



Flora & Fauna Management Plan

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# Ulan Coal Mines Limited Flora & Fauna Management Plan

Xstrata Coal NSW – Ulan Coal Mine.				
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## Flora & Fauna Management Plan

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**Ulan Coal Mines Limited.**  
**FLORA & FAUNA MANAGEMENT PLAN**

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## **1.0 Introduction**

Ulan Coal Mines Limited (UCML) operates both underground and open cut mining operations near the village of Ulan, approximately 45 kilometres north east of the township of Mudgee. The current operations include a dragline, stockpiles, a coal handling and processing plant (CHPP) conveyors administration buildings, train loading facilities, mine workings with underground access point and associated remote infrastructure. Operation of the open cut mine, coal preparation plant and rail loading facility is contracted and is currently operated by Roche Mining.

Environmental matters at the Ulan Coal Mine are managed by:

**Environmental Department,**

4505 Ulan Road,  
(Private Mail Bag).  
Ulan Via,  
**MUDGEE** NSW, 2850

Telephone: (02) 63725300. Fax: (02) 63725333.

UCML has implemented a number of control initiatives on and around the operation to mitigate potential impacts on flora and fauna. The purpose of this Management Plan is to ensure the effectiveness of these initiatives, and ensure that the regulatory obligations with respect to Flora & Fauna are being met.

This review of the Flora & Fauna Management Plan ("the Plan") fulfils the requirements of:

- Development Consent DA 113-12-98- conditions 3.2(d) and 3.4(a) of the; and
- Development Consent DA 103-5-2005 Condition 16 Schedule 3.

These consents were issued by the Department of Planning (DoP) (formerly Department of Planning and Natural Resources (DIPNR)), and was undertaken in consultation with the Director General. It applies specifically to all UCML works / activities contained within, and associated with ML1468 and CCL 741 respectively. Included in this document is the required compensatory Habitat Plan required by DA 103-5-2005 Condition 16 Schedule 3.

Notwithstanding this, the general principals embodied in the Management Plan are to be applied to all activities at the Ulan Coal Mine and UCML managed lands. **Table 1** below



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summarises the relevant conditions of the consent highlighting where the various elements of the plan have been addressed.

This Plan has been developed to give UCML supervisory personnel a clear understanding of the issues related to Flora and Fauna. It has been based on an earlier Management Plan report prepared by Mount King Ecological Surveys (December 2000) which was approved by the Director General prior to commencement of works under the original Development Consent..

**(This section has intentionally been left blank)**



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**Table 1: Checklist taken from Consent Conditions (DA No. 113-12-98) (December 2003) which relates to the specific requirements for the preparation of a Flora & Fauna Management Plan.**

Condition	Management Plan Condition	Section
3.4 (a)	<b>Assessment and Management:</b> UCML shall prior to the commencement of any construction works, prepare and implement a <b>Flora and Fauna Management Plan</b> for the management of flora and fauna issues for Company owned land within the Consent area. The Plan shall be prepared by a suitably qualified ecologist in consultation with DEC, Hunter and Central West Regional Councils and to the satisfaction of the Director-General, and shall include but not be limited to:	Entire document
3.4 (a) (i)	A detailed assessment of the current characteristics and ecological values of existing ecosystems likely to be affected by the development	Section 3.0,
3.4 (a) (ii)	Strategies to minimise the net loss of ecologically significant vegetation communities within DA area as a result of the development, including the provision of compensatory areas of equivalent ecological and habitat value where necessary	Section 5.0 Env Proc 6.3 & 6.4
3.4 (a) (iii)	Measures to minimise the removal of trees and other vegetation from the proposed surface facilities	Section 5.0 Env Proc 6.3
3.4 (a) (iv)	Strategies to provide increased security for existing habitats and communities, and habitats of native and threatened species such as the Masked Owl, Brush-tailed Rock-Wallaby, Large Pied Bat, Little Pied Bat and the Common Bentwing Bat identified in the Species Impact Statement. This shall include details of any identified species or habitats to be removed or translocated	Section 5.1.7
3.4 (a) (v)	Strategies to manage the impact of surface water management, erosion and sediment control measures, and flooding mitigation measures on flora and fauna, including the impact of heavy machinery	Section 5.0, 5.2 ESC Mgt Plan
3.4 (a) (vi)	Measures to locate access tracks, powerlines and pipelines away from all cliff lines where possible	Sections 5.0 Env Proc 6.4



