



Western Coal Services Biodiversity Management Plan

April 2025

TITLE BLOCK

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Abbreviations

Australian and New Zealand Environment Conservation Council	ANZECC
Asset Protection Zones	APZ
Agriculture and Resource Management Council of Australia and New Zealand	ARMCANZ
Australian River Assessment System	AUSRIVAS
Before-After, Control-Impact	BACI
Biodiversity Assessment Method	BAM
<i>Biodiversity Conservation Act 2016</i>	BC Act
Biodiversity Management Plan	BMP
Community Consultative Committee	CCC
Consolidated Coal Lease	CCL
Centennial Coal Company Limited	Centennial
Cos's River Catchment Improvement and Land Management Plan	CILMP
Department of Agriculture Water and Environment	DAWE
Department of Environment and Energy	DEE
Department of Planning and Environment	DP&E
Department of Planning Industry and Environment	DPIE
Endangered Ecological Community	EEC
Environmental Impact Statement Assessment	EIS
Environmental Management Statement	EMS
<i>Environmental Planning and Assessment Act 1979</i>	EP&A
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	EPBC Act
Environment Protection License	EPL
Flora and Fauna Management Plan	FFMP
Groundwater Dependent Ecosystem	GDE

Key Threatening Process	KTP
<i>Local Land Services Act 2013</i>	LLS Act
Licensed Discharge Point	LDP
Longwall	LW
Million tonnes per annum	Mtpa
Project Approval Modification#	Mod#
Newnes Plateau Shrub Swamp	NPSS
National Parks and Wildlife Service	NPWS
Former Office of Environment and Heritage	OEH
Plant Community Types, as defined by the <i>Vegetation Information System</i>	PCT
Regional Biodiversity Management Plan	RBMP
Rural Fire Service	RFS
State Conservation Area	SCA
Subsidence Management Plan	SMP
Site Specific Guidance Values	SSGVs
<i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW)</i>	Mining SEPP
Temperate Highland Peat Swamps on Sandstone	THPSS
<i>Threatened Species Conservation Act 1995 (repealed and replaced by the BC Act)</i>	TSC Act
Western Region Biodiversity Offset Strategy	WRBOS
Western Region Water Management Plan	WRMP

1 INTRODUCTION

Centennial Coal Company Limited ('Centennial'), a wholly owned subsidiary of Banpu Public Company Limited, is a coal mining and marketing company supplying thermal and coking coal to domestic and export markets. The company is a major fuel supplier to the NSW energy industry, fuelling approximately 40% of the state's coal-fired electricity. Centennial's Western Region operations, located in the Lithgow and Mid-Western Local Government Areas (LGAs), include (Figure 1):

- Airly Mine;
- Angus Place Colliery;
- Charbon Colliery;
- Clarence Colliery;
- Lidsdale Siding;
- Springvale Mine; and
- Western Coal Services.

1.1 Purpose

This Biodiversity Management Plan (BMP) has been reviewed and updated to ensure that it continues to provide an overview of biodiversity management requirements and standardise the management of biodiversity across Centennial's western operations. To provide a uniform approach across the western region the main part of this document was developed to be consistent across all sites. The site-specific Appendix include the specific site related requirements and management activities.

Centennial has de-coupled the submitted Western Region Biodiversity Management Plan (RBMP) due to the complexities with obtaining approvals across numerous operations. This administrative change enables each site to be approved independently whilst immediately retaining a consistent approach to the management of biodiversity related matters.

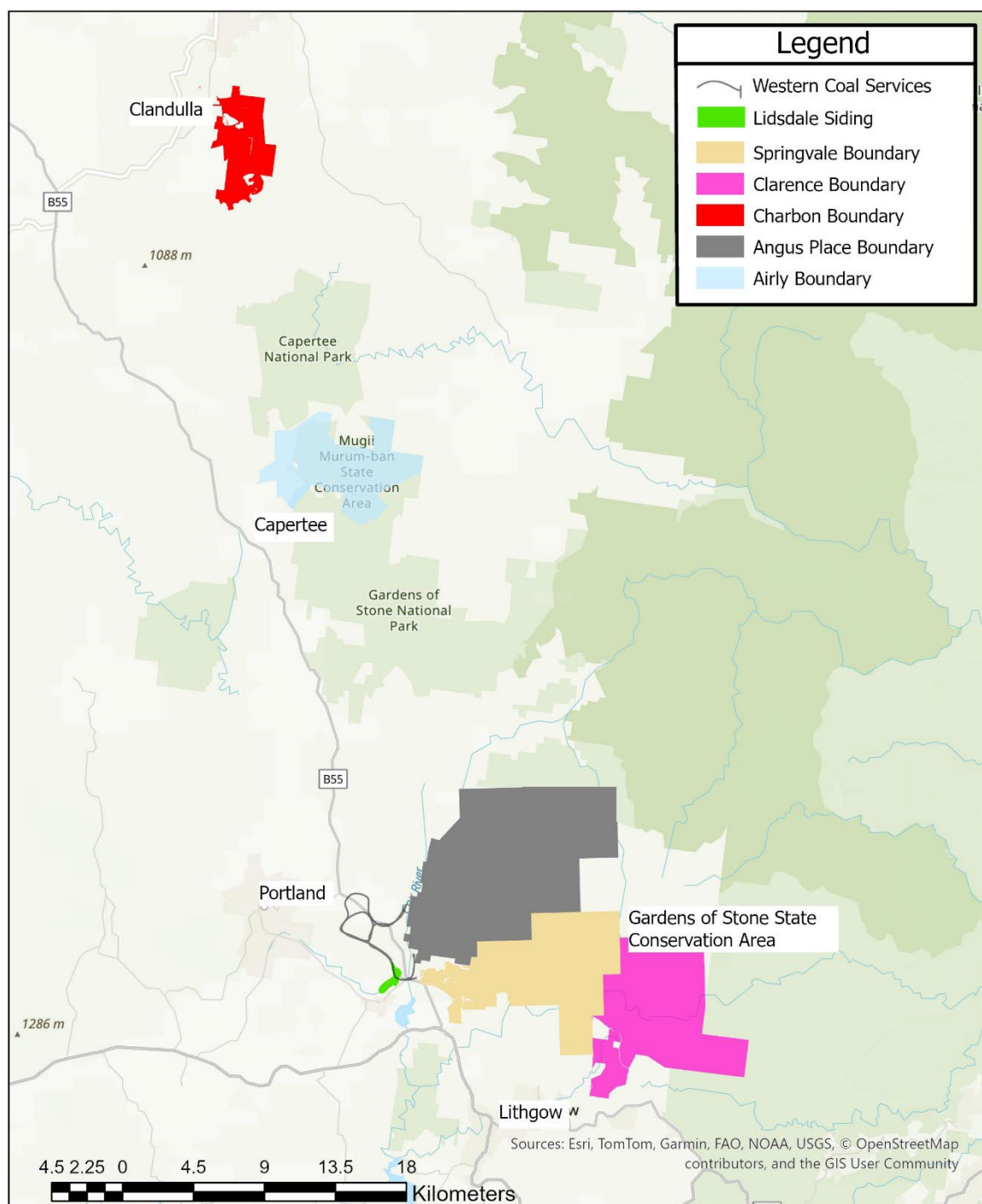
While the front section of this plan has been developed to be consistent across operations with overlapping biodiversity elements (such as the Gardens of Stone Conservation Area), moving forward any changes made to either the front section of the document, or the site-specific appendix will be undertaken by each site and submitted for approval under their respective consents.

The Appendices documents site specific development approval conditions and biodiversity management requirements for individual sites within Centennial's western operations.

1.2 Reviews and Versions

This section outlines the history in the preparation of the current document.

Version 1 of the RBMP was prepared in 2016 by GHD Pty Ltd, a review of this document was completed by RPS in 2019 and 2021 (Version 2, 3 and 4) and by EcoResolve in 2022 (version 5) in consultation with Centennial and in accordance with the requirements of Department of Planning Industry and Environment (DPIE). Version 6 was updated to address the DPE RFI and following Western Coal Services Modification 4. Version 7 of the BMP was reviewed by Jeremy Pepper (SLR) in June 2023, in response to comments received from NSW Department of Planning & Environment (Biodiversity, Conservation and Science Directorate) on 13 February 2023. Version 8 was administratively updated by Centennial following a request for additional information from the DPHI in November 2024, and to decouple from the regional plan creating Version 1 of the site-specific BMPs. This review created the opportunity to change the previously submitted plan format to this structure to assist in the assessment and approval of each operation's own Biodiversity Management Plan for compliance with each sites consent conditions independently.



TITLE: Figure 1. Locality Plan
LOCATION: Western Region Centennial Sites
PURPOSE: Western Region Biodiversity Management Plan
#REF/VERSION: ER049/ Rev C by HJ @ A4
CLIENT: Centennial Coal Pty Limited
DATE: 06 April, 2022



FIGURE 1. LOCALITY PLAN

1.3 Relationship between management plans

Centennial facilities operate under an Environmental Management Strategy. The Environmental Management Strategy identifies Environmental Management Plans and Strategies required including:

- Operational Environmental Management Plans;
- Regional Environmental Management Plans and Strategies; and
- Operational Extraction Plans.

The Regional Environmental Management Plans and Strategies, using regional framework for consistency, provides a broad overview of baseline monitoring, compliance monitoring, adaptive management, reporting and review processes to be adopted across the operations.

Extraction Plans and Sub-Plans required under the *Mining Act 1992* are constrained to a mining area and specific to requirements outlined in the Extraction Plan Guidelines (NSW Department of Planning and Environment, 2015). As such, each Sub-Plan required by the Extraction Plan developed for Centennial operations will specifically include:

- Site specific baseline information;
- Updated subsidence predictions on relevant surface features;
- Performance measures for relevant surface features;
- Trigger Action Response Plans;
- Adaptive Management Approach; and
- Any additional monitoring reporting and review requirements not addressed by the REMP.

The Regional Environmental Management Plans and Strategies and Extraction Plan Sub-Plan are interrelated, and each plan will reference sections where relevant for the purpose of maintaining consistency (Figure 2).



FIGURE 2. INTERACTION OF REGIONAL MANAGEMENT PLANS AND EXTRACTION PLANS

Approved Extraction Plans are accessible on the Centennial website (<https://www.centennialcoal.com.au/>) under relevant operations.

Where an overlap in condition requirements has been identified, a summary of information has been provided to provide context only. The Approved document shall be referred to for additional details to prevent conflicting compliance requirements.

1.4 Regional Environmental Management Plans and Strategies

1.4.1 Western Region Biodiversity Offset Strategy

The Western Region Biodiversity Offset Strategy (WRBOS) was developed to satisfy biodiversity offset obligations for the following development consents:

- Angus Place Ventilation Facility Mod 2 (SSD 06_0021);
- Western Coal Services (SSD-5579);
- Clarence REA (SSD 504-00);
- Springvale Mine Extension Project (SSD-5594 includes the Springvale Bore 8 project originally approved under DA11/92 Mod 3); and
- Springvale Water Treatment Project (SSD-7592).

The WRBOS was approved on 27 January 2021 by the NSW Department of Planning and Environment (DP&E). The following actions are required under the WRBOS:

- Securing of biodiversity offset site Carinya Lot 163 through a Conservation Agreement or gifting to the National Park estate;
- Retirement of biodiversity credits at the following biodiversity offset sites retired through BioBanking Agreements:
 - Pipers Flat Lot 5;
 - Springvale Lot 125; and
 - Wolgan Road Lot 56;
- Payment to the NSW Biodiversity Conservation Fund;
- Completion of *Persoonia hindii* research program and assessment of residual impact (refer to Angus Place BMP); and
- Commencement of *Caesia parviflora* var. *minor* research program (refer to Appendix C).

1.4.2 Coxs River Catchment Improvement and Land Management Plan (CILMP)

The Coxs River Catchment Improvement Land Management Plan prepared in accordance with Springvale Mine Extension Project Consent (SSD 5594 Schedule 4 Condition 18) was approved by DP&E on 8 March 2018. The Coxs River Catchment Improvement and Land Management Plan (CILMP) incorporates land management actions for the protection, restoration and enhancement of in-stream and riparian native vegetation, partial restoration of natural flow and hydrological function and stabilisation of areas of identified active-instream erosion. The CILMP works will:

- Improve aquatic habitat and stream health;
- Improve oxygenation of the water; and
- Reduce eutrophication.

1.5 Site Environmental Management Plans

1.5.1 Rehabilitation Management Plans (RMPs)

Each operation has developed their own site-specific Rehabilitation Management Plan (RMP) in accordance with their development approvals and Mining Leases.

