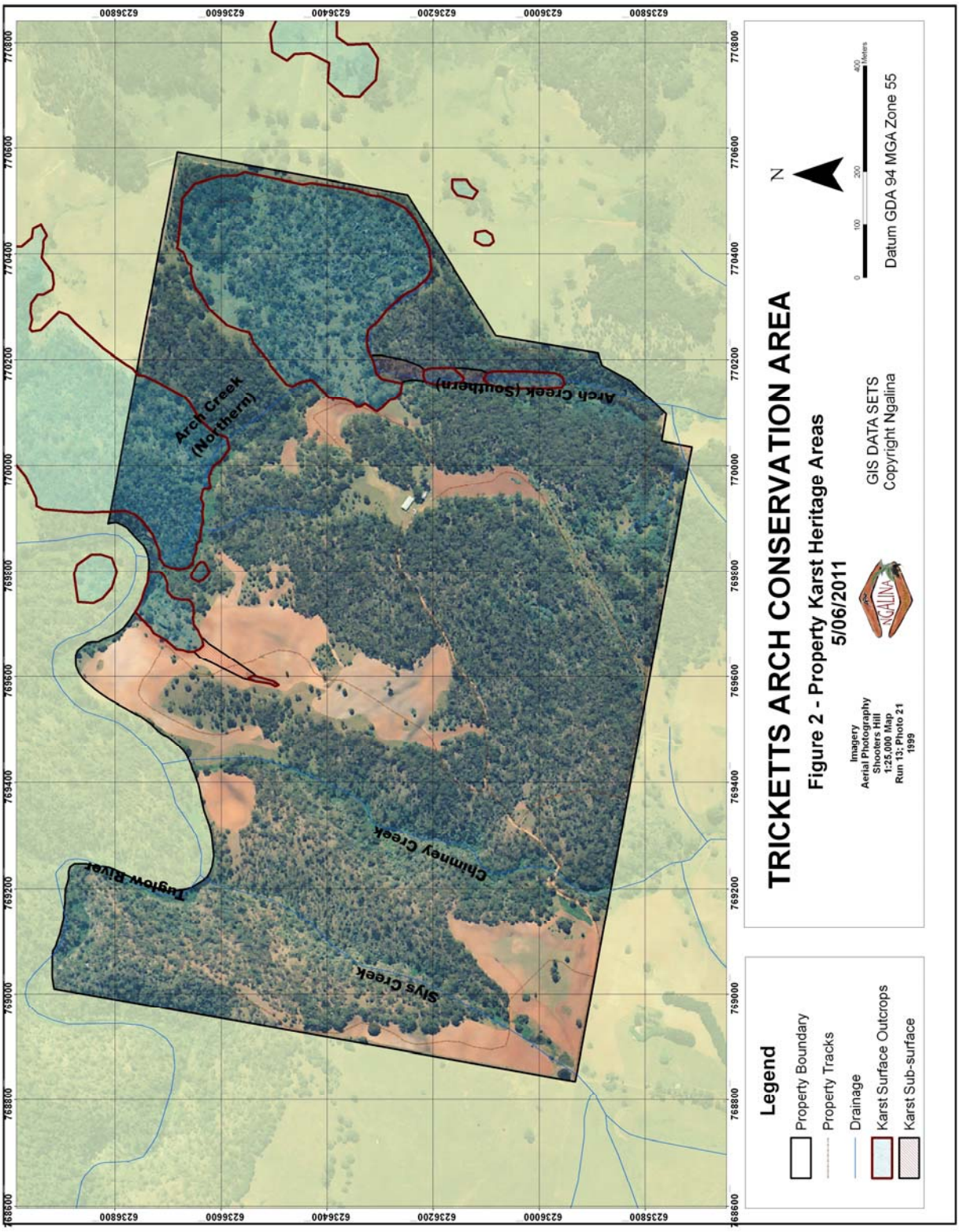


Figure 2. **Tricketts Arch Conservation Area:**
Property Karst Heritage Areas



The Tuglow and Hollanders Rivers Limestone Deposits

As mapped by Lishmund et al (1986) in Figure 13 pp 22

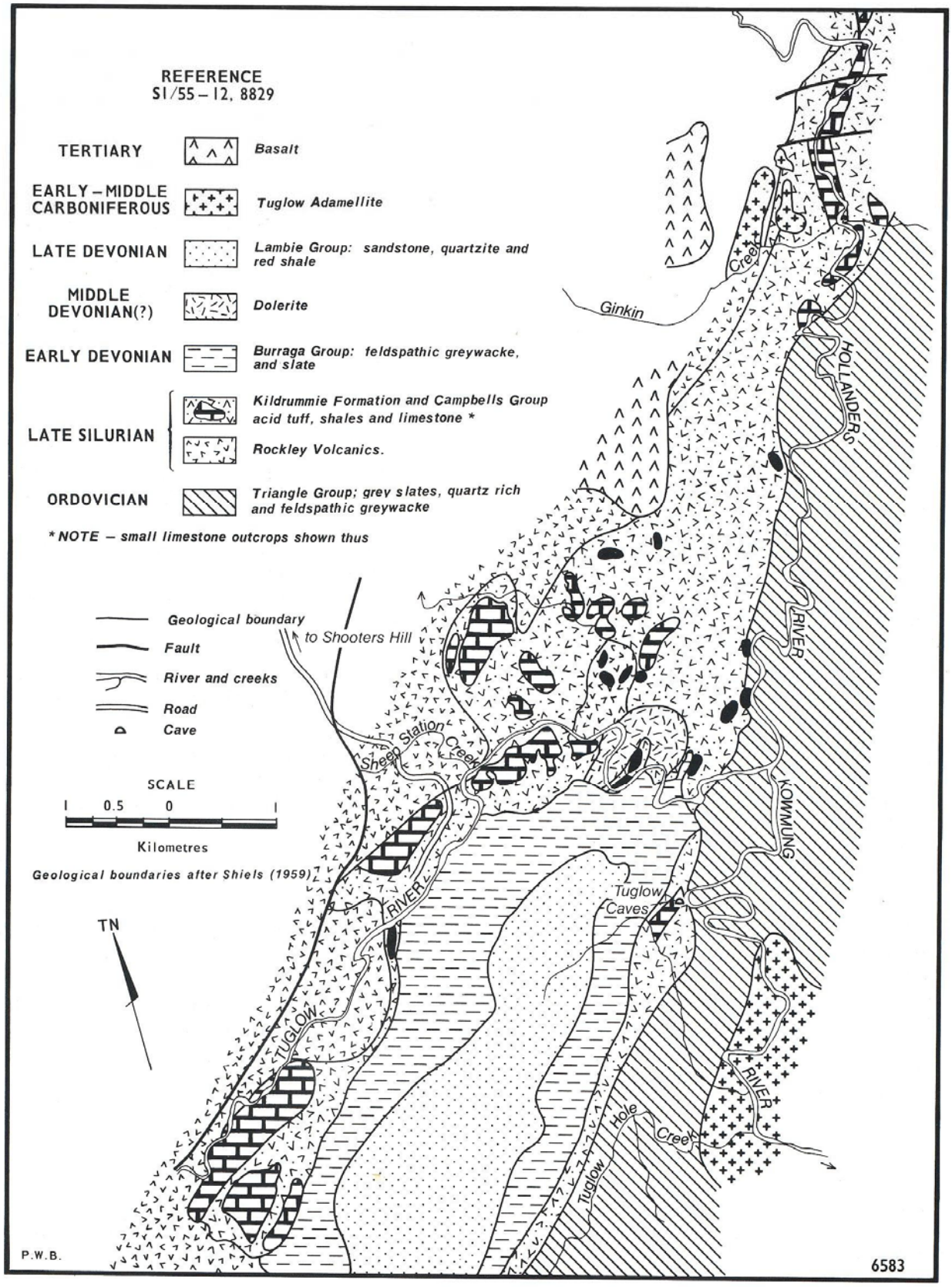


Figure 13. The Tuglow and Hollanders Rivers limestone deposits.

13 Photos

Photo 1. Southern Arch Creek – inflow valley into JA-1 Southern Tricketts Arch Cave

(Photo Peter Dykes Mar 2011)

Photo 2. Tricketts Arch main outcrop looking north east

(Photo Peter Dykes Mar 2011)

Photo 3. JA-3 Bourchier Cave – pioneer signatures recorded in cave

(Photo Peter Dykes Mar 2011)

Photo 4. JA-67 – the cave with the Brushtail Possum colony

(Photo Peter Dykes Mar 2011)

Photo 5. JA-10 – a grike/shaft and site of an underground dig

(Photo Peter Dykes Mar 2011)

Photo 6. JA-144 – a large doline on northern side of the main outcrop

(Photo Peter Dykes Mar 2011)

MINING HERITAGE MANGEMENT PLAN

TRICKETTS ARCH

NGALINA
the two of us

LandAlive
Aboriginal land management
for biodiversity

CONTENTS

Cover: Mine entrance above Chimney Creek Cascades (photo Peter Dykes Oct 2010).