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3.4 (a) (vii)	Measures to modify long wall panelling to avoid or reduce potential subsidence impacts on cliff lines, as outlined on page 88 of the SIS	Sections 5.0
3.4a (viii)	Details of any relocation or modification of surface facilities associated with the mine extension to minimise the potential loss of threatened species, important wildlife habitat or disruption of wildlife corridors, as outlined on page 94 of the SIS	Sections 5.0
3.4 (a) (ix)	Details of monitoring the mines' impacts on flora and fauna, including success or otherwise of any proposed ameliorative measures and an outline of contingency measures should impacts be identified as occurring	Section 6.0
3.4 (a) (x)	Measures to monitor the impacts on threatened species or populations	Section 6
3.4 (a) (xi)	Development of a protocol for identifying and managing significant impacts on any threatened flora and fauna species not identified in the EIS during development through construction or operation of the mine	Section 5.1.4

**Table 1: Checklist taken from Consent Conditions (DA No. 103-5-2005) (December 2005) which relates to the specific requirements for the preparation of a Compensatory Habitat Plan.**

Condition	Management Plan Condition	Section
16(a) (b)	<p>Within 6 months of this consent, the Applicant shall prepare (and subsequently implement) a Compensatory Habitat Plan for the development to the satisfaction of the Director-General. This plan must:</p> <p>(a) Describe what measures would be implemented to compensate for the loss of 2 hectares of Yellow Box Woodland and 13 hectares of Apple – Ironbark Woodland that would be removed by the development; and</p> <p>(b) Describe how the performance of these compensatory measures would be monitored over time.</p>	



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## Flora & Fauna Management Plan

### 2.0 Objectives

UCML aims to minimise the impacts on flora, fauna and fauna habitats that could result from mining and associated activities within land owned by and managed by UCML. This includes the prevention and management of impacts as well as monitoring to provide early identification of an impact which will trigger the need to implement mitigation measures.

More specifically the objectives of this plan are to:

- Meet the requirements of development consents relevant to the operation of UCML ;
- Address all Flora & Fauna related issues in the mine operations area;
- Set down control measures to mitigate the impacts on Flora and Fauna associated with mining activities at UCML;
- Outline how UCML have established and are implementing a Compensatory Habitat Plan as required by DA No. 103-5-2005.
- Outline the monitoring and measurement protocols for Flora & Fauna within the UCML lease in both the areas that are not disturbed by mining as well as to assess the return of Flora & Fauna to areas that have been rehabilitated;
- Detail the Review and Reporting protocols; and
- Establish Responsibilities for the management of Flora & Fauna issues at UCML.

### 3.0 Background

The landscapes in and around Ulan Mine vary from the broad valley floors of the Goulburn River and Ulan Creek immediately to the south, through to the undulating land, steep slopes and rocky escarpments in the north, east and west. While the steeper areas are largely undisturbed bushland, flatter areas have generally been cleared for grazing, for pasture, and for the Ulan open cut mine and operation areas. The visual character of the region is therefore strongly influenced by rural grazing and agricultural activities, set against a background of natural bushland on the steeper and higher lands.

The Ulan study area is considered to be an important biogeographic site because it is located at the western and eastern edges of two (2) major regions – the coastal Sydney Basin and the inland south western slopes. The area is also at the edge of two (2) large river catchments – being the Goulburn River flowing east and the Talbragar River flowing west.



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Because of the proximity of the eastern and western fall of the Great Dividing Range (the summit runs through the Bobadeen area), Ulan represents a good example of a broad wildlife corridor, where fauna can travel along the Talbragar and Goulburn Rivers to and from inland and coastal NSW. The biodiversity of fauna reflects these influences as well as the influences from the variety of habitats in the area.