The RMPs detail the rehabilitation objectives and satisfy the RMP criteria for the operation as outlined in the relevant development approvals applicable to each site. The RMPs detail a forward program for mining activities and rehabilitation activities for the next three years, demonstrating how rehabilitation will commence as soon as practicable after mine disturbance. The BMP and RMP have been substantially integrated to achieve biodiversity and rehabilitation objectives for the operations.

2 APPROVALS AND LICENSING REQUIREMENTS

2.1 Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined as Matters of National Environmental Significance (MNES).

Centennial maintains a register of threatened biota determinations under the EPBC Act to review the applicability of determinations against Centennial activities.

Under the EPBC Act, actions that have, or are likely to have, a significant impact on a MNES require referral and approval from the Australian Government Minister for the Environment (the Minister) in the form of an EPBC referral.

Table 1 lists the current EPBC approvals for Centennial's western operations. The requirements of each EPBC approval and how it is addressed is provided in each site BMP.

TABLE 1. EPBC ACT APPROVALS

Site	EPBC Approval number	Date enacted	Expiry date
Airly Mine	2013/7076	18 May 2015	31 March 2047
Angus Place	2011/5952	17 April 2012	19 March 2032
Charbon	2010/5498	19 November 2010	2025
Springvale	2011/5949	14 March 2012	19 March 2032
	2013/6881	15 October 2015	8 October 2035

2.1.2 Environment Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the core legislation relating to planning and development activities in NSW and provides the statutory framework under which development proposals are assessed.

The development consents for each of Centennial's western operations contain a number of conditions relevant to the preparation and implementation of BMPs and management of flora and fauna. This BMP and the attached Appendix have been prepared in accordance with the conditions of each operation's respective development consent.

Current development consents for Centennial's western operations are provided in Table 2. The Appendix in the BMP identifies the development consents and relevant conditions for the preparation and implementation of BMP.

TABLE 2. PROJECT APPROVAL DETAILS

Site	Development consent	Date enacted	Expiry date
Airly Mine	SSD 12-5581	15 December 2016	15 December 2036
Angus Place Colliery	PA 06_0021	13 September 2006	18 August 2024
Charbon Colliery	PA 08_0211	7 September 2010	31 August 2025
Clarence Colliery	DA 504-00	2005	31 December 2026
Lidsdale Siding	PA 08_0223	3 May 2013	31 December 2042

Site	Development consent	Date enacted	Expiry date
Springvale Mine	SSD-5594	21 September 2015	31 December 2028
Springvale Water Treatment Project	SSD-7592	19 June 2017	NA
Western Coal Services	SSD-5579	4 April 2014	30 June 2039

2.1.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) lists threatened species, populations and ecological communities as well as Areas of Outstanding Biodiversity Value (AOBV) and key threatening processes that must be considered when assessing the effects of an activity. It provides for:

- Specification of methodology for all ecological assessments in NSW identified as the Biodiversity Assessment Methodology (BAM). Identification of assessments to include as Development Assessment Report (BDAR) and Species Impact Statement (SIS);
- The listing of threatened species and populations, and Key Threatening Processes; and
- Commencements of the Biodiversity Offset Scheme.

2.1.4 Local Land Services Act 2013

The primary objective of the Local Land Services Act 2013 (LLS Act) is to establish a statutory corporation [to be known as Local Land Services (LLS)] with responsibility for management and delivery of local land services in the social, economic and environmental interests of the State and to manage environmental issues at a regional scale.

Under the LLS Act all land managers in NSW, whether on public or private land, have an obligation to control declared pest species on their land.

Under the LLS Act, Local Land Services can issue an eradication order in relation to a pest on controlled lands which must be complied to within the specific timeframe.

2.1.5 Biosecurity Act 2015

A general biosecurity duty applies to Centennial as the person who is the owner, occupier or otherwise responsibility for land to:

- To prevent, eliminate or minimise biosecurity risk as far as is reasonably practicable to do so, and
- To notify of a biosecurity risk event (a defence is that the person had good reason to believe that the particular circumstances of the event or suspected event were widely and publicly known).

Authorised officers have powers which may be exercised for the purpose of investigating, monitoring and enforcing compliance under the act and preventing, eliminating, minimising or managing biosecurity risks or suspected biosecurity risks.

2.1.6 Local Land Services (Wild Dogs) Pest Control Order 2015

An obligation applies to Centennial as the occupier of controlled land (all private land in NSW, and selected public land that does *not* include Capertee National Park, Gardens of Stone State Conservation Area, Ben Bullen State Forest, Muggi Murum-ban State Conservation Area) to:

- Eradicate the pest by any lawful method; and
- Notify Local Land Services of the pest on the land as soon as practicable after becoming aware of its presence, and power to Local Land Services to serve an individual eradication order.

2.1.7 Rural Fires Act 1997

The *Rural Fires Act 1997* controls the management of bushfires and controlled burning in NSW. The Act requires Centennial to take all practical steps to prevent bushfires and to minimise the danger of the spread of bushfires on, or from, offset lands under its control (excluding operational areas where fires are prohibited).

In accordance with the *Rural Fires Act 1997* mining lease holders have a responsibility to prevent and control bushfires, consequently Centennial will maintain a fire free zone within its mining lease areas. All fire management activities will be undertaken in accordance with the provisions of the Rural Fires Act 1997.

A Hazard reduction certificate is required prior to undertaking any mechanical or fire related reduction activities.

2.2 Policies

2.2.1 Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* has five key aims, to:

- Ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act;
- Provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act;
- Deliver improved environmental outcomes by consistently applying the policy;
- Outline the appropriate nature and scale of offsets and how they are determined; and
- Provide guidance on acceptable delivery mechanisms for offsets.

2.2.2 State Environment Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environment Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (NSW) (the Mining SEPP) governs the way that mining, petroleum production and extractive material resource proposals are assessed and developed in NSW. The Mining SEPP aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of NSW.

2.3 Guidelines and reference information

The following documents and guidelines are applicable to biodiversity monitoring, assessment and management within the western operations area and are useful tools and information sources when preparing background data and monitoring programs. The guidelines provided in Table 3 below are not a comprehensive list and are only an indication of suitable information and guideline sources for gathering biodiversity information and data.

TABLE 3. BIODIVERSITY GUIDELINES

Type	Document title	Reference	Purpose
Biodiversity Impact Assessment and Biodiversity Offset Assessment	Biodiversity Assessment Method	State of NSW 2017	Direction for collecting ecological field data, undertaking environmental assessment and identifying suitable offset land
Flora and Fauna Surveys	Survey Guidelines for Australia's Threatened Birds	DEWHA 2010a	To assist in preparing and/or reviewing flora and fauna surveys to support environmental approvals or biodiversity
	Threatened Species survey and assessment guidelines: field survey and methods for fauna - Amphibians	DECC 2009	
	Survey Guidelines for Australia's Threatened Frogs	DEWHA 2010b	

Type	Document title	Reference	Purpose
	Survey Guidelines for Australia's Threatened Reptiles	DotE 2011a	
	Survey Guidelines for Australia's Threatened Mammals	DotE 2011b	
	EPBC Act referral guidelines for the vulnerable Koala	DotE 2014	
	Draft Survey Guidelines for Australia's Threatened Orchids, Guidelines for detecting Orchids listed as 'Threatened' under the EPBC Act 1999.	DotE 2013	
	Bionet survey timing	OEH 2016b, OEH 2019	
Regional Vegetation Mapping	The Vegetation of the Western Blue Mountains (including Capertee, Cox's, Jenolan and Gurnang Areas)	DEC 2006	To assist in identifying ecological constraints for environmental assessments
Biodiversity Offsets	EPBC Act Environmental Offsets Policy	DSEWPaC 2012	Requirements for determination of biodiversity offsets
Groundwater Dependent Ecosystems	NSW State Groundwater Dependant Ecosystem Policy	DLWC 2002	To assist in identifying ecological constraints for environmental assessments
Aquatic and Marine Habitats	Policy and guidelines for fish habitat conservation and management	NSW Fisheries 2013	To assist in preparing and/or reviewing flora and fauna surveys to support environmental approvals or biodiversity monitoring projects

3 REGIONAL ENVIRONMENT

3.1 Bioregion

The Centennial Coal Western Region operations area (including biodiversity offset areas) occurs within three Bioregions (IBRA 7), as shown on Figure 3:

- Sydney Basin Bioregion;
- NSW South Eastern Highlands; and
- NSW South Western Slopes.

Descriptions of each of these bioregions are provided below.

3.1.1 Sydney Basin Bioregion

Centennial's western operations area occurs within the Wollemi subregion of the Sydney Basin Bioregion, which is characterised by:

- Hawkesbury Sandstone and equivalent quartz sandstones of the Narrabeen Group, sub-horizontal bedding, strong vertical joint patterns and a few volcanic necks;
- The highest part of the Blue Mountains;
- Sandstone plateaus with benched rock outcrops;
- Creek directions controlled by the jointing deep gorges of the Capertee and Wolgan Rivers;
- Soils typically consist of thin sands or deep yellow earths on plateaus, thin texture contrast soils on shale benches. Organic sands in swamps and joint crevices, boulder slope debris below cliffs, sandy alluvium in pockets along the streams. Red brown structured loams on basalts.; and
- A variety of vegetation types including:
 - Red bloodwood, yellow bloodwood, rough-barked apple, smooth-barked apple, hard-leaved scribbly gum, and grey gum with diverse shrubs and heaths on plateaus.
 - Smooth-barked apple, Sydney peppermint, blue-leaved stringybark, and turpentine and gully rainforests in gullies and canyon heads.
 - Ribbon gum and Blaxland's stringybark on basalt.
 - River oak along main streams.

3.1.2 NSW South Eastern Highlands

Centennial's western operations area occurs within the Capertee Uplands subregion of the South Eastern Highlands Bioregion, which is characterised by:

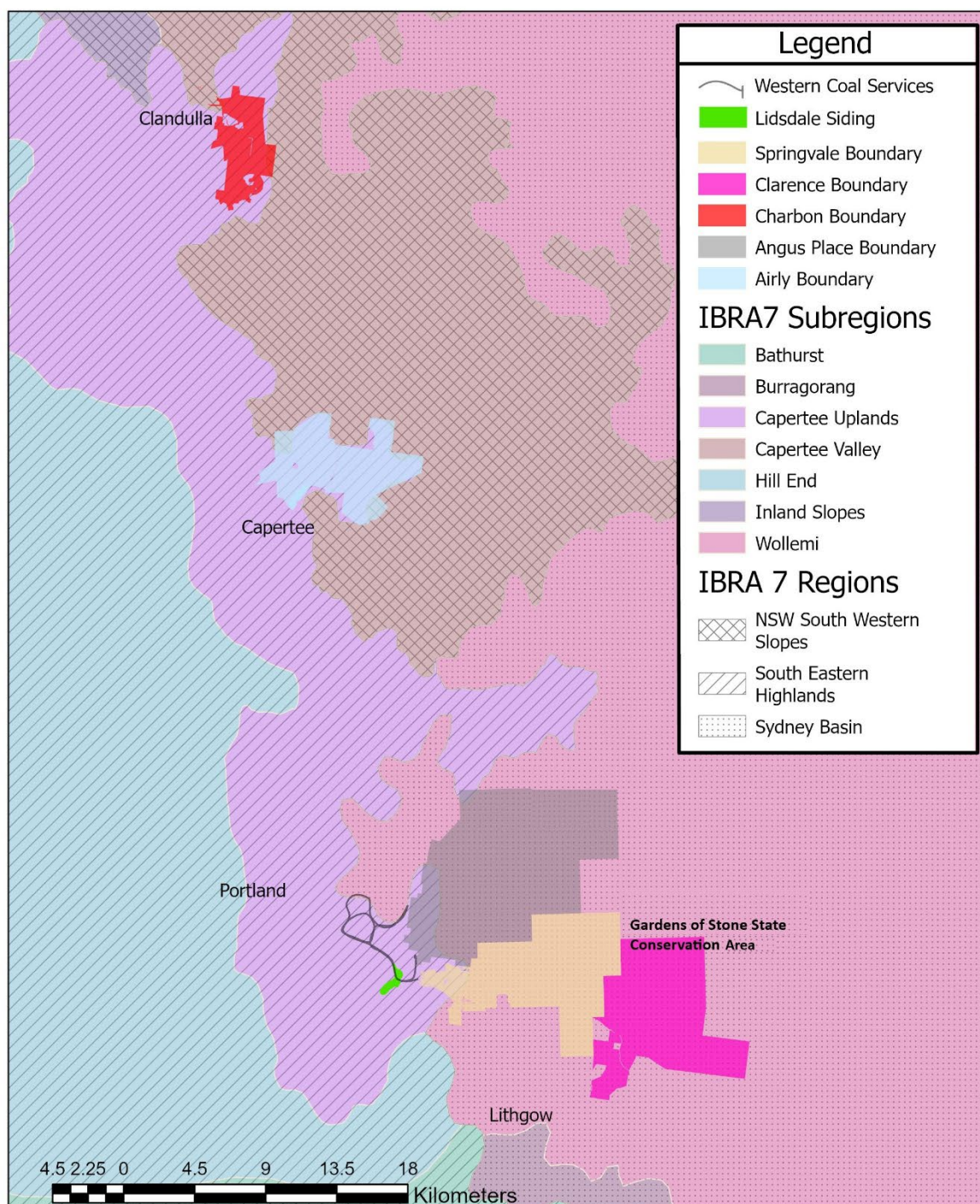
- Permian Shoalhaven Group conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone or quartzite. Eastern margin of Narrabeen sandstone in cliffs. Small areas of hilltop Tertiary basalt;
- Wide valleys, low rolling hills below sandstone cliffs with isolated flat top mountains in the valleys formed as pinnacles or remnant pieces of plateau;
- Steep, boulder debris slopes below cliffs;
- Shoulder slopes with stone pillars or "pagodas" above steep canyons on tributary streams falling into gorges;
- Low gradient swampy stream lines;
- Soils typically characterised by shallow stony texture contrast profiles, usually with gritty well drained A horizons, over tough yellow or grey poorly drained clays. Boulder debris with clay matrix below cliffs (talus). Organic sands in swamps. Red brown structured loams on basalts; and
- A variety of vegetation types including:

- Woodlands supporting rough barked apple, red stringybark, red box, yellow box, Blakely's red gum with shrubby understorey and wallaby grass in open valleys.
- Scribbly gum, red stringybark, red box and broad-leaved ironbark on talus slopes.
- Black ash and Sydney peppermint on sandstone peaks.
- Dwarf casuarina, tea tree, and sedge on pagoda margins.

3.1.3 NSW South Western Slopes

Centennial's western operation area occurs within the Capertee Valley subregion of the South Eastern Highlands Bioregion, which is characterised by:

- Permian Shoalhaven Group conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone or quartzite. Eastern margin of Narrabeen sandstone in cliffs. Small areas of hilltop Tertiary basalt.;
- Wide valleys, low rolling hills below sandstone cliffs with isolated flat top mountains in the valleys formed as pinnacles or remnant pieces of plateau;
- Steep, boulder debris slopes below cliffs;
- Shoulder slopes with stone pillars or "pagodas" above steep canyons on tributary streams falling into gorges;
- Low gradient swampy stream lines;
- Soils typically characterised by shallow stony texture contrast profiles, usually with gritty well drained A horizons, over tough yellow or grey poorly drained clays. Boulder debris with clay matrix below cliffs (talus). Organic sands in swamps. Red brown structured loams on basalts; and
- A variety of vegetation types including:
 - Woodlands supporting rough barked apple, red stringybark, red box, yellow box, Blakely's red gum with shrubby understorey and wallaby grass in open valleys.
 - Scribbly gum, red stringybark, red box and broad-leaved ironbark on talus slopes.
 - Black ash and Sydney peppermint on sandstone peaks.
 - Dwarf casuarina, tea tree, and sedge on pagoda margins.



TITLE: Figure 3. Bioregional Context
LOCATION: Western Region Centennial Sites
PURPOSE: Western Region Biodiversity Management Plan
#REF/VERSION: ER049/ Rev C by HJ @ A4
CLIENT: Centennial Coal Pty Limited
DATE: 06 April, 2022



FIGURE 3. BIOREGIONAL CONTEXT

4 CLIMATE

The climate of the region is typical of a cool-temperate mountain climate, characterised by cold winters and warm summers. The local climate is influenced by topography, altitude and aspect. The warmest month of the year is January with a mean maximum temperature of 28.5°C, with the coolest months occurring in July with a mean maximum temperature of 11.8°C. Snow and/or sleet are common in winter months.

Rainfall is generally uniform throughout the year however rainfall is higher during the months of October through to March. Summer months are generally the wettest months. The monthly rainfall averages for the region range from approximately 45 mm in May to approximately 67 mm in January. It is noted that the local intensity of rainfall is influenced by the orographic influence of the Great Dividing Range.

Regional wind speed and direction is characterised by the following:

- During summer, light to moderate winds from the southern, eastern and north-western quadrants;
- During autumn, light to moderate winds from the southern and south-western quadrants;
- During winter, light to high winds predominantly from the south-western quadrant; and
- During spring, light to moderate winds from the west, south-west and north-western quadrants.

5 HIGH VALUE ECOLOGICAL AREAS

Centennial's western operations area primarily occurs within forested areas on the western fringe of the Blue Mountains. High value, State managed conservation reserves are located within and adjacent to the management areas of the western operations including:

- Gardens of Stone State Conservation Area (part of the Blue Mountains World Heritage Area);
- Blue Mountains National Park (World Heritage);
- Wollemi National Park (World Heritage);
- Capertee National Park; and
- Mugii Murrumbidgee State Conservation Area (Mugii Murrumbidgee SCA).

The Gardens of Stone State Conservation Area was formally proclaimed on the 6 March 2022. The SCA encompasses the Newnes Plateau (as Newnes State Forest), Ben Bullen State Forest, Wolgan State Forest as well as other Crown lands.

These reserves are typically characterised by mountains, pagodas (sandstone formations), cliffs, and dissected sandstone gorges, all of which contain significant natural and cultural heritage values.

6 IMPLEMENTATION

Biodiversity management at Western Coal Services is undertaken in accordance with this BMP front section and as detailed in the site-specific Appendix.

6.1 Management Timeframes

Management actions within this BMP and attached site-specific Appendix are provided as one of three timeframes presented in Table 4 below. The timeframes integrate this BMP with biodiversity management of the site and rehabilitation within the Rehabilitation Management Plans.

TABLE 4. MANAGEMENT TIMEFRAMES

Description	Timeframe	Objective
Short	3-year period of current BMP	Provide short term/immediate action for biodiversity management on the site
Medium	Operation of the site as a mine	Actions relating to the implementation of short-term actions to ensure long term objectives are achieved
Long	Rehabilitation and closure of the mine	Long-term outcomes linked to the operations Mining Operations Plan

6.2 Adaptive management

To account for uncertainties and to improve management response, all impacts to biodiversity will be adaptively managed across Centennial's western operations areas using an Adaptive Management Framework.

This framework consists of the traditional adaptive management model, complemented by management outcomes, as detailed in Figure 4.

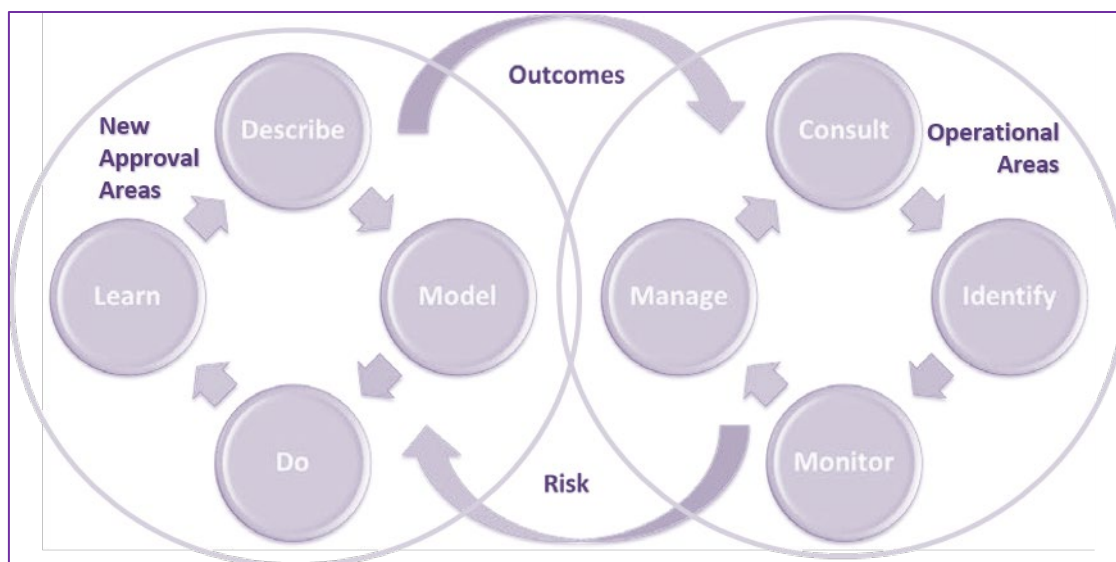


FIGURE 4. ADAPTIVE MANAGEMENT FRAMEWORK

The adaptive management framework actions relevant to biodiversity are detailed below.

For new approval projects, steps one to four will be applied. Once project approval has been obtained and the project commences its operational phase, the knowledge obtained during the previous steps will be used to apply steps five to seven.

1. **Describe** – Undertake and complete comprehensive baseline biodiversity data collection (including flora and fauna, focussing on threatened species and endangered ecological communities under State and Commonwealth law).
2. **Model** – Model the biological environment and its response to certain management actions/decisions, based on scientific literature, hydrological information, existing site conditions and best practice procedures.
3. **Do** – Implement the modelled biological management action.
4. **Learn** – Monitor and evaluate the biological response by using a detailed monitoring plan such as the Before-After, Control-Impact (BACI) monitoring study design.
5. **Consult** – Seek input from relevant stakeholders on outcomes.
6. **Identify** – Set clear biodiversity management objectives (development consent performance measures) including calculation of any required biodiversity offsets in accordance with consent conditions.
7. **Monitor and Manage** – Monitor and manage responses to evaluate progress against objectives, determine the status of the system, increase our understanding of the environment and the potential impacts of mining on it, and to further validate the modelling used to underpin the impact assessment. Monitoring will be undertaken in accordance with that detailed in this BMP and the site-specific Appendix.

6.3 Trigger Action Response Plan (TARP)

Where required, Centennial sites in the western operations will prepare a Trigger Action Response Plan (TARP), which has the purpose of evaluating biodiversity monitoring data against performance criteria specified in corresponding Extraction Plans/ Subsidence Management Plans. The TARP provides action responses for monitoring results which are found to be;

- In normal range;
- Approaching trigger levels; and
- Exceedances of trigger levels.

Accurate identification of trigger events provides for early responses to emerging risks. As well as identifying the initial trigger for response, the ecological monitoring program provides the primary means to monitor the effectiveness of the response actions including those developed through the adaptive management framework.

6.4 Biodiversity monitoring

A biodiversity monitoring program exists at each site in the Western Region. The monitoring is detailed in the site-specific Appendix.

The objective of monitoring is to ensure that management measures impacting biodiversity are implemented and are functioning as intended.

The site-specific Appendix are attached and detail the biodiversity monitoring programs to be implemented for the site. A summary of general biodiversity monitoring methods contained within each site-specific Appendix is provided below.

6.4.1 Objectives

The objectives of the biodiversity monitoring program are to provide an understanding of:

- The biodiversity assemblages and values prior to impacts occurring;
- Impacts of operational activities on receiving environments during operations; and
- The effectiveness of implemented biodiversity management measures.

Biodiversity monitoring results will be used to inform adaptive management practices and to assist in improving biodiversity management activity outcomes on Centennial managed lands as required.

6.4.2 Purpose and task

6.4.2.1 Aquatic ecology

Monitoring of aquatic ecology is currently undertaken at a number of locations in association with Centennial's mining operations to obtain relevant information that allows for:

- Investigation of potential impacts of operational activities on the receiving environment;
- Development of site-specific guideline values (SSGVs) that aid in the assessment of impacts to the aquatic ecology of downstream environments; and
- Demonstration of environmental due diligence implemented for targeted surveys e.g., swamp subsidence.

6.4.2.2 Terrestrial ecology

Monitoring of terrestrial biodiversity is currently undertaken at a number of locations in association with Centennial's mining operations and offset management areas. The purpose of terrestrial biodiversity monitoring is to:

- Investigate potential impacts of operational activities on the receiving environment;
- Detect and monitor terrestrial ecology condition against the baseline condition; and
- Provide information to support adaptive biodiversity management to provide the necessary information to determine the efficacy of management actions undertaken aimed at improving environmental condition and quality.