1. Context

Peter and Sharon Dykes are the Landowners of "Tricketts Arch", a property composed of Lot 15 in Deposited Plan number 661990 also referred to as Lot 15 Parish Abercorn, County Westmoreland and Lot 1 in Deposited Plan number 1152451.

The rural address for the property is:
605 Jaunter Road
JAUNTER NSW 2787

The Landowners have decided to enter into a BioBanking Agreement with the Office of Environment and Heritage (OEH) under Part 7a Division 2 of the *Threatened Species Conservation Act 1995*. The Landowners may also at a future date enter into a Conservation Agreement with the Office of Environment and Heritage (OEH) under Part 4 Division 12 of the *National Parks and Wildlife Act 1974*.

Refer Map 1 showing property boundary, tenure details and BioBanking site.

Two reports were prepared on the property as part of the process to achieving a BioBanking Agreement. These are:

1. An ecological assessment by a registered ecological assessor (refer Blundell & Pedersen 2010) and checked for accuracy by OEH (refer Kannane 2011).
2. A property management plan for the BioBanking site using a OEH template (refer Dykes 2010) which is incorporated into the BioBanking Agreement.

2. Purpose of Tricketts Arch Mining Heritage Management Plan

The BioBanking Property Management Plan is solely directed at conserving and improving biodiversity values. It does not address other cultural and heritage values of this site in any detail.

The BioBanking Property Management Plan contains management actions required to contain and limit human disturbance to the BioBanking site. Point 3.3 and 3.4 acknowledge that "t*he biobank site contains areas and items of historical significance, including the old Tuglow Copper Mine and associated workings"* and that the landowner "*has prepared specific management plans for Aboriginal cultural heritage, karst areas and mining heritage*". Implied in this point is the recognition that the ongoing management and conservation of Aboriginal sites/objects is beyond the scope of the BioBanking Agreement but nonetheless important in preserving and conserving the BioBanking site.

The Tricketts Arch Mining Heritage Management Plan has been developed in consultation with stakeholder groups – including members of the Tuglow Landcare Incorporated, to provide a management plan for the Tricketts Arch mining heritage areas.

The Tricketts Arch Mining Heritage Management Plan is meant to complement the actions and provisions contained in the BioBanking Property Management Plan and Agreement. Where conflict may arise between the two plans, unless resolved by mediation between all interested parties, the BioBanking Property Management Plan and Agreement will take precedence over the Tricketts Arch Mining Heritage Management Plan.

3. Overview

The mining heritage present on Tricketts Arch Property can be traced to two separate but related mining operations, namely:

Tuglow Copper Mine:
The first of the mining operations now known as Tuglow Copper Mine is in fact a series of mine workings stretching over 1 to 2 km from the hilltop ridge on Tricketts Arch property to the upper sections of Chimney Creek (on earlier maps Chimney Creek is sometimes referred to as Charsfield Creek) on the adjoining Clovers Hills property.

Each group of workings had its own distinctive name. Those on the Tricketts Arch and Chimney Creek properties were originally known as "*Bourchiers Mine*" named after Mr. J. W. Bourchier, the reported discover of the ore body. The workings on the upper Chimney Creek in Portion 49 Parish Abercorn were known as "*Frazers and Cottons Workings*" being presumably named after their owners.

Both mine areas were worked sporadically for about 10 years until 1906 when "*Bourchier Mine was reopened by a Yerranderie syndicate, who subsequently formed the Tuglow Copper Mining Company, Limited in March 1907. In July, 1907, the main shaft in Tuglow Mine was 130 feet deep on a small body of 20 per cent ore.*" (Carne 1908)

Both the Bourchier Mine and the Frazer and Cotton Workings have since than been collectively known as the Tuglow Copper Mine, although as the Department of Mine records note, other minerals were also extracted. "*Mr W. J. Bourchier, of Clover Hills, near Tuglow, who worked a lobe in portion 52 parish Banshea, supplied the following information under date of May 1898: - The lobe in portion 52 has a thickness of about 5 feet. Two shafts have been sunk 30 and 45 feet. From one of these, 36 tons of ore were extracted for an average yield of 14% of copper, 10% of lead, and 5 oz. of silver and 2 dwt. gold per ton. Inspector H. Hooke who visited Tuglow about this date, states that Bourchier and party sunk to a depth of 60 feet on what appears to be a true fissure vein, averaging 3 feet in thickness and containing ore rich in copper and which also yielded as high as 17 dwt. of gold per ton."* (Carne 1908)