Within the Ulan mine area there are several sites which are considered to have a significant conservation value. These sites include:

- The valley formed by the headwaters of Ulan Creek;
- A length of cliff-line to the north ;
- North east of "Walkerville" property;
- Cliff-lines along the northern side of Spring Gully Creek;
- Cliff-lines to the north of the main mine administration buildings; and
- A steep cliff line to the North of Woodbury, next to a tributary of Mona Creek.

These locations have been marked on **Figure 1** in **Appendix 2** in order to highlight the locations for any future mining or associated works that may be undertaken on the site.

The vegetation communities and their distribution across land owned by UCML is illustrated in **Figure 1** in **Appendix 3** The following is a general description of these communities:

### **Narrabeen Sandstone Complex**

One of the most widespread communities that generally occurs on the Narrabeen Group sediments. Soils of moderate depth support a woodland or open forest dominated by Rough Barked Ironbarks (*Eucalyptus fibrosa*), Narrow-leaved Ironbarks (*E. crebra*) and Narrow-leaved Stringy-barks (*E. sparifolia*).

### **Yellow Box Woodland**

Alluvial, deep colluvial and granite derived soils in broad open valleys support Yellow Box Woodlands. The dominant tree species is the Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*). Associates tree species include the Rough Bark Apple (*Angophora floribunda*), Kurrajong (*Brachychiton populneum*) and Long-leaved Box (*E. gonicalyx*)



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### **Western Scribbly Gum Woodland**

Broad flats with sandy soils support a Woodland community dominated by Western Scribbly Gum (*E. rossi*). Associated tree species include Blakely's Red Gum (*E. blakelyi*) and Parramatta Red Gum (*E. parramattensis*).

### **Stringybark – Apple Forest**

This community occupies small areas where sheltered south-facing valleys in the lee of sandstone escarpments occur. The vegetation is an Open Forest of Woodland dominated by Narrow-leaved Stringybark, Rough Barked Apple and Broad-leaved Ironbark. Narrow-leaved Ironbark may also be present.

Both the Yellow Box Woodland and Western Scribbly Gum Woodland are considered to have conservation importance, because of their limited distribution and the relatively high levels of clearing associated with the communities in the area. It is unlikely that either of these communities will be affected by activities and Ulan as care will be taken in locating any future infrastructure so that it is not inside the areas identified to contain these species.

A Species Impact Statement (SIS) was prepared in accordance with the requirements of the NPWS (DEC) by Mount King Ecological Surveys as part of a larger EIS (Kinhill Pty Ltd, 1998). The SIS was prepared because field surveys of the area had shown that:

- Eight (8) threatened animal species **were known to** occur in or around the study area;
- Thirty two (32) threatened animal species **may** have occur in the study area; and
- Five (5) threatened plant species **may** have occur in the area.

An eight (8) part test was applied to the known and potential threatened species in the study area and it was found that the proposal may have an effect on these species.

**Table 2** over the page contains a list of the threatened Flora and Fauna species which are known to exist in the general region surrounding the Ulan Coal Mine. The list was compiled from information supplied in the NPWS (now DEC) Director Generals requirements for the EIS, known recordings in the Ulan area and the NPWS Atlas and Wildlife database listings for the Gulgong region. Of the species listed below, eight (8) have been recorded as occurring within the Ulan mine area.



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**Table 2: Threatened species which are known to exist in the general area surrounding the Ulan Coal Mine (identified during the EIS in 1998).**