6.4.3 Monitoring design

Two frameworks for the design of a monitoring program are outlined below.

6.4.3.1 Before – After

This is a simple monitoring design that involves the collation of ecological monitoring data for an impact area over time, this being before and after the impact event. This monitoring approach has the purpose of determining if change has occurred in the receiving environment and is a useful economical monitoring approach for use in circumstances where only knowledge of change is required. However, this monitoring design is unable to inform the reason for change as the design provides no comparison with what is happening more broadly in surrounding environment independent of the impact (i.e., provides no information on biological responses to uncontrolled environmental factors such as variation in weather).

6.4.3.2 Before – After Control -Impact

A more rigorous and empirical approach to ecological monitoring is to assess status and trends of physical and biological responses to disturbance and management activities within experimental design. A monitoring design based on the principles of a Before After Control Impact (BACI) framework is an accepted approach for quantifying change within the environment and, most importantly, providing opportunity for identifying the causation for such change (i.e., was change a consequence of the impact prediction or was it a function of other unrelated environmental factors such as the weather). A BACI design involves the sampling of multiple independent monitoring sites in areas where an impact is expected and where it isn't (i.e., control) with adequate statistical validity (Underwood, 1992).

6.4.4 Monitoring methods

The biodiversity monitoring methods are summarised below.

Centennial will continually assess available best practice biodiversity monitoring techniques and methodologies to achieve their monitoring objectives.

The type of monitoring implemented will be determined based on needs, target species, previous information and studies in accordance with approvals and appropriate implemented standard industry practices.

6.4.4.1 Baseline biodiversity monitoring

Environmental baseline data is required to enable sites to understand the environmental impacts and consequences of mining and other mining related operations.

Baseline data and biodiversity monitoring must be undertaken in accordance with current Government legislation, policy and guidelines (as detailed in Section 2.3) and site-specific Appendix.

An environmental baseline data review and analysis will be undertaken as required. The environmental

baseline data review and analysis must be included in the Annual Review for each site.

6.4.4.2 GIS

Centennial operate an integrated Geographical Information System (GIS) which includes relevant threatened flora and fauna records, vegetation mapping and fauna habitat mapping. The system is populated using a combination of Centennial's biodiversity monitoring and survey/assessment data and publicly available data. This GIS, in conjunction with the example monitoring methods detailed below, provides a tool for Centennial personnel to identify biodiversity constraints and manage ecological assets.

Before and After sampling allows for assessment of how the disturbance activities may have changed the site through time from its historical condition, whilst the Control and Impact sampling allows the disturbance effects to be discerned from natural variability, stochastic events and underlying trends in the larger area.

6.4.4.3 Desktop review

The following sources and databases should be reviewed and considered in addition to Centennial's GIS prior to baseline surveys:

- previous ecological surveys;
- EPBC Act Protected Matters Search Tool;
- BioNet Wildlife Atlas;
- NSW DPI Fisheries Records Viewer;
- NSW PlantNet;
- NSW Vegetation Classification;
- Aerial photographs;
- Regional vegetation mapping including The Vegetation of the Western Blue Mountains (DEC 2006); and
- Relevant documents including previous surveys and reporting.

6.4.4.4 Flora monitoring

Flora monitoring will involve undertaking detailed qualitative site surveys in accordance with the BAM, floristic plots or Brownstein surveys methodologies detailed in the following subsections and in associated site Appendix.

Existing programs may continue with established methodologies to ensure spatial and temporal consistency unless otherwise required.

6.4.4.5 Biodiversity Assessment Method

The Biodiversity Assessment Method (BAM) sets out the requirements for a repeatable and transparent assessment of terrestrial biodiversity values and impacts on biodiversity values, and provides a mechanism for calculating biodiversity offsets for loss of biodiversity values. As Centennial's biodiversity monitoring is not supporting a development application or impact assessment, it is not strictly subject to the requirements of the BAM (DPIE, 2020); however, for the purposes of monitoring biodiversity, it is an effective qualitative and quantitative tool.

At this stage, seasonal or annual monitoring using the BAM is being carried out at Airly Mine, to monitor Box Gum Woodland Endangered Ecological Communities. Additionally, BAM is now being used as the primary field and data capture technique for rehabilitation monitoring across Centennial Coal sites in NSW, in line with the Resources Regulator (2021) guidelines *Form and Way: Rehabilitation Management Plan for Large Mines*.

The BAM is summarised in the following subsections.

MAPPING VEGETATION ZONES

A 'vegetation zone' is defined in the BAM as an area of native vegetation characterised by the same Plant Community Type (PCT) and a similar broad condition state. A vegetation zone mapped as derived vegetation is assessed against the benchmark data for the PCT from which it was derived.

ASSESSING THE PATCH SIZE FOR A VEGETATION ZONE

The patch size area must be determined for each vegetation zone. The patch size area is assigned to the vegetation zone as a class, being <5ha, 5-24ha, 25-100ha or ≥100ha. The patch size class is used to

determine the habitat suitability of the site.

ASSESSING VEGETATION INTEGRITY (SITE CONDITION)

Each vegetation zone must be measured quantitatively for the composition, structure and function attributes listed in Table 5. Note, for PCTs classified under vegetation formations that are freshwater wetlands, saline wetlands, grasslands, alpine complex, arid shrublands and heathlands without trees (Southern Montane Heaths (NSW035), South Coast Heaths (NSW065), Coastal Headland Heaths (NSW070)), only the composition and structure attributes must be measured.

TABLE 5. GROWTH FORM GROUPS AND ATTRIBUTES USED TO ASSESS THE COMPOSITION, STRUCTURE AND FUNCTION

Growth form groups used to assess composition and structure	Attributes used to assess function
- Tree - Shrub - Grass and grass like - Forb - Fern - Other	- Number of large trees - Tree regeneration - Tree stem size class - Total length of fallen logs - Litter cover - High threat exotic vegetation cover - Hollow bearing trees

VEGETATION INTEGRITY SURVEY PLOTS

The minimum number of plots/transects required for each vegetation zone is detailed in Table 6.

TABLE 6. MINIMUM NUMBER OF PLOTS REQUIRED PER ZONE AREA

Vegetation zone area (ha)	Minimum number of plots/transects
<2	1 plot
>2-5	2 plots
>5-20	3 plots
>20-50	4 plots
>50-100	5 plots
>100-250	6 plots
>250-1000	7 plots; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots; more plots may be needed if the condition of the vegetation is variable across the zone

From Table 3 in the BAM (DP&E 2020)

Establishing or randomly locating plots within stratification units to provide a representative assessment of the vegetation integrity of the vegetation zone can be undertaken as follows:

- Marking waypoints and bearings randomly to provide a representative assessment of the vegetation integrity of the vegetation zone in the assessment area and establishing plots at all or some of these waypoints, or
- Walking a random distance into the vegetation zone. The survey data must be collected from that location on a randomly generated compass bearing, with the process repeated elsewhere within the vegetation zone.

Survey plots must be established around a central 50m transect as follows:

- One 400m² plot (standard 20m x 20m) used to assess all of the composition and structure attributes;

- One 1000m² (standard 20m x 50m) plot is used to assess the function attributes: number of large trees, stem size class, tree regeneration and length of logs; and
- Five 1m² sub-plots are used to assess average litter cover (and other optional groundcover components) for the plot.

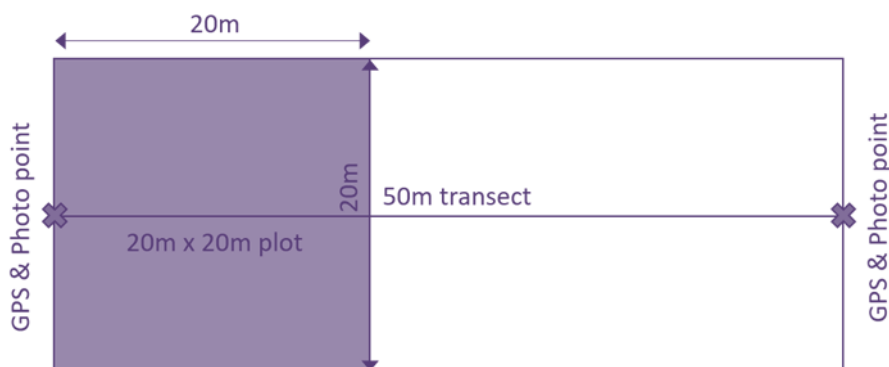


FIGURE 5. LAYOUT OF NESTED 20M X 50M PLOTS USED FOR THE ASSESSMENT OF VEGETATION CONDITION ATTRIBUTES

A summary of the plot sizes, attributes and measures for recording BAM variables relating to composition, structure and function is presented in Table 7.

TABLE 7. MEASURING COMPOSITION, STRUCTURE AND FUNCTION

Aspect	Plot Size	Variable	Measure
Composition	20m x 20m	Species richness	Number of difference plant species recorded within each growth form group
Structure	20m x 20m	Foliage cover	Foliage cover estimate for each growth form group drawn from the following number series: 0.1, 0.2, 0.3,...1, 2, 3, ...10, 15, 20, 25,...100%. The structure of each growth form group is the sum of all individual foliage cover estimates of all species recorded. Foliage cover estimates for non-native (exotic) species must be assigned either E (exotic) or THE (high threat exotic)
Function	20m x 50m	Tree stem size class	Either <5, 5-9, 10-19, 20-29, 30-49, 50-79, or 80+ cm 'diameter at breast height over bark' (DBH) for all species in the tree growth form group
		Number of large trees	Count of all living stems with a DBH ≥ the large tree benchmark DBH size for that PCT or vegetation class
		Regeneration	Presence or absence of living trees with stems <5cm DBH
		Length of fallen logs	Total length (in metres) of all dead woody material >10cm diameter on the ground
		Hollow bearing trees	Number of living and dead trees within hollows
	Five 1m x 1m plots	Litter cover	Average percentage ground cover of litter

The BAM allows data from the monitoring program to be compared and monitored against the “benchmark values” for each plant community type (PCT) to assess the effectiveness of management measures implemented at the site. The BAM can also be used to generate a vegetation integrity (VI) score for each sampling site during each sampling period, which provides a comparable score between sites for habitat condition which can also be compared to relevant benchmark values.

Any additional sampling requirements for vegetation and flora monitoring are provided within the site specific requirements are included in the Appendices.

6.4.4.6 Braun Blanquet

The Braun Blanquet survey methodology was developed in the early 20th century by the plant biologist Josias Braun-Blanquet to assess cover of abundance of marine and aquatic vegetation. Braun Blanquet can also be easily applied to terrestrial vegetation and provides for a rapid visual assessment of vegetative cover, is relatively quick and highly repeatable, minimising observer differences in sampling. Braun Blanquet scores are provided in Table 8.

TABLE 8. MINIMUM NUMBER OF PLOTS AND TRANSECTS REQUIRED PER ZONE AREA

Score	Cover within quadrat (0.25m ²)
0	Native species absent from quadrat
0.1	Native species represented by a solitary shoot, <5% cover
0.5	Native species represented by a few (<5) shoots, <5% cover
1	Native species represented by many (>5) shoots, <5% cover
2	Native species represented by many (>5) shoots, 5-25% cover
3	Native species represented by many >5 shoots, 25-50% cover
4	Native species represented by many >5 shoots, 50-75% cover
5	Native species represented by many >5 shoots, 75-100% cover

Statistics can then be undertaken on the data to determine trends in the monitoring data including density, abundance and frequency.

6.4.4.7 Floristic quadrats

Floristic quadrats provide a detailed floristic assessment of a 20m-by-20m area. This survey methodology involves the collection of the data detailed in Table 9 and Table 10.

TABLE 9. VARIABLES TO BE MEASURED DURING FLORA MONITORING

Aspect	Variable	Measure
Canopy	Species richness	A count of the total number of canopy species
	% canopy cover	An estimate of percent foliage cover for the canopy
	Species condition	An estimate of the condition score (see Table 10) of each species
Midstorey	Species richness	A count of the total number of midstorey species
	% midstorey cover	An estimate of percent foliage cover for the midstorey
	Species condition	An estimate of the condition score of each species
Ground layer	Species richness	A count of the total number of ground cover species
	Species condition	An estimate of the condition score of each species
	% Bare ground	Total area of bare ground within plot
Weed species	Species richness	Total number of weed species

TABLE 10. CONDITION SCORES

Condition Score	Description
1	Severe damage/dieback
2	Many dead stems
3	Some dead branches
4	Minor damage
5	Healthy

6.4.4.8 Brownstein methodology monitoring

The 'Flora monitoring methods for Newnes Plateau Shrub Swamps and Hanging Swamps' (Brownstein et al 2014) forms the methodological basis for the Swamp Monitoring Programs for Springvale and Angus Place Mines. This methodology involves both seasonal and annual monitoring.