The Tuglow Copper Mine operated for about 20 years from around 1890 to just prior to The Great War. The mine operation seems to have been a response to the 1890's depression when both drought and low wool prices forced farmers and rural worker to look elsewhere for income. The legacy of the mine is a whole series of pits, trenches and tailing dumps on the ridge top south of the Tricketts Arch property residence. (For the local Jaunter community the mine workings represent a positive link with early pioneering families and their struggle to survive through difficult periods.)

Erskine Diggings:
The second of the mining operations is known locally as the Erskine Diggings and is a series of mine shafts located in the south eastern corner of the property adjacent to the southern Arch Creek on the former Department of Lands rural access easement, recently purchased by the Landowners.

Erskine was a market gardener who owned a 2 acre block on the southern corner of the property which is now part of the adjoining Chimney Creek property. Following World War I he built a shack, the foundations of which are still visible, on his block and lived there until he died in the early 1960's. During the 1920's and 1930's he dug several small shafts often described as "grave pits" because of their similarity in size to cemetery grave sites in the rural access easement and on the western slopes of Arch Creek. Local information (provided by Lorraine Maloney to the Landowner) has it that Erskine was prospecting for gold and dug the shafts to reach old alluvial river gravel sediments.

Mining Infrastructure:
Along the northern Arch Creek, just down from the outflow cave JA-2 Northern Tricketts Arch Cave, is a series of stone walls and water races which are not mentioned in any records to do with Tuglow Copper Mine or Erskine Diggings. It is often assumed that they were part of Tuglow Copper Mine infrastructure but they could have been constructed by Erskine to wash his diggings/tailings for gold.

4. Mining Heritage Values

The mining heritage (mine sites and infrastructure) on Tricketts Arch property are important for the local community in providing a connection to pioneer settlement of the Jaunter area. They have a range of values which when combined give them a high conservation value. Briefly these values are discussed in the following sections.

4.1 Archaeological:

- Tuglow Copper Mine used as a rubbish dump from around 1920's / 1930's until late 1960's by Arnold family – has old bottles, tools, and other farming artefacts of period, indications an old horse drawn dray was emptied into mine shaft.
- Areas around the water races and stone walls on Arch Creek are likely to also yield mining artefacts.
- The Bourchier Mine area stretches over two properties – tailings dump on Chimney Creek property complements mine workings on Tricketts Arch property to provide a clear picture of the mining operations.
- The Frazers and Cottons Workings have been substantially obliterated to develop pasture and crop lands by the Bourchier family since their closure, which increases the value of the remaining Bourchier Mine area with its substantial unmodified mining heritage.

4.2 Cultural:

- Provide a link to post colonial settlement period of the late 19th Century early 20th Century rural Oberon District.
- A link to the first great depression to influence Australia, the 1890's Depression when wool prices fell and farmers and rural workers alike sought alternative income sources to sustain them during times of drought and depression.
- The mine workings are important to many current Oberon families who can trace their ancestry back to people who either owned or worked the mines.

4.3 Historic:

- The mines are locally significant mining areas for the Jaunter / Shooter Hill / Oberon District.
- Provide a glimpse into the mining history at the end of the 19th Century beginning of the 20th Century.
- Represent one of only 3 mining areas in the Oberon District (Burraga, Mt. Werong and Jaunter).
- The stone walls and water races are not seen at other mine workings in the Oberon area and are similar to those at Hill End and Sofala.

5. Management Issues

5.1 Aboriginal Heritage:

- Bourchiers Mine area is surrounded by scarred trees and is close to a significant boundary marker tree indicating the area may be part of a larger cultural site.
- The Erskine Diggings are next to a very significant sacred tree indicating a possibly women site is close by.
- Need to ensure that any management actions in these two areas are consistent with Tricketts Arch Aboriginal Cultural Heritage Management Plan.

5.2 Cultural and Historical Heritage:

- It is important to preserve mining heritage for the local community.
- It is important to identify any item of cultural and heritage significance to ensure its preservation when removing "rubbish" from old mine sites.