Birds	Mammals	Reptiles	Flora
Bush Thick-knee	Brush Tailed Rock Wallaby	Pale-headed Snake	<i>Bothriochloa biloba</i> (grass)
Malleefowl <sup>2</sup>	Squirrel Glider <sup>3</sup>	Western Blue Tongue	<i>Dichanthium setosum</i> (grass)
Australasian Bittern	Koala <sup>2</sup>	Green-Golden Bell Frog	<i>Swainsona recta</i> (herb)
Grey Falcon	Tiger Quoll		<i>Eriostemon ericifolius</i> (shrub)
Square-tailed Kite <sup>2</sup>	Brushed Tailed Phascogale		<i>Homoranthus darwinioides</i> (shrub)
Shy Hylocola	Pilliga Mouse		<i>E. parramattensis</i> (Tree)
Glossy Black Cockatoo <sup>3</sup>	Large Pied Bat <sup>3</sup>		
Red Tailed Black Cockatoo <sup>3</sup>	Little Pied Bat		
Swift Parrot	Greater Long-eared Bat <sup>3</sup>		
Turquoise Parrot <sup>3</sup>	Common Bent wing Bat <sup>3</sup>		
Superb Parrot			
Powerful Owl			
Masked Owl			
Olive Whistler			
Regent Honeyeater			
Painted Honeyeater			
Pied Honeyeater			
Yellow-eyed Cuckoo - shrike			
Blue-billed Duck <sup>3</sup>			

Threatened species are listed in Schedules 1 and 2 of the Threatened Species Conservation Act (1995).

**Note 2:** Recorded in the Gulgong region

**Note 3:** Recorded in the Ulan mine area.

### 4.0 Potential Impacts

An assessment of potential impacts is presented in detail in the EIS (Kinhill Pty Ltd, 1998). In addition, UCML has completed a detailed Environmental Risk Assessment (ERA) in order to identify all "aspects and impacts" associated with the open cut and underground mines. During this process all activities that were identified as generating or having the potential to generate airborne dust were considered and rated using the UCML environmental risk matrix. **Table 3** over page shows those aspects of the operation where impacts of flora and fauna was considered.



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**Table 3: Activities undertaken at Ulan Coal Mine identified as having the potential to impact on Archaeological and Cultural Heritage sites.**

- Vegetation removal / disturbance;
- Construction of road access (e.g. the creation of barriers);
- The construction of surface facilities;
- The construction of water holding facilities;
- Long-wall Mining (Subsidence);
- Disruption of water course and changes to groundwater; and
- The introduction of competitor and predator species (e.g. weeds & pests).

## 5.0 Mitigation Measures

The following section outlines the control measures adopted by UCML as part of their commitment to managing Flora & Fauna at the mine.

### 5.1 Control Measures

Detailed Flora & Fauna control measures are presented in the **Environmental Procedure – Flora & Fauna Management**. It can be found in the Environmental Procedures Manual in accordance with **Section 4.0 (Environmental Management Procedures)** of the UCML Environmental Management System. A copy has also been attached as **Appendix 4**.

A number of specific control measures have been included in some detail below as they are considered integral in the protection and preservation of Flora & Fauna.

These include:

- Rehabilitation of disturbed and mined land as soon as practical;
- Implementing a mine site rehabilitation strategy in the Open Cut that provides linkages with existing vegetation around the mine (i.e. corridors);



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- Planning the construction of roads and utility corridors;
- Completing the Proposed Works Plan / Review application prior to the commencement of works on the site;
- Locating the long-wall panels (and other infrastructure) to minimise the impact on cliff-lines; and
- Seasonal monitoring of flora & fauna (with an emphasis on cliff-line habitat to ensure that any long-term changes in biodiversity are avoided).

### **5.1.1 Rehabilitation**

Rehabilitation of disturbed sites is undertaken as soon as possible. This includes not only areas disturbed as part of the open cut mining process, but also disturbance which occurs during the establishment of surface infrastructure and roads. Further specific information related to the rehabilitation program for UCML can be obtained from the **Erosion & Sediment Control Management Plan** (section 5.0) and the **Visual Amenity & Landscape Management Plan** (section 5.1).

The mine rehabilitation strategy has been developed to provide linkages (or corridors) between the revegetated areas and the undisturbed bushland around the site. As the revegetated areas become successful it is expected that native fauna will progressively re-occupy these areas.

### **5.1.2 Pre-clearing Protocol**

**Section 5.2** below describes the Proposed Works application process which is designed to ensure that all environmental issues are addressed prior to clearing or surface works. This specifically includes reference to issues related to Flora and Fauna on the site. For example this would include such things as avoiding the Yellow Box and Western Scribbly Gum communities.