Seasonal Monitoring

Remote sensing and ground control monitoring methods are ideally suited to the monitoring of sensitive environments and/or large areas, such as Newnes Plateau Shrub Swamps. Remote sensing techniques have very low impacts when performed in combination with ground control points, with the latter monitoring component being the only site-based aspect of this approach.

Annual Monitoring

The sampling design involves a series of three or more randomly selected and permanently marked transects spanning from edge to edge of the swamp community, perpendicular to the direction that water would travel for any given swamp. Details of the installation, timing and sampling methodology are detailed below.

6.4.4.9 Fauna monitoring

Where possible, fauna monitoring will focus on key indicator species as opposed to monitoring all fauna species which occur on a site. A large proportion of the key management species within the western management area are vertebrate fauna from the bird, microchiropteran bat, and amphibian groups. Monitoring of these fauna groups will provide valuable information on the progress of restoration and/or impact of mining, as these fauna rely on good quality habitat with specific resources and features, along with complex structure, for important life cycle stages (ie foraging, dispersal, roosting and breeding). Additionally, specific fauna species might also require monitoring, subject to the presence of suitable habitat and relevant approval conditions.

6.4.4.10 Invertebrate Monitoring

Invertebrate monitoring will be undertaken in accordance with methodologies specific to the particular species and in accordance with published guidelines. Two invertebrates, Bathurst Copper Butterfly (*Paralucia spinifera*) and Giant Dragonfly (*Petalura gigantea*), are monitored as part of the Springvale Extraction Plan and the EPBC 2013/6881 Biodiversity Management Plan (see Springvale BMP).

6.4.4.11 Impact monitoring

Impact monitoring will be undertaken in accordance with relevant guidelines, approval conditions and project assessment requirements.

6.4.5 Survey timing

Where required by an operation, targeted surveys should be undertaken during periods of high detectability to increase the likelihood of detecting a target species (where possible).

A summary of indicative detection periods for all threatened flora and fauna species known or considered likely to occur within the western operation management areas is provided in Table 11 below.

TABLE 11. SUMMARY OF FAUNA MONITORING TIMING

Threatened fauna species	Recommended survey time**	Active period (months of the year)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Reptiles													
Blue Mountains Water Skink (<i>Eulamprus leuraensis</i>)	Survey during active period												
Broad-headed Snake (<i>Hoplocephalus bungaroides</i>)	Survey during winter												
Rosenberg's Goanna (<i>Varanus rosenbergi</i>)	Survey during summer												
Amphibians													
Giant Burrowing Frog (<i>Heleioporus australiacus</i>)	Nights of thunderstorm activity or after substantial rainfall during active period												
Littlejohn's Tree Frog (<i>Litoria littlejohni</i>)	Survey during active period												
Red-crowned Toadlet (<i>Pseudophryne australis</i>)	Survey during active period after periods of heavy rain												
Stuttering Frog (<i>Mixophyes balbus</i>)	Survey during active period after periods of heavy rain												
Invertebrates													
Bathurst Copper Butterfly (<i>Paralucia spinifera</i>)	Survey on warm cloudless days in September between 10 am to 3 pm												
Giant Dragonfly (<i>Petalura gigantea</i>)	Survey during active period												
Birds													
Barking Owl (<i>Ninox connivens</i>)	Survey at night during active period												
Black-chinned Honeyeater (eastern subspecies) (<i>Melithreptus gularis gularis</i>)	Survey during active period												
Brown Treecreeper (eastern subspecies) (<i>Climacteris picumnus victoriae</i>)	Survey anytime, peak is spring and summer												

Threatened fauna species	Recommended survey time**	Active period (months of the year)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Diamond Firetail (<i>Stagonopleura guttata</i>)	Survey anytime												
Flame Robin (<i>Petroica phoenicea</i>)	Survey anytime												
Gang-gang Cockatoo (<i>Callocephalon fimbriatum</i>)	Spring-Summer survey in tall mountain forests. Winter-Autumn survey in low altitude open forests and woodlands.												
Gilbert's Whistler (<i>Pachycephala inornata</i>)	Survey during active period												
Glossy Black-Cockatoo (<i>Calyptrorhynchus lathamii</i>)	Survey during active period												
Grey-crowned Babbler (eastern subspecies) (<i>Pomatostomus temporalis</i>)	Survey anytime												
Hooded Robin (south eastern form) (<i>Melanodryas cucullata cucullata</i>)	Survey during active period												
Little Eagle (<i>Hieraaetus morphnoides</i>)	Survey during active period												
Little Lorikeet (<i>Glossopsitta pusilla</i>)	Survey during active period												
Masked Owl (<i>Tyto novaehollandiae</i>)	Survey anytime during calm, dry weather												
Painted Honeyeater (<i>Grantiella picta</i>)	Survey during active period												
Powerful Owl (<i>Ninox strenua</i>)	Survey during active period												
Regent Honeyeater (<i>Anthochaera phrygia</i>)	Survey during the morning during active period												
Scarlet Robin (<i>Petroica boodang</i>)	Survey anytime												
Sooty Owl (<i>Tyto tenebricosa</i>)	Survey during active period												
Speckled Warbler (<i>Pyrrholaemus sagittatus</i>)	Survey during active period												
Varied Sittella (<i>Daphoenositta chrysoptera</i>)	Survey anytime												

Threatened fauna species	Recommended survey time**	Active period (months of the year)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Migratory birds													
Cattle Egret (<i>Bubulcus ibis</i>)	Survey during active period												
Black-faced Monarch (<i>Monarcha melanopsis</i>)	Survey during active period												
Fork-tailed Swift (<i>Apus pacificus</i>)	Survey during active period												
Great Egret (<i>Ardea alba</i>)	Regionally migratory – survey anytime												
Latham’s Snipe (<i>Gallinago hardwickii</i>)	Spring and summer												
Painted Snipe (<i>Rostratula australis</i>)	Mostly active at dawn, dusk and night												
Rainbow Bee-eater (Merops ornatus)	Survey during active period												
Regent Honeyeater (<i>Anthochaera Phrygia</i>)	Late winter, associated with feed tree flowering												
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Summer												
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	Late spring, summer												
Swift Parrot (<i>Lathamus discolour</i>)	Winter												

6.5 Land disturbance activities

All vegetation clearing must be undertaken within the approved project boundaries and in accordance with relevant approvals for each site. Each site completes a land disturbance approval (or permit) to ensure any land disturbance is conducted in accordance with the approval requirements with effective management measures implemented (Figure 6). The aim of the internal land disturbance approval process is to:

- Ensure the extent of native vegetation removal is minimised and consistent with the requirements of the relevant site approvals;
- Minimise impacts on native biodiversity, particularly threatened species, populations and communities; and
- Maximise the usage of products of clearing (large woody debris, topsoil, subsoil and natural hollows) to improve biodiversity values.

6.5.1 Ecological Pre-Clearance Surveys

Clearance supervision will be undertaken by a qualified ecologist prior to clearing activities where land contains or potentially containing threatened species and/or endangered ecological communities or as a requirement of an ecological inspection, ecological due diligence or other ecological report.

Pre-clearance controls which may be required include:

- The Ecologist will mark or provide co-ordinates for all trees within the development footprint that can potentially be used by resident and migratory fauna as habitat. The trees will be demarcated using flagging tape or fluorescent tape. Natural habitat features include potential shelter sites, nest sites, hollows, termite mounds, epiphytes, crevices, standing dead trees and large hollow logs.
- Prior to the commencement of clearing, the area shall be inspected to ensure natural habitat features such as burrows, hollow logs, felled branches and bush rock identified for movement to another site within the development footprint as identified during the due diligence survey. Fauna microhabitat features will be removed from areas to be cleared and relocated to suitable nearby areas to be retained
- Within seven days prior to the commencement of clearing, the Ecologist is required to identify nearby habitat suitable for the release of fauna that may be encountered during the pre-clearing process.

6.5.2 Tree Felling

Prior to the clearing of trees, a due diligence process is required to be undertaken to minimise potential impacts on resident native fauna. Clearance activities are required for all trees, including habitat trees. These include:

- All site personnel involved in clearance activities must be briefed on the requirements of this land disturbance requirements, prior to commencing work within the development footprint. Site personnel are to be:
 - Made aware of the clearing limits and how they are marked.
 - Informed that they are not to encroach on areas beyond the clearing limits.
 - Are to be informed of the two-stage clearing process for habitat trees.
 - Made aware of the locations of trees that will be retained, the measures required to protect them, and the consequences of damage to these areas.
 - Made aware of threatened and migratory species or ecological communities within or surrounding the area from other previous assessments known or surveys, and likely to occur in the development footprint and their habitat.
- Undertake a pre start-up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials. If fauna is identified, notify the Ecologist or WIRES so that they can relocate uninjured animals and manage injured animals.

- Undertake a two-stage approach to clearing:
 - Stage 1: under-scrubbing of the entire development footprint should be carried out by a 4x4 tractor/ or similar with a slashing deck and a layer of mulch is to be left to aid in soil retention. Non-hollow-bearing tree and non-habitat trees will be cleared in a sequence that leaves trees which allow fauna to move to adjacent vegetation to be retained.
 - Stage 2: After a period of up to two weeks, clearing of hollow bearing and habitat trees will commence. Trees not requiring arborist attention are to be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling. Tree should be “soft-felled”.
 - Felled trees must be left for two nights on the ground to give any fauna trapped in trees an opportunity to escape before further processing of the trees.
 - Felled hollow bearing trees must be inspected by the Ecologist as soon as possible for the presence of fauna, including trapped, shocked or injured fauna.
 - Trees must be left on the ground for two nights before being mulched and stockpiled.
 - The draining of dams/ waterbodies in the development footprint must be supervised by the Ecologist. The Ecologist will relocate any wildlife found in these areas.
 - If an animal is injured (including shocked, juvenile animals or eggs) during clearing or other construction activities appropriate assistance for the animal should be sought see section 6.5.3)

Each sites internal land disturbance approval process follows the requirements as listed in Figure 6 below.

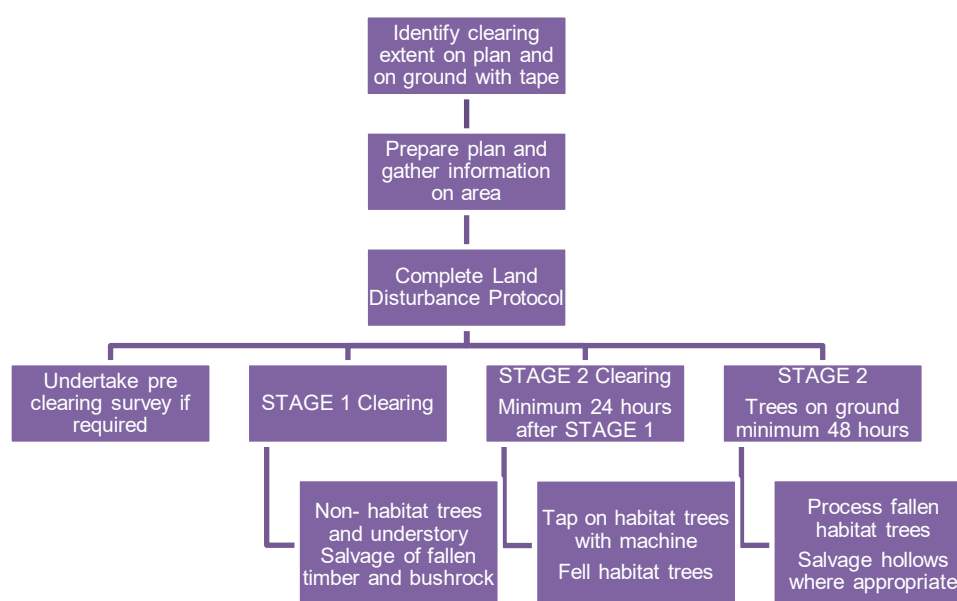


FIGURE 6. SURFACE DISTURBANCE PROCEDURE

6.5.3 Injured fauna management

Should injured fauna be captured or observed during vegetation clearing or any other operational activities on Centennial Managed lands, injured animals will be cared for according to specific animal care and ethics guidelines Guideline 10 Wildlife surveys (Animal Research Review Panel, 2015) with services of local animal welfare groups engaged as required. Contact details for local veterinary clinics and animal welfare groups are detailed in Table 12.