5.3 Chemical Contaminated Sites:

- Mine site adjoining residence access track shows typical signs of severe chemical contamination – lack of regrowth/regeneration over a prolonged period (30 years).
- Need for chemical analysis to determine nature and extent of problem to aid decision making on rehabilitation

5.4 Erosion:

- Potential for erosion to occur around some mine sites if disturbed through pig diggings – need for on-going monitoring.
- Minor erosion around contaminated mine site adjoining residence access track.

5.5 Knowledge Gaps:

- Lack of a comprehensive mining heritage survey to identify all mine sites and mining heritage infrastructure hinders management planning and decision making.
- Lack of a comprehensive cultural survey to identify all sites and area of interest to Aboriginal People hinders management planning and decision making.

5.6 Weeds and Feral Pests:

- Pig diggings have potential to lead to erosion and increase weed presence around old mine sites.
- Blackberry (*Rubus fruticosus*) infestations present on and around some mine shafts, some of which were sprayed (2007/2008) but are still subject to on-going re-infestation - a major weed on the property.
- Sweet Briar (*Rosa rubiginosa*) presents as isolated individuals – a minor weed on the property.
- Cherry Laurel (*Prunus laurocerasus*) presents as isolated individuals – a major weed on the property.
- Paterson's Curse (*Echium plantagineum*) and Vipers Bugloss (*Echium vulgare*) is present on and around some mine sites usually as a result of pig digging disturbance areas – a major weed on the property.

6. Management Actions

6.1 Aboriginal Heritage:

- Implement management actions as required under Tricketts Arch Aboriginal Cultural Heritage Management Plan for all Aboriginal sites and areas located on or adjacent to mining heritage areas.
- Sites and areas identified as gender specific will only be visited by persons of the appropriate gender.
- Every effort will be made to balance the need to preserve mining heritage values, but where there is a conflict between the preservation of a mining heritage sites/objects/infrastructure and Aboriginal cultural heritage values, which is unable to be resolved by mediation/negotiation, then the Aboriginal cultural heritage values and customs will take precedence over mining heritage values.

6.2 Cultural and Historical Heritage:

- Seek assistance and advice from the local community historical society/group in the preservation of Tricketts Arch mining heritage.
- When removing "rubbish" from the old mine sites, ensure items identified as having a cultural heritage value are documented, preserved and safely stored for future investigation/research

6.3 Chemical Contaminated Sites:

- Seek advice and assistance from the Derelict Mines Program within the Department of Trade & Investment, Regional Infrastructure on rehabilitation techniques for the mine site area adjacent to the residence access track.
- Seek assistance from the relevant group in the Mineral Resources and Energy section of the Department of Trade & Investment, Regional Infrastructure in identifying contaminants at the site (See http://www.dpi.nsw.gov.au/minerals/environment/derelict and http://www.trade.nsw.gov.au/).

6.4 Erosion:

- Monitor all mine site areas on regular basis to identify sites subject to pig diggings and implement the *BioBanking Property Management Plan to Control Feral and Overabundant Native Herbivores* where appropriate.
- Use sandbagging and natural timber to limit erosion from the mine site area adjacent to the residence access track

6.5 Knowledge Gaps:

- Liaise with local community groups to seek funding for a comprehensive mining heritage survey of the property.
- Liaise with the Tuglow Landcare Incorporated to seek funding for a comprehensive survey of the property's mining heritage.

6.6 Weeds and Feral Pests:

- Implement the *BioBanking Property Weed Management Plan*.
- Implement the *BioBanking Property Management Plan to Control Feral and Overabundant Native Herbivores*.
- Liaise with the NSW Game Council to assist in the control of pigs and foxes and rabbits.

7. Interested Parties:

The Office of Environment and Heritage (OEH) has for the last 2 years been working with the Landowners to develop a BioBanking Agreement for the property "Tricketts Arch" and is a principal party to the BioBanking Agreement No 33. The Minister and the Director General for OEH are regarded as interested parties to this Property Mining Heritage Management Plan

The Minister and the Director General of The Office of Environment and Heritage may nominate any departmental officer or departmental unit as an interested party to this Property Mining Heritage Management Plan.

Members of the local Jaunter and Oberon communities, as well as descendants of the original pioneers of the Jaunter area are considered to be stakeholders having an interest in preserving the Tricketts Arch mining heritage.