In addition to these controls, the following pre-clearing protocols are to be followed prior to the clearing of any bushland around the site:

- The area to be cleared will be inspected by the Environmental Officer to make sure that there are not any hollow bearing trees present. If there are they will be marked and avoided where possible. Where the trees can not be avoided clearing will be undertaken around the trees, leaving them standing for a period of at least one (1) week. This will enable the fauna inhabiting the



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hollow to relocate prior to the tree being removed. Once felled these trees should be left on the ground overnight to allow bats to escape.

- Clearing will generally be undertaken outside the known nesting periods for the threatened bird species (known to occur in the area) that use hollows.
- Where practicable, the hollow bearing trees that do not break up when felled and a portion of the upper foliage should be relocated into the bushland areas to provide habitat and be a source of seed for bushland regeneration.

### **5.1.3 Provision of Compensatory Habitat**

Because the extent of clearing to occur at the mine is relatively small (open cut requires little additional clearing & underground requires only very small areas for infrastructure) the loss of habitat can be adequately compensated by relocating some of the hollow bearing trees into the undisturbed bushland and establishing artificial nest boxes on trees around the site. In addition the progression of rehabilitated areas that include stands of trees will also provide offset habitat as they become more established. Monitoring undertaken on the site has already shown evidence of fauna returning to these areas, even after only a few years establishment.

### **5.1.4 Hazard Reduction Burning**

Uncontrolled Bushfire on the UCML lands would pose an ecological threat to the Ulan area. The risk of Bushfire escaping into the neighbouring Goulbourn River National Parks land is considered high (Eco Logical Pty Ltd, 2002). Controlled hazard reduction burning operations are a commonly practiced form of attempting to reduce the risk of uncontrollable Bushfire and its associated effects.

All hazard reduction works are to be undertaken in accordance with the UCML **Bushfire Management Plan**.

### **5.1.5 Weed & Pest Management**

UCML conducts weed control programs in liaison with the local authorities on an "as-needs" basis, using control measures such as chemical spraying, wick weeding, cultivation and grazing. The presence of weed species across the site is noted during routine inspections of the site by the Environment & Community Manager (ECM) and the Environmental &



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Community Officer (ECO), and is also recorded during routine seasonal Flora & Fauna monitoring.

Only certified contractors (i.e. hold appropriate tickets under the relevant legislation) are to be used for weed control on the site.

Introduced predators, such as foxes, feral pigs and dogs are controlled as part of the ongoing management of land owned by UCML. The program is often run in joint operations with the Rural Lands Protection Board (RLPB) and the NPWS. The program relies principally on the use of targeted baits, but some shooting does occur. Should baiting and trapping (or similar) be required, it will only be undertaken in accordance with the relevant government approvals. The use of firearms on land owned by UCML can only be undertaken with the expressed written approval of the Statutory Mine Manager.

All weed and pest control programs used at UCML are to be approved by the ECM.

### **5.1.6 Injured Wildlife**

All injured wildlife is to be reported to the Environmental Officer. The Mudgee W.I.R.E.S (Wildlife Information and Rescue Service) will then be contacted on **(02) 63721611** for initial treatment advice and eventual handing over of injured animals.

### **5.1.7 Strategies to provide increased security for existing habitats and communities, including known threatened species.**

The establishment of the pre-clearing protocols (see section 5.1.2 above) is a good way to ensure areas of high significance are not disturbed. In addition to clearing, subsidence from the underground mine also has the potential to affect some habitat types, particularly those associated with cliff-lines (i.e. overhangs, caves, etc).

Mount King Ecological (2000) concluded that while subsidence may cause cracking, cliff falls and caves or overhangs to collapse, the percentage of the cliff formations expected to be affected by rock fall ranges from 10 – 25%. This is not expected to be significant across the entire site. Subsidence at the mine is managed and monitored in accordance with the UCML **Subsidence Management Plan**.

The potential reduction of foraging habitats and possibly roosting habitats for fauna will be minimised by careful selection of facility sites, and by



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avoiding large trees and habitat considered of ecological importance. The provision of nest boxes to accommodate bats, owls and arboreal mammal species will also be used to provide habitat in areas where large areas of undisturbed bushland is cleared.