TABLE 12. LOCAL VETERINARY AND LOCAL ANIMAL WELFARE ORGANISATIONS

Organisation	Contact Details
Secret Creek Native Animal Sanctuary	02 6352 1133
Kangaroo Protection Cooperative	02 9651 2557
Wildlife Carers Network Central West – Mudgee Region, Western NSW, Lithgow and Bathurst areas	0408 966 228
Blue Mountains RSPCA Shelter	02 4782 2674
WIRES	1300 094 737 (main office) 02 4754 2946 (Blue Mountains regional office)
Sydney Bats Ku-ring-gai Bat Conservation Society	02 9413 4300
Lithgow Veterinary Practice	02 6351 3269

Injured animals will require additional care and may need to be nursed on route to care. The following criteria will be met for all animals kept for night release or transported to an approved carer:

- Animal is protected from extremes of temperature;
- Animal is protected from accidental trauma by other animals, equipment and machinery;
- Animal is protected from adverse sensory stimuli such as loud noises, strong vibration and bright lights;
- The bag or container provides sufficient airflow to allow normal air exchange and radiation/dispersal of heat (calico bag, pillowcase or cardboard box is best);
- The container, receptacle or bag is protected from direct sunlight, rain, wind or other environmental conditions likely to cause suffering or harm to the animal;
- The animal is checked regularly during its period of confinement;
- The container, bag or receptacle is clean, hygienic and safe for the animal; and
- All mammals and birds held in short term containment for more than four hours are given access to water.

6.6 Weed management

6.6.1 Weed species in the region

Weeds generally have life cycles that facilitate their own spread in various ways (i.e., faster germination, crowding out of other species, higher numbers of propagules, more efficient propagule dispersal). Weeds threaten native plant species through competition for limited resources. Sunlight, nutrient, water and space availability are limited, and an extensive presence of weeds is detrimental to native species. This can change vegetation community composition and lead to larger ecological issues such as poor soil quality, erosion and sedimentation, decline in fauna foraging and nesting habitats and the extinction of native flora species.

The following applicable key threatening processes (KTPs) are listed under the BC Act:

- Invasion and establishment of Scotch Broom (*Cytisus scoparius*);
- Invasion and establishment of exotic vines and scramblers;
- Invasion, establishment and spread of *Lantana camara*;
- Invasion of native plant communities by exotic perennial grasses and the African Olive (*Olea europaea* L. subsp. *cuspidata*); and

- Invasion of native plant communities by exotic perennial grasses.

Within the Western Operation sites weeds primarily occur within areas of recent disturbance or historical agricultural areas. Typical noxious weeds identified throughout the Western Operation sites include, but are not limited to:

- Blackberry (*Rubus fruticosus*);
- Patterson's Curse (*Echium plantagineum*);
- St John's Wort (*Hypericum perforatum*);
- African Olive (*Olea europaea* L. subsp. . *cuspidata*);
- Scotch Broom (*Cytisus scoparius*); and
- Serrated Tussock (*Nassella trichotoma*).

6.6.2 Treatment and timing

Despite the removal of all weeds from Centennials Western Operation sites being the desired outcome, there are limitations regarding the extent to which this can be achieved. A realistic approach involves controlling and suppressing weed species, thus providing a better opportunity for native flora to germinate, grow and establish dominance. Priority will be given to weed species listed as Priority weeds under the *Biosecurity Act 2015*, or Weeds of National Significance (WoNS). Specific treatment and timing requirements are provided in the appended BMPs.

Weed management will be conducted by appropriately trained personnel, with particular knowledge of the weed removal processes required in sensitive areas (such as adjacent to drainage lines, EECs etc.).

6.6.3 Inspections and reporting

Centennial operations complete site inspections considering weed removal programs to manage weed outbreaks. Weed abundance will inform the management actions to be undertaken.

6.7 Pest management

6.7.1 Pest species in the region

Introduced species pose direct and indirect threats to native fauna either through predation or competition. Pests such as the feral European rabbit (*Oryctolagus cuniculus*) and feral goat (*Capra hircus*) pose intense ecological threats towards native flora through herbivory (both species) and ground compaction (goats). Their management is important for the protection of native flora, particularly post-rehabilitation works.

Pest species such as the European fox (*Vulpes vulpes*), feral dogs (*Canis lupus familiaris*) and feral cats (*Felis catus*) pose a threat to native fauna species, particularly small mammals, birds and reptiles. Their management is important for maintaining current fauna populations and encouraging recolonisation into rehabilitated areas.

Predation by the European fox and feral cat is listed as a KTP under the BC Act, along with competition and grazing by the European rabbit and feral goat.

6.7.2 Treatment and timing

The control of feral species will only be conducted by suitably trained personnel using several management techniques employed over an extended period of time. Typical management actions for pest species on Centennial's western operations include, but are not limited to:

- Inspections by Centennial personnel or a pest management specialist to detect pest species diversity and abundance on site;
- Sightings of pest species to be notified to the site's Environmental Coordinator;
- 1080 baiting for rabbits, cats and foxes;

- Destruction of rabbit warrens;
- Trapping and removal program for feral cats;
- Maintaining a clean, rubbish free environment as to not attract feral species scavenging; and
- Restriction of domestic species on Centennial sites.

Site-specific management measures for feral and pest species control are detailed in site-specific Appendix.

6.7.3 Inspections and reporting

Centennial will implement pest and feral species management programs in accordance with site specific BMPs. Ongoing monitoring for each site will include recording the extent and location of pest species occurrence, the type of species found and their approximate density. This information will inform the particular actions required to manage pests and protect threatened flora and ecological communities.

6.8 Biodiversity Offsets

Biodiversity offsets are measures that benefit biodiversity by compensating for the adverse impacts elsewhere of an action. They help achieve long-term conservation outcomes where development and infrastructure projects are likely to impact biodiversity. Biodiversity offsets work by protecting and managing biodiversity values in one area in exchange for impacts on biodiversity values in another.

Biodiversity offsets in Centennial's western operations areas will be managed in accordance with the relevant current Government biodiversity policy requirements.

The Western Region Biodiversity Offset Strategy has been approved for the following projects

- Western Coal Services (SSD-5579) in accordance with Condition 25 of Schedule 3;
- Angus Place Coal Mine (MP06_0021) in accordance with Condition 24B of Schedule 3;
- Clarence Coal (DA504-00) in accordance with Condition 12A of Schedule 3;
- Springvale Coal Mine Extension (SSD-5594) in accordance with Condition 15 of Schedule 4; and
- Springvale Water Treatment Facility (SSD-7592) in accordance with Condition 7 of Schedule 3.

6.8.1 Commonwealth (EPBC Act) Offsets

Under the EPBC Act biodiversity offsets are required for activities or developments which result in unavoidable impacts to matters of national environmental significance. Offsets must be targeted to the aspect of the environment that is being impacted. Principles for the use of biodiversity offsets for EPBC Act matters are outlined in the *Environmental Offsets Policy* (DSEWPaC, 2012).

6.8.2 NSW Biodiversity Offsets

At a state level, offsets for permanent and unavoidable impacts on biodiversity values are outlined under the *NSW Biodiversity Offsets Scheme*, which is underpinned by the BAM (DPIE 2020). The Biodiversity Offsets Scheme (BOS) was established under the *Biodiversity Conservation Act 2016* (BC Act). Under the BOS, applications for development or clearing approvals must set out how impacts on biodiversity will be avoided and minimised. The remaining residual impacts can be offset by the purchase and/or retirement of biodiversity credits or payment to the Biodiversity Conservation Fund.

6.9 Bushfire management

6.9.1 Objective

The objective of fire management within the western operations areas is to appropriately manage the risk of fire to protect life and property while providing the necessary protection of the significant ecological features of the area.

6.9.2 Treatment and Timing

Bushfire management with the Western operations area may include provisions for the following:

- Undertaking fire management to reduce grassy fuel in Asset Protection Zones (APZs);
- Establishing and maintaining APZs permanently around infrastructure and along the boundaries of the properties (including offset properties) as required under the NSW Rural Fire Services (RFS) document Planning for Bushfire Protection (RFS, 2019);
- Undertaking fuel reduction where appropriate by slashing or crash grazing in high-risk areas without damaging woodland regeneration in adjacent areas. APZ areas will be maintained relatively weed free and weeds within the APZ will be controlled to both manage fire risk and promote regeneration of native plants; and
- Maintaining tracks to enable access for fire-fighting purposes, particularly along property boundaries, to ensure the protection of life and property.

Under Section 63 of the *Rural Fires Act 1997*, owners and occupiers of land have a duty to take steps to prevent bushfires, which may include undertaking hazard reduction activities. A hazard reduction certificate is required prior to undertaking any mechanical or fire related hazard reduction activities.

To obtain a hazard reduction certificate the operation will contact the RFS. In the event that an adjoining land manager identifies a significant fire risk within the western operations area, Centennial will complete a fuel load assessment with RFS and if applicable, assess the feasibility of completing fuel load reduction burning with the RFS.

Low intensity, controlled burns in consultation with the RFS may need to be considered in non-operational areas to facilitate natural regeneration from the soil seed bank if natural recruitment levels are not sufficient in Centennial's biodiversity offset and regeneration areas.

Bushfire management controls will consider the locations of known records of threatened species (particularly orchids) and threatened ecological communities and attempt to exclude fire from these areas to ensure persistence of these ecological features following the event.

6.9.3 Inspections and reporting

Monitoring of APZs in the mining lease areas and fuel levels in offset areas will take place as required, for the period of management for the site by Centennial or a suitably qualified contractor engaged by the Environmental Coordinator.

6.9.4 Liaison with National Parks and Wildlife Service

The Gardens of Stone State Conservation Area Plan of Management has been developed by NSW National Parks and Wildlife Service (November 2022).

Any activities within the Gardens of Stone State Conservation Area and Mugii Murum-ban State Conservation Area will be undertaken by or in consultation with the NSW National Parks and Wildlife Service.

6.10 Public access management

Unsecured entrance points to the management areas increase the risk of unauthorised persons/vehicles accessing management areas and exposes the area to rubbish dumping, vandalism/arson, vehicle track damage and pest animal movements. In accordance with relevant consent conditions, all known site access points should be maintained to restrict public access into the management areas. All informal tracks should be closed where possible to prevent public access including pedestrians, motor bikes, and 4WD vehicles. Areas restricting unauthorised persons should be clearly demarcated through appropriate signage.

6.11 Corrective and preventative actions

Both Contractors and Centennial employees will be involved in the implementation of corrective and preventative actions.

6.11.1 Non-conformances and corrective actions

Any biodiversity non-conformance will be detected through a verification process such as monitoring, inspections, audits and receipt of complaints.

The process for managing biodiversity non-conformances is detailed in Figure 7.

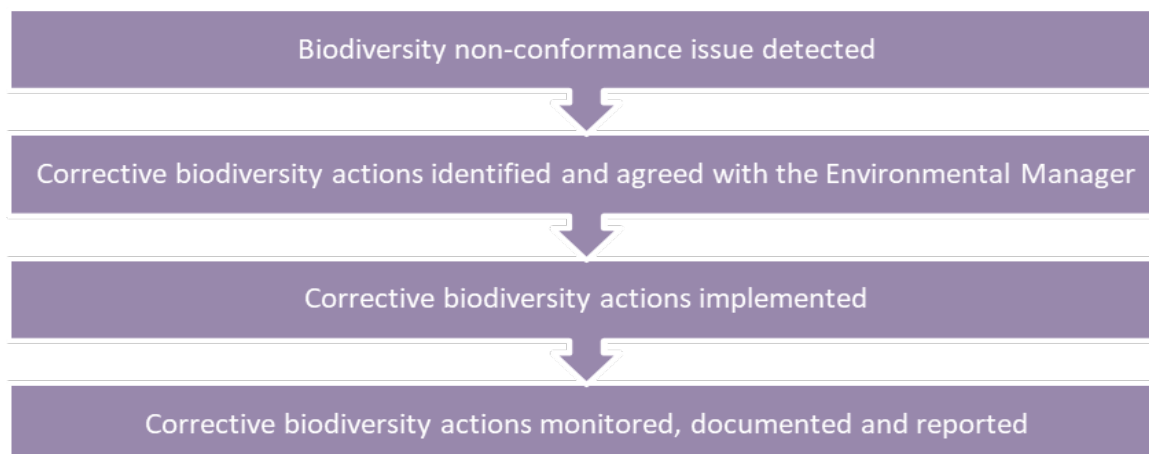


FIGURE 7. BIODIVERSITY NON-CONFORMANCE AND CORRECTIVE ACTION PROCESS

Non-conformance management will also include the following:

- The occurrence of incidents and receipt of a biodiversity related complaints
- Contractors will be notified immediately of any non-conforming activities/practices which present a biodiversity or environmental risk;
- Corrective action will include a full investigation and review of any relevant manuals, procedures and plans following identification of non-conformances;
- Where the non-conformance issue is associated with an inspection, audit or monitoring event, the actions will be linked to the record of that event;

Corrective actions are monitored, documented and reported as per the monthly reporting requirements in Section 7.3 with compliance reviewed through periodic inspections and audits as outlined in Section 8.2.