8. Monitoring

The BioBanking Agreement has provisions for monitoring the BioBanking Property Management Plan through regular reporting to OEH and on-site inspections. It is not intended to supplant these provisions but rather to provide additional and specific monitoring to complement OEH monitoring, through the assistance of stakeholder groups.

9. Timeframes

This Mining Heritage Management Plan shall have effect from the day the Tricketts Arch BioBanking Agreement is signed.

10. Plan Review

This Mining Heritage Management Plan may, with the consent of Landowners, OEH and interested parties be reviewed at any time. However every 10 years in consultation with the Landowners, OEH and interested parties there will be a formal review of the provisions and operation of the plan. After review, any necessary amendments will be made.

11. References

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12. Maps

Figure 1. Tricketts Arch Conservation Area:
BioBanking Site Boundary

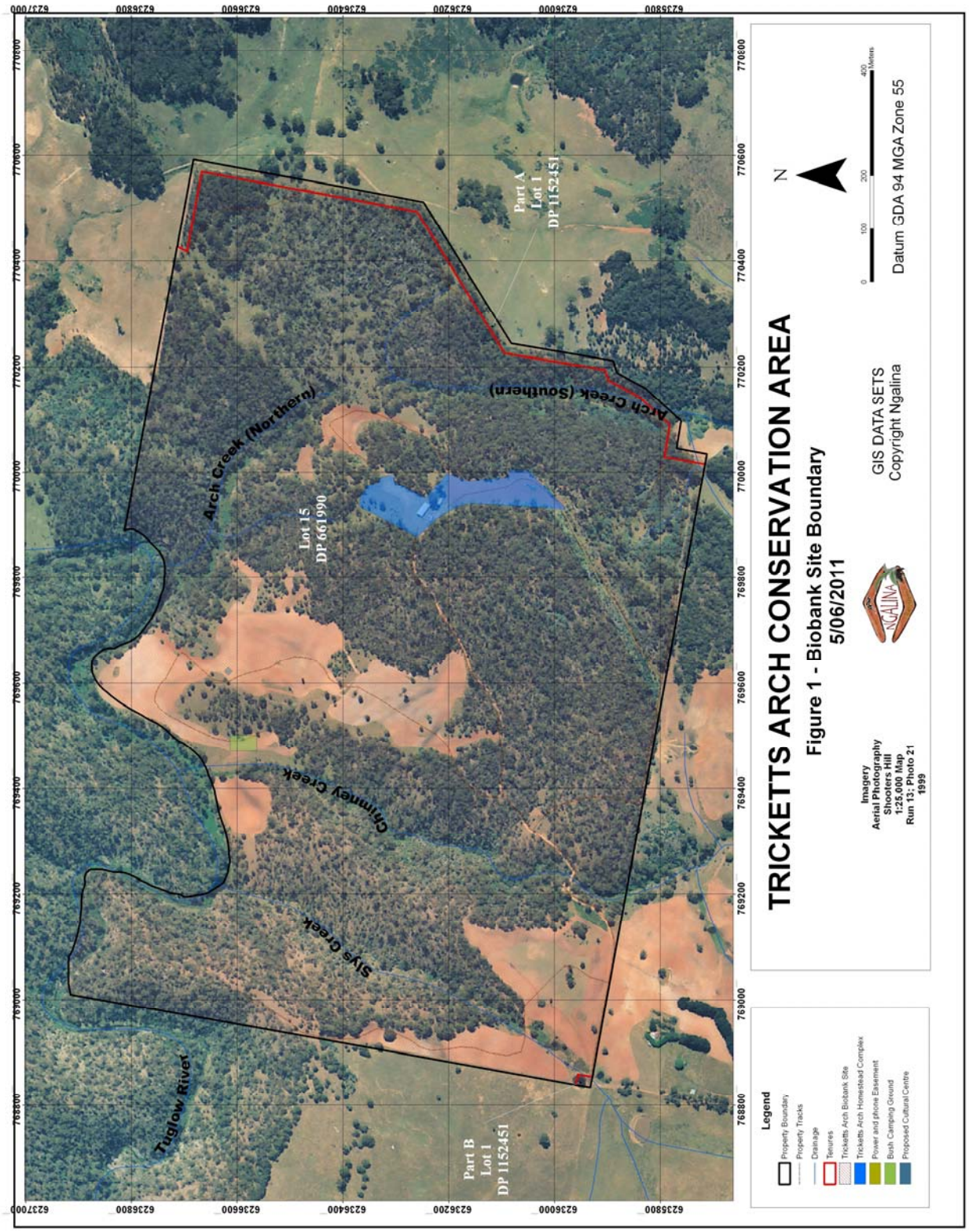


Figure 2. **Tricketts Arch Conservation Area:**
Property Mining Heritage Areas

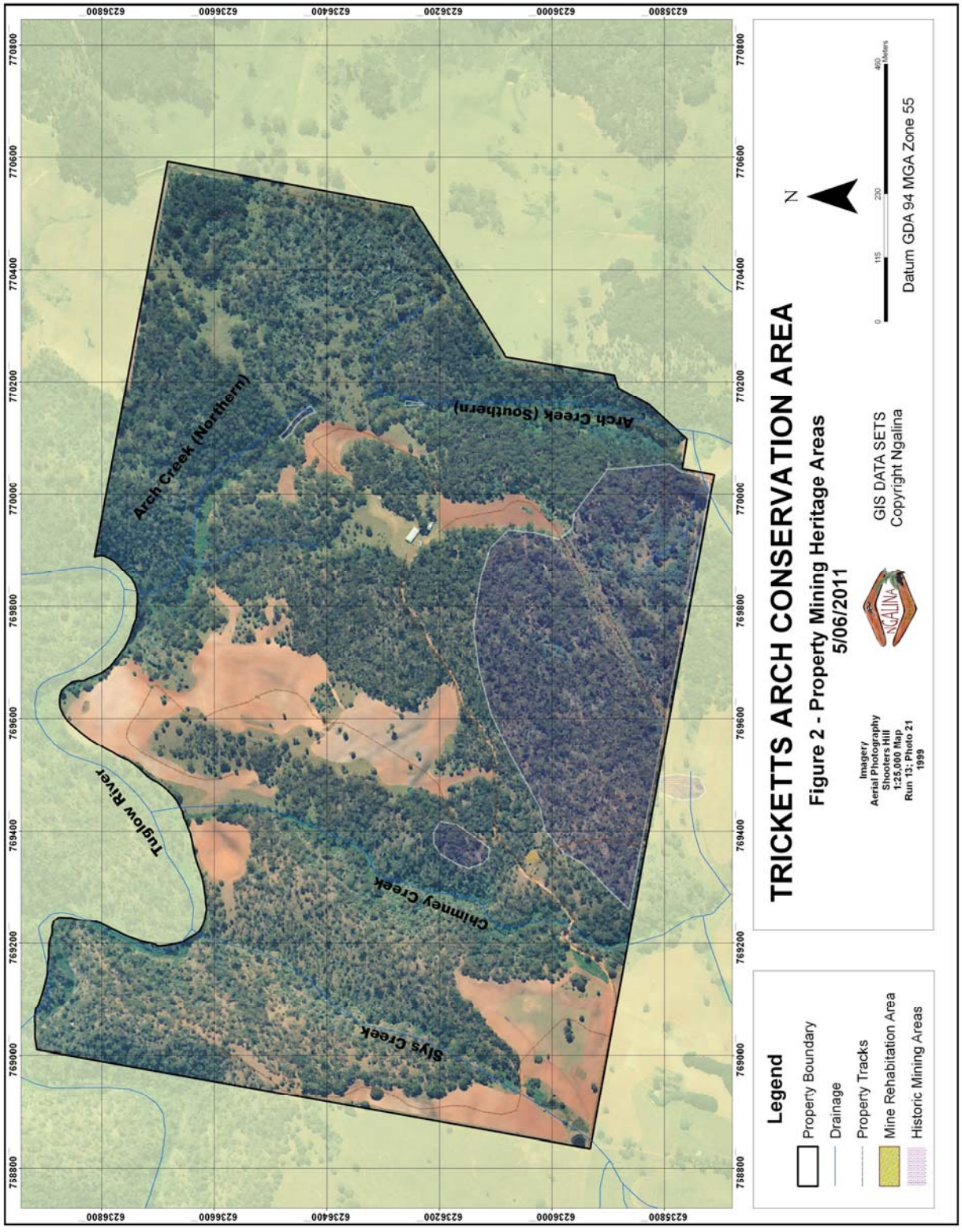
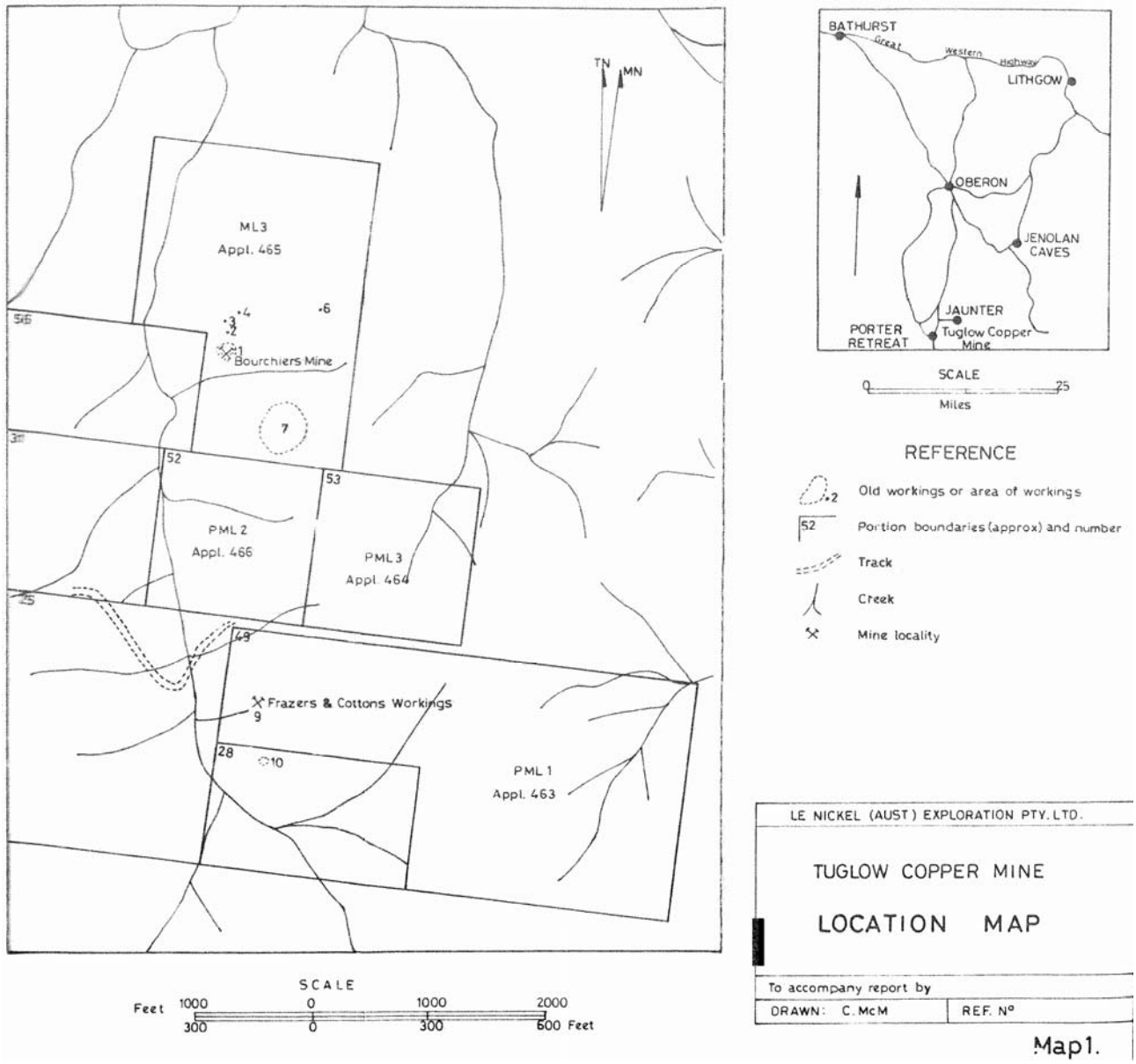


Figure 3. **Tuglow Copper Mine**
Location Map from Brown (1973a)



13. Photos

Photo 1. Mine shaft at Bourchiers Mine (site 6) Tuglow Copper Mine

(Photo Peter Dykes Mar 2011)

Photo 2. Shaft adjacent to southern boundary fence at Bourchiers Mine

(Photo Peter Dykes Mar 2011)

Photo 3. Part of the stone walls and water races on northern Arch Creek

(Photo Peter Dykes Mar 2011)

Photo 4. An example of a mine "trench" dug to identify the strike of the ore body

(Photo Peter Dykes Mar 2011)

Photo 5. An example of one of the many shafts/pits in mining heritage area

(Photo Peter Dykes Mar 2011)

Photo 6. Contaminated mine site adjacent to residence access track

(Photo Peter Dykes Mar 2011)