### **5.1.8 Identification of “new” Threatened Species**

There are several bird and mammal species which possibly occur at Ulan, but have not yet been recorded. In the event that a new species is found (and it is listed as threatened in the Schedules of the Threatened Species Conservation Act) a suitably qualified ecologist will be engaged to undertake an assessment into the possibility of that species being affected by activities at UCML. If it is determined that the species and / or population is *likely to be affected* by mining a Species Impact Statement (SIS) will be completed. UCML will review any recommendations as determined by the SIS in order to minimise any impact on the species.

The findings from the SIS and the controls adopted by UCML will be reported in the AEMR in accordance with **Section 7.0** of this Management Plan.

### **5.1.9 Habitat Recreation Programs on rehabilitated areas.**

UCML has committed to recovering some of the timber resources cleared ahead of the open cut mine development and replacing it on the rehabilitated areas to provide refuse and habitat for fauna using the area. The success of this program will be assessed as part of the ongoing monitoring in the rehabilitated areas.

## **5.2 Proposed Works Plan / Review Form**

Prior to any disturbance or clearing of land within the mining lease area, UMCL completes a **Proposed Works Application / Review**. This process incorporates a review of all environmental factors, including but not limited to, the following key areas:

- ▶ Environmental Risks;
- ▶ Land Ownership and Title;
- ▶ Land Zoning;
- ▶ Relevant development consent conditions;
- ▶ Lease and Colliery Boundaries
- ▶ Protected lands



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- ▶ Aboriginal and Cultural heritage issues;
- ▶ Flora & Fauna
- ▶ Erosion & Sediment Control;
- ▶ Noise
- ▶ Air & Water Quality; and
- ▶ Visual Amenity.

The application for a Proposed Works Application / review is made to the Environmental Officer for approval. Where an activity is determined likely to have an impact on land management around the site, it is identified prior to it being undertaken and an appropriate management control is employed.

### **5.3 Complaints Management**

Community complaints management include receipt of complaints, investigation, implementation of appropriate remedial action, feedback to the complainant, and communication to site management or personnel and notification to the external bodies where necessary.

A register of complaints is retained on the UCML site. Roche are required to retain their own register and pass all information to UCML within 24 hours of the complaint.

Details of all community complaints are to be reported in the AEMR in accordance with the detail contained in **Section 6.0** of this Flora & Fauna Management Plan.

### **5.4 Community Consultation**

UCML actively encourages engagement with the wider community by holding regular Community Consultative Committee (CCC) meetings. All Flora & Fauna related incidents and complaints received by either UCML or Roche are discussed at the CCC. This discussion includes the findings of investigations undertaken by UCML as well as any outcomes, including additional control strategies to be put in place to address the concern (if necessary).

Any significant changes to the Flora & Fauna Management Plan will be presented to the CCC for their consideration and input. Copies of the minutes from all CCC recording the meeting are available from the Site Environmental Officer.



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### **5.5 Training and Awareness**

UCML recognises that training and awareness is an integral part of the Environmental Management System. This is the means by which personnel are informed about the components of the Flora & Fauna Management Plan and how it is implemented on the sites. The training also includes detail on people's specific responsibilities with respect to the management of dust related issues on the mining lease.

UCML's environmental training and awareness program consists of induction training for new starters and contractors along with refresher and ongoing "toolbox" training for all permanent employees as required.

All environmental training and awareness completed at UCML is undertaken in accordance with **Section 5.2 (Training & Awareness)** of the Environmental Management System.

## **6.0 Monitoring & Measurement**

The following section outlines the monitoring and measurement requirements which have been adopted as part of the Flora & Fauna Management Plan. The monitoring program has previously been developed in consultation with the Director General of DIPNR, DEC and NSW Fisheries.

### **6.1 Terrestrial Flora and Fauna Monitoring Program**

Historically, monitoring of flora and fauna has been ongoing since 1994, with a total of four (4) seasonal surveys covering a total of twelve (12) different sites. This monitoring is particularly useful because it provides baseline data for all future surveys of the area.