6.11.2 Preventative actions

Preventative actions will be managed as follows:

- Preventative actions may be identified without an environmental incident or non-conformance occurring;
- Preventative actions may be raised by either Centennial or a Contractor;
- Corrective actions will be identified and agreed before being implemented; and
- Preventive actions may include changes to procedures, the site-specific Appendix, training requirements or other management areas.

7 ENVIRONMENTAL MANAGEMENT

7.1 Roles and responsibilities

All employees and contractors carrying out work under the BMP must be familiar with the requirements of the plan and comply with it in full. All personnel will be provided with appropriate instruction and training to possess the necessary skills and knowledge to competently perform their roles and to be aware of the associated hazards and risks. All employees and contractors are required to complete an environmental induction prior to working on-site that addresses the hazards and risks associated with the biodiversity management system.

As required by ISO 14001, the General Manager Environmental Social Governance has the responsibility and appropriate authority to:

- Ensure that EMS requirements are established, implemented and maintained generally in accordance with ISO 14001;
- Report on the performance of the EMS to senior management for review and as a basis for improvement of the system; and
- Update personnel on changes in environmental legislation, policy and guidelines and to notify each site's management team and other relevant staff of changes that may significantly affect the operations.

On an operational scale the management of biodiversity related issues, including identifying the role of other personnel and system overview, are the responsibility of the Environment and Community Coordinator under the direction of the Mine Manager at each site.

The key roles and responsibilities with respect to the management of biodiversity is provided in Table 13.

TABLE 13. ROLES AND RESPONSIBILITIES OF PERSONNEL INVOLVED IN THE BMP

Title	Position Description	Responsibilities
Mine Manager	This is the person nominated by Centennial to co-ordinate and manage the site	▪ Authorise environmental management strategies and plans. ▪ Compliance with the Environment and Community Policy. ▪ Provide resources to allow the identified environmental risk and community objectives be implemented. ▪ Provide resources for the site to ensure activities comply with this BMP ▪ Provide appropriate resources to check that activities are undertaken in accordance with this BMP ▪ Authorise and approve activities in accordance with this BMP ▪ Facilitate effective workforce consultation on changes to the BMP ▪ Understand the heritage requirements under the NSW Legislation ▪ Be aware that there is an immediate STOP WORK requirement for some situations outlined in heritage management flow charts and ensure there are procedures in place to secure the area for such situations.
Environment and Community Co-ordinator/ or equivalent role	This is the person nominated by Centennial to co-ordinate and manage environmental requirements in each respective operation	▪ Report environmental incidents which may cause environmental harm to the Group Environmental Manager. ▪ Read, understand, implement and ensure the practical applications of this BMP ▪ Ensure that a copy of this BMP is available onsite in addition to any other reports applicable to area of proposed works. ▪ Act and provide advice in a timely manner to all parties. Develop and implement EMS including strategies, plans and procedures. ▪ Liaise with regulators and the community concerning environmental matters. ▪ Reporting of environmental incidents as required to external and internal stakeholders.

		- Conduct environmental monitoring and auditing in accordance with approvals and management plans. - Coordinate compliance with environmental licences and approvals for the site. - Development and implementation of environmental training and inductions - Coordinate environmental and community activities in accordance with the BMP - Provide clear direction to all workers and contractors undertaking works under this BMP - Read, understand, implement and ensure the practical applications of this BMP - Act and provide advice in a timely manner to all parties - Understand the heritage requirements under the NSW legislation - Be aware that there is an immediate STOP WORK requirement for some situations outlined in heritage management flow charts and ensure that there are procedures in place to secure the area for such situations.
Onsite Personnel and Contractors Completing Works	Any individual undertaking surface disturbance within Centennial's western operations	- Provide clear direction to all workers and contractors undertaking works under this BMP - Understand the biodiversity requirements under the NSW legislation. Manage operations in an environmentally responsible manner. - Complete the procedure for surface disturbance - Report any incidents or community complaints to the Environment and Community Coordinator - Report all unauthorised clearing - Report all injured fauna - Take action to minimise the environmental impacts from site operations. - Undertake all workplace activities in accordance with this BMP - Comply with all instructions in accordance with this BMP - Be aware that there is an immediate STOP WORK requirement for some situations outlined in heritage management flow charts and ensure that there are procedures in place to secure the area for such situations.
Ecologist	An individual with appropriate tertiary qualifications and experience to undertake biodiversity monitoring and management activities	- Assist with the implementation of this BMP, as required. - Execute biodiversity monitoring program (field work, data collection and analysis and reporting). - Provide biodiversity advice in accordance with the relevant legislation - Pre-clearing surveys (prior to vegetation clearing works) - Tree felling supervision and fauna capture, rescue, treatment and/or relocation (as required)

7.2 Emergency response

7.2.1 Environmental incidents

All environmental incidents will be managed in accordance with the relevant sites-specific Incident Management Protocol or equivalent. Incidents relating to biodiversity may include but are not limited to:

- Impacts on threat-listed species and vegetation;
- Injury to native fauna;
- Clearing of vegetation beyond clearing limits; and
- Introduction and establishment of weed and pest infestations.

7.2.2 Emergency contacts

Emergency contacts relevant to biodiversity management are summarised in Table 14.

TABLE 14. EMERGENCY CONTACTS

Site	Phone Number
Airly Mine	02 6359 2121
Angus Place Colliery	02 6354 8700
Charbon Colliery	02 6379 4255
Clarence Colliery	02 6353 8000
Lidsdale Siding	02 6355 9500
Springvale Mine	02 6350 1640
Western Coal Services	02 6355 9500

7.2.3 Environmental management system integration

The BMP and its associated procedures form part of Centennial's EMS. Compliance with the system's requirements is an expectation of all employees and contractors of Centennial.

7.3 Reporting

Reporting at Centennial involves a number of internal and external reporting procedures that comply with statutory and operational requirements. These include:

- Annual review;
- Environmental monitoring;
- Incidents;
- Complaints; and
- Community Consultative Committee (CCC).

Reporting requirements associated with subsidence are outlined in extraction plans/SMP.

7.3.1 Annual review

Each site prepares an Annual Review (previously an annual environmental management report) that reviews the performance of operations against the requirements of the BMP. The annual review typically includes the following elements specific to biodiversity management:

- Any amendments to licensing or statutory approvals;
- A summary of any complaints or incidents relating to the performance of the biodiversity management system over the reporting period;
- A summary of the monitoring results collected over the reporting period and assessment against any relevant criteria;
- An evaluation of any trends in the monitoring results occurring across the site over the life of the operation;
- Any non-compliance recorded during the reporting period and the actions taken to ensure compliance;

- Identification of any discrepancies between the predicted and actual impacts of operations and an analysis of the potential cause of any significant discrepancies; and
- A summary of the management actions to be implemented over the next year to improve the environmental performance of the site.

7.3.2 Environmental monitoring

Subsequent to completion of the biodiversity monitoring events a Biodiversity Monitoring Report will be prepared. The report will outline the methods used in the collection of field data and statistical analysis, present survey results and provide a discussion of general trends and conclusions.

7.3.3 Incident reporting

Any incident which occurs within a site boundary or is associated with Centennial's Western operations must be reported by the employee or contractor who has been associated with or witnessed the incident. The method for reporting incidents is outlined in each site's development consent, Pollution Incident Response Management Plan and Centennial's Incident Reporting Procedure.

7.3.4 Complaints

In accordance with the requirements of Environmental Protection Licences (EPL's), each site must keep a record of any complaints made to Centennial or any employee or agent of Centennial in relation to pollution arising from any site activities and is outlined in the site EMS.

7.3.5 Community Consultative Committee

The CCC meets on a regular basis for each of the operations. Some of the information reported at the CCC at a site scale includes:

- Progress at the mine;
- Operational issues;
- Monitoring and environmental performance; and
- Community complaints and the response to complaints.

7.4 Training

Personnel are to be provided with instruction and training to ensure the necessary skills and knowledge to competently complete required tasks, with awareness of the potential environmental hazards and risks.

Environment and community information and training is typically communicated to staff and contractors in the following ways:

- Induction training for new staff, contractors and visitors;
- Training in specific environmental roles (e.g., emergency response);
- Refresher training; and
- Toolbox training.

7.4.1.1 Environmental induction

New employees and contractors are required to complete an environmental induction that outlines the hazards and risks associated with the biodiversity management system on that site.

7.4.1.2 Timing

All Centennial employees and contractors will be inducted prior to commencing work onsite.

Visitors to Centennial western operations will undertake a brief visitor induction upon arrival at the site, with an awareness section on the following key environment components:

- The importance of Centennial's Environmental Policy;
- Regulatory requirements;
- Roles and responsibilities and
- General Environmental procedures.

Due to the extensive and varied nature of works conducted within the mine site project specific requirements will be communicated to relevant personnel rather than the standard mine operations induction.

7.4.1.3 Targeted environmental training

Targeted environmental training of key staff, workforce and contractors in environmental procedures and programs will be conducted as specified but not limited to the relevant operational business plan. Specific environmental training may be delivered in the form of toolbox talks, training and assessment packages and accredited training programs to update personnel on the relevant Centennial procedures and environmental programs.

8 REVIEW

8.1 Continual improvement of performance

Centennial will investigate and implement ways to improve the environmental performance of operations over time. This will be achieved through the effective application of best practice principles to mining operations where cost effective and practicable. Centennial will continue to improve on the biodiversity management performance of each site with progress to be monitored.

- Continual improvement of environmental performance shall be achieved through:
- Environmental monitoring;
- Monthly environmental operations meetings;
- Risk assessments;
- Compliance audits;
- Environmental inspections;
- Communication with stakeholders;
- Implementation of corrective and preventative actions; and
- Progress against objectives and targets and site environmental and community management commitments.

8.2 Environmental auditing

Centennial environment personnel conduct site inspections to assess compliance and performance against environmental requirements.

The development consent for each site within the western region specifies the requirements for external independent environmental audits. Audits will occur as required under the consent of each operation.

8.2.1 Biodiversity Management Plan review

The measures outlined by this BMP are to be enacted, reviewed and updated in accordance with the operations EMS Management Review or as a result of:

- Any regulatory or statutory requirements;
- Any significant change to biodiversity management practices;
- Development of any new open cut or underground mining projects;
- Submission of an incident report to DPHI;
- Within 3 months of submission of an Annual review;
- Submission of an Independent Environmental Audit; and
- Modification to development consent conditions.

8.3 Document control

Centennial will ensure that this BMP is readily accessible to Centennial employees and contractors. It is the responsibility of all Environment and Community Coordinators to ensure that revised editions of this document are made readily accessible to all on-site Centennial employees and contractors. The revision procedure involves:

- BMP will be updated as necessary. Noting that the BMP was developed as a consolidated approach across the western sites. Any changes made to the BMP for each site will be site specific due to decoupling of the RBMP;

- Each version of the updated BMP will be clearly dated, with the version of the report noted. The updated version of the BMP may be issued to stakeholders for comment;
- Updated version of the BMP will be returned to each nominated Environment and Community Coordinator; and
- The most current version of the BMP will be made readily available to all employees and contractors via electronic means.

9 REFERENCES

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- Underwood, 2012, Beyond BACI: the detection of environmental impacts on populations in the real but viable world. Experimental. Marine. Biology. Ecology, Vol 161, pp.145-178

Appendix A.