Currently there are eight (8) monitoring sites being monitored on an annual basis. Four (4) sites are established in the ML1468 area, with two (2) of these being from the original sites monitored since 1994. Four (4) additional new sites have been added. Site selection has been influenced by the UCML policy of restoring disused logging tracks, and as such in 2001 and 2003 sites were selected that were associated with permanent tracks. Notwithstanding this, the sampling sites incorporate those environments considered to be the most sensitive to mining activities (i.e. cliff-lines and creek-lines).

Monitoring also occurs in areas of the Open Cut rehabilitation in order to measure the return of flora and fauna species. This is a useful indicator to measure rehabilitation success or failure. The information related to the mine rehabilitation program is collected using transect surveys in the "1985 - 1986 rehabilitated" areas.

**Figure 1** in **Appendix 5** shows the location of all monitoring sites as well as the “1985- 1986” rehabilitation.

### **6.1.1 Survey Techniques**

#### **A) Fauna**

A range of survey techniques are used to determine faunal usage at each monitoring sites. The following techniques are used during the monitoring surveys:

- ▶ **Small Ground Mammals:** Elliott Traps, pit-fall traps and hair tubes;
- ▶ **Large Ground Mammals:** General observations, tracks, scats and hair-tubes;
- ▶ **Arboreal Mammals:** Tree-mounted traps, hair-tubes, spotlighting, call broadcasting, inspection of trees for scratches and scat identification;
- ▶ **Bats:** Mist nets, hard traps, ultrasonic call identification and radio tracking;
- ▶ **Reptiles:** General observations, pit fall traps and drift fences; and
- ▶ **Amphibians:** Pit traps, call analysis, general searching & spotlighting.

#### **B. Flora**

In addition, the condition and composition of the vegetation cover is measured along transects at each of the monitoring sites. The following key parameters are considered as part of this assessment:

- ▶ The degree of vegetation cover (percentage cover);
- ▶ Measurements of the height and density (trees/ha) of the upper, middle and lower storey vegetation are taken;
- ▶ The quantity of litter (total mass within a m<sup>2</sup> quadrant). The presence of logs and rocks is also noted;
- ▶ Diameter Breast Height (DBH) (*which is a measure of the diameter of the tree at breast height*); and



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- ▶ Grass and forb height is measured.

### ***C. Habitat Characteristics***

Measurements considering the characteristics of the cliff-line environment are also undertaken within the area contained within ML1468. The environment has been broken down into a series of unique habitats, and the extent of each habitat is measured at each of the sites. The different habitats that are measured include; cliff base, blowouts, ledges, cliff rack, rock falls and areas of tress and shrubs. Changes in distribution of these habitats over time could provide evidence of the degree of impact from mining (e.g. subsidence).

Any restoration or reconstruction works (as required) will also be monitored as a measure of works success.

The results from all flora & fauna monitoring and measurement activity is recorded and reported in accordance with **Section 7.0** of this Management Plan.

## **6.2 Aquatic Fauna**

An ongoing macro-invertebrate (small “bugs” living in the water) and aquatic vertebrate (fish, eels, etc) monitoring program has been implemented. Six (6) sampling sites along the Goulburn River (upstream and downstream of the mine) have been established. Figure 1 in **Appendix 6** shows the monitoring locations.

### **6.2.1 Survey Techniques**

The methodology used is the Australian River Assessment System (AusRivAS), which has been the nationally accepted standard since 1997. It is a rapid prediction system used to assess the biological health of Australian Rivers and was developed under the National River Health Program (NRHP).

Fundamental to the AusRivAS methodology is the predictive model which is able to predict the aquatic macro-invertebrate fauna that is expected to be present in the absence of environmental stress (i.e. pollution). The macro-invertebrates collected at the site during the surveys are compared with this model and an assessment of the impact by external stressors is made. Comparisons between the sites upstream and downstream of the mine enable a “measure” of the impact related to mining to be determined.



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In addition, littoral and aquatic habitat characteristics are described by using a rating system which considers biological and abiotic parameters. The riparian, channel, and environment inventory (RCE) is currently used.

The results from all flora & fauna monitoring and measurement activity is recorded and reported in accordance with **Section 7.0** of this Plan.