Document History, Consultation Log and Consultation Comments

Table 1. WR BMP TITLE BLOCK

WR BMP Document Details	Title:	Western Region Biodiversity Management Plan
	Applicant:	Centennial Coal Pty Limited
	Current revision:	8.0 (Centennial)
	Previous revisions:	2.0, 3.0, 4.0, 5.0 (RPS), 6.0 & 7.0 (SLR)
	Original version:	1.0 (GHD)

Table 2. WRBMP DOCUMENT CONTROL

WRBMP Approval and Revision Details	Rev No	Trigger	Details of Change	Status
	1	SSD-5594 and SSD-5579 Approval	Document Developed to satisfy Springvale Mine SSD-5144 and Western Coal Services SSD-5579	Submitted for approval in November 2016
	2	SSD-5581 Approval	Revision to incorporate Airly Mine SSD-5581	Submitted for approval in April 2017
	3	DPE MP Review RFI & inclusion of Clarence DA PA 504-00, Charbon PA 08_0211 and Lidsdale Siding PA 08_022.	Address DPE Feedback received on Airly Mine SSD-5581 and Springvale Mine SSD-5144. Incorporation of Clarence DA PA 504-00, Charbon PA 08_0211 and Lidsdale Siding PA 08_022. Address requirements satisfied by the approval of the Coxs River Catchment Improvement and Land Management Plan and Western Region Biodiversity Offset Strategy	Submitted for approval in September 2019
	4	Airly IEA	Resubmitted following Airly IEA	Submitted for approval in September 2021
	5	DPE MP Review and RFI	Address DPE Feedback following submission of Rev 4.	Submitted for approval in June 2022

	6	DPE RFI & WCS Mod 4	Address DPE Feedback following submission of version 5 and for Modification 4 of the WCS Consent	Submitted for approval in February 2023
	7	DP&E & BCD Feedback	Updated to address BCD feedback on the management plan.	Submitted for approval in July 2023
	8	DPI&E Feedback	Updated to address DPHI feedback on 18 November 2024 and to decouple from the regional plans.	Submitted as V1 of Site BMPs in April 2025

Table 3. Consultation Log

Date	Description of Consultation
9 November 2016	Letter seeking review and comment sent to: - Central Tablelands Local Land Services; - Department of Environment and Energy (DoEE); - Forestry Corporation; and - Office of Environment and Heritage (OEH).
24 November 2016	Feedback received from Forestry Corporation on the RBMP.
9 December 2016	Feedback received from OEH on the RBMP.
16 December 2016	Revised RBMP sent to DP&E seeking approval.
22 February 2017	Letter seeking review and comment sent to NSW National Parks and Wildlife Service (NPWS).
14 March 2017	Meeting with NPWS and OEH (Threatened Species).
31 March 2017	Letter seeking review and comment sent to - OEH; - DoEE; and - NPWS.
13 April 2017	Feedback received from OEH on the RBMP.
28 April 2017	Revised RBMP sent to DP&E seeking approval.
9 June 2018	Letter received from DPE providing feedback on Airly and Springvale.
23 April 2019	Approval received from DPE of the Western Region Biodiversity Offset Strategy.
3 September 2019	Revised RBMP sent to DP&E seeking approval.
18 October 2021	The Department requests that Centennial Coal undertakes contemporary consultation with the relevant agencies in accordance with the conditions of consent for each site to which the BMP relates. These agencies include: - NSW Biodiversity, Conservation and Science Directorate; - Department of Agriculture Water and the Environment; - Forestry Corporation NSW; and - Central Tablelands Local Land Services. The Department also requests that once the BMP is revised to include agency feedback, the revised BMP be submitted to the Department for a detailed review. We understand that this consultation process will take some time and request that the revised BMP be submitted by 30 April 2022.

08 April 2022	Revised draft BMP submitted to the following agencies for consultation prior to submission to the Department on 30 April 2022: ▪ NSW Biodiversity, Conservation and Science Directorate; ▪ Department of Agriculture Water and the Environment; ▪ Forestry Corporation NSW; and ▪ Central Tablelands Local Land Services.
14 April 2022	Email received from BCS stating that they are unable to review the RBMP before 29 April, and will not be providing feedback on this version of the plan.
27 April 2022	Feedback received from DAWE.
29 April 2022	Western Region Biodiversity Management Plan v5 submitted to DP&E for approval.
13 May 2022	Request for additional information received from DP&E.
13 February 2023	Request for additional information received from BCS
18 July 2023	Western Region Biodiversity Management Plan v7 submitted to DP&E for approval.
18 November 2024	Request for additional information received from Department of Planning, Housing and Infrastructure (DPH&I)

Table 4. Consultation Comments

Description of Consultation	How Addressed in Management Plan
Letter from Forestry Corporation NSW 24 November 2016	
Section 4.8 Bushfire Management should identify if any operations are planned to occur on State Forest, consultation will occur prior to works with State Forests.	Section 4.8 of the BMP has a new heading "Liaison with the Forestry Corporation and National Parks and Wildlife Service". Text under the heading specifies Forestry Corporation should be notified of any hazard reduction works on the Newnes Plateau prior to works being undertaken, seeking their comment. Text under the heading specifies work on the Mugii Murum-ban State Conservation Area will be undertaken with the NSW National Parks and Wildlife Service.
Letter received from OEH 9 December 2016	
The monitoring objective be reworded to, the objective of monitoring is to determine the level of impacts on biodiversity and ensure mitigation measures are effective.	Section 6.4 Biodiversity Monitoring text has been updated to copy requested wording. Requested wording has also been inserted in Section 6.4.1 Objectives.
Additional underlying documents such as the relevant management standards be included as appendices to the RBMP.	All documents required by conditions of development consent have been included within this BMP. Centennial's internal management document Permit to Disturb has not been distributed to external agencies. Centennial has removed the reference to other internal management plans that are not required by conditions of development consent.
The discussion referring to Native Vegetation Assessment Tool for the NSW Property Vegetation Planning System be changed to instead refer to the BioBanking Assessment Methodology.	Following commencement of the Biodiversity Conservation Act 2016 the section is considered redundant.

Description of Consultation	How Addressed in Management Plan
The flora monitoring methodology should be updated and be consistent with the Biodiversity Assessment Method (BAM) once it is operational under the Biodiversity Conservation Act 2016.	Section 6.4.4 Monitoring Methods stipulates the BAM.
Table 4-3 be updated to refer to the above minimum survey requirements.	OEH minimum survey requirements have been updated following implementation of the BAM.
The RBMP should note whether invertebrates such as the Bathurst Copper Butterfly and Giant Dragonfly are to be monitored	The monitoring of the Bathurst Copper Butterfly and Giant Dragonfly are identified in site specific appendix for Springvale including the monitoring and management measures.
The RBMP to discuss monitoring of invertebrates.	A heading has been inserted in Section 6.4.4.12 "Invertebrate Monitoring" identifying monitoring will be undertaken as required.
References to "threat-listed" be changed to "threatened".	Wording of "threat-listed" changed to "threatened".
Springvale Mine's requirement for due diligence assessments for exploration drill holes be incorporated into the RBMP.	All of Centennial's operations must undertake due diligence assessments prior to surface works in accordance with Section 6.5, including exploration or environmental monitoring boreholes.
The Rehabilitation and Land Management sites to be included in the Western Region Biodiversity Offset Package as sub-plans rather than as "Biodiversity Offset Lands".	The Western Region Biodiversity Offset Strategy was approved by the DP&E on 24 April 2019. The implementation of conservation requirements is undertaken in accordance with the approved Strategy.
Copies of reports relating to the <i>Persoonia hindii</i> and Blue Mountains Water Skink monitoring and research programs be included with the RBMP and provided to OEH.	The Blue Mountains Water Skink Research and Monitoring Program design has been included as an Appendix to this Management Plan. For completed components of research components, an Appendix "Research Programs" is included with this Management Plan. This Appendix includes the monitoring outcomes of the first component of the <i>Persoonia hindii</i> research program. The finalisation of the <i>Persoonia hindii</i> research program is being undertaken with the NSW Royal Botanic Gardens in an Australian Coal Association Research Program. A description of the status of the monitoring programs and any further information is submitted with Annual Reviews.
E-mail received from OEH 13 April 2017	
Opportunities to share monitoring data and reporting were discussed, in particular: - reporting by OEH/NPWS on SOS projects which Centennial may reference in their annual reporting under the consent (i.e., for <i>Pultenaea</i> sp. 'Genowlan Point', and for the Heath EEC); and - monitoring data collected by Centennial that has obvious benefits to other SOS projects (e.g., <i>Prostanthera stricta</i>).	Centennial engaged with OEH to identify information that can be shared. The Airly site specific Management Plan "Consultation with NSW National Parks and Wildlife Service" incorporates sharing of information and data with OEH.
Utilising Centennial's change monitoring via drone technology for Genowlan Point was also discussed, especially for	Airly site specific Management Plan "Consultation with NSW National Parks and Wildlife Service" incorporates sharing of information and data.

Description of Consultation	How Addressed in Management Plan
monitoring change in the Heath EEC, and for cliff fall rates (of particular relevance to the Pultenaea).	
Feedback received from DPE 1 June 2018	
Where commitments are met through a reference to another management plan, it is recommended to either attach the plan or provide further description of how the matter will be managed.	The document has been updated to describe how matters managed through other management plans is addressed.
It is recommended that Section 6.0 be updated to be consistent with the requirements of Condition 6 of Schedule 6 of SSD_5594 (Revision of Strategies, Plans and Programs).	The trigger for review of the Management Plan has been updated in Section to include the RBMP will be reviewed following: ▪ submission of an incident report to DPE ▪ submission of an Annual Review ▪ submission of an independent Environmental Audit ▪ any modification to a consent
It is recommended that Attachment D be updated to include the outcomes of consultation with the government departments listed in the log and where in the document comments arising from consultation have been addressed.	Appendix A has been updated to reflect consultation. Appendix A Table 1 – Consultation and Table 2 – Consultation Comments describe how comments arising during consultation have been addressed.
It is recommended that the following wording (specifically the word “not”) be reviewed and amended: “Site Specific Management Measures - Description of the management measures identified within the consent or statement of commitments which are not required under this BMP and where they are to be addressed”.	Airly site specific Appendix wording changed removing “not”.
The management actions relevant to erosion, salinity and surface water management refer to the “Airly Water Management Plan”. Where commitments are met through a reference to another management plan, it is recommended to either attach the plan or provide further description of how the matter will be managed.	References to other Management Plans including water have been expanded in Section 0 Water Management of the BMP. The Airly site specific appendix in Management Measures identifies measures relevant to erosion, salinity and surface water management.
The management actions relevant to erosion, salinity and surface water management refer to the “Springvale Water Management Plan”. Management actions relevant to bushfire management refer to the “Springvale Bushfire Management Plan”. Where commitments are met through a reference to another management plan, it is recommended to either attach the plan or provide further description of how the matter will be managed.	References to other Management Plans including water have been expanded in Section 0 Water Management of the BMP. The Springvale site specific appendix in Management Measures identifies measures relevant to erosion, salinity and surface water management. Information regarding the Bush Fire Management Plan for Springvale is detailed in section 4.1.2 of Springvale BMP Appendix.

Description of Consultation	How Addressed in Management Plan
It is recommended the management actions be updated to describe “short, medium, and long-term measures” in accordance with Condition 17 (c) of Schedule 4 and “detailed performance and completion criteria” in accordance with Condition 17 (e) of Schedule 4.	The detailed performance and completion criteria are specified in Airly Mine Schedule 3 Condition 17 (c) relate to threatened species and ecological communities within the Mugii Murum-ban State Conservation Area with the exception of <i>Eucalyptus cannonii</i> . The addressing of performance measures for species within the Mugii Murum-ban State Conservation Area are provided in site specific measures of Airly BMP Appendix .
Feedback received from DAWE – 27 April 2022	
Recommend that the report be updated with direct hyperlinking of the referenced documents in the BMP. Without access to these documents, it is difficult to verify whether EPBC conditions have been addressed.	The documents for verification with EPBC or other conditions are publicly available at: https://data.centennialcoal.com.au/domino/centennialcoal/cc205.nsf/Published.xsp?site=&type=&date= Due to time constraints individual hyperlinks have not been provided for all documents. However, links to the specific documents that DAWE were having difficulty locating, have been provided to DAWE separately.
Additionally, there are a number of instances of typographical issues which would improve the document if addressed.	These have been addressed where appropriate in this updated document version.
Feedback received from DP&E (Biodiversity, Conservation and Science Directorate) 13 February 2023	
Trigger Action Response Plans should be included in the BMP for each Centennial western operation site	TARPs added to each site-specific BMP – see Appendices.
Potential conflicts between flora and fauna and cultural heritage be outlined in the BMP	Permit to Disturb to be prepared prior to any works within or adjacent to cultural heritage sites. Angus Place BMP has been updated accordingly.
Application of research program outcomes to management actions be included in the BMP	The <i>Persoonia Hindii</i> and <i>Caesia parviflora</i> var minor are supplementary offset measures outlined in the Approved Western Region Offset Strategy
Copies of all research reports for <i>Persoonia hindii