### **7.0 Reporting and Reviewing**

The following section of the Management Plan includes the Reporting and Reviewing requirements relating to the management of Flora & Fauna related issues at the Ulan Coal Mine.

#### **7.1 Reporting**

All external and internal reporting is undertaken in accordance with the reporting requirements of the UCML EMS (**section 5.3.2**).

A copy of the annual fauna report for UCML will be presented in the AEMR.

#### **7.2 Inspections**

UCML will conduct regular inspections in accordance with the UCML Environmental Management System (EMS). Any improvements made as a result of the inspections process will be reported in that AEMR reporting period.

UCML's Environmental Department co-ordinates regular environmental inspections of all mine activities in accordance with **Environmental Procedure – Flora and Fauna Management**. This process also includes all contractors working on the site. Any findings from these inspections shall be documented and addressed as per UCML EMS.

Where non-conformances are observed the person responsible for the area is notified immediately and the issue is rectified. Any non-conformances resulting from these inspections are recorded by the EO in the non-conformance register for follow-up action.

Additional audits are undertaken by Xstrata Coal NSW at a corporate level (i.e. EMS, Compliance, etc). The various regulatory agencies (e.g. DPI, DIPNR and DEC) also undertake statutory inspections when required.

#### **7.3 Review**

The Plan will be reviewed and updated regularly in accordance with the UCML EMS. The review will include an assessment of the effectiveness of the established flora



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## Flora & Fauna Management Plan

and fauna controls and their performance against the Plan's objectives. Progressive amendments will be made to the Plan as a result of UCML's continuous improvement process. Any amendments the Plan will be undertaken in consultation with the appropriate regulatory authorities.

Notwithstanding the above, in accordance with the Development Consent, the Plan is to be revised / updated at least every seven (7) years or as otherwise directed by the Director General in consultation with the relevant government agencies. The changes will reflect changing environmental requirements or changes in technology/operational practices.

### 8.0 Responsibilities

The Environmental Manager is responsible for the implementation of the Flora & Fauna Management Plan, while the Operations Managers of the Ulan Underground Operations and the Ulan Open Cut Operations are responsible for ensuring that adequate resources are available for the implementation of the Flora & Fauna Management Plan. Notwithstanding this, specific individual responsibilities are provided in the **Environmental Procedure – Flora & Fauna Management (Appendix 5)**. The Manager(s) will allocate responsibility for specific tasks where necessary.

The Environmental Manager (EM) and the Environmental Officer (EO) are to provide technical support to the Manager(s) for all Flora & Fauna related issues where required.

### 9.0 Relevant documents and Legislation

The following section lists the relevant documentation as applicable to the Flora & Fauna Management Plan for the Ulan Coal Mine. A summary of the relevant legislation has been noted below, however a more comprehensive list are included in the register of *Legal and Other Requirements (section 2.4)* of the UCML Environmental Management System.

#### **Relevant Documents:**

- ▶ ML1486 Development Consent (as amended, Dec 2003);
- ▶ Kinhill Pty Ltd (1998) *Mining Lease Application No. 80 – Development Application and Environmental Impact Statement, Ulan Coal Mines Limited*;
- ▶ Mount King Ecological Surveys (2000) *Flora and Fauna Management Plan for ML1468 (previously MLA 80) at Ulan Coal Mines, Draft Report*.



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- ▶ Eco Logical Pty Ltd (2002) *Review of Environmental Factors (REF) for Hazard Reduction Burn at Ulan Coal Mine.*

### **Relevant Legislation:**

- ▶ *Protection of the Environment Operations Act, 1997*
- ▶ *Threatened Species Conservation Act, 1995*



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***Appendix 1: CORRESPONDENCE FROM STAKEHOLDERS***

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***Appendix 2: AREAS OF SIGNIFICANT CONSERVATION  
VALUE***

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***Appendix 3: EXISTING VEGETATION COMMUNITIES***

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***Appendix 4: ENVIRONMENTAL PROCEDURE – FLORA & FAUNA MANAGEMENT***

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***Appendix 5: FLORA & FAUNA MONITORING SITES***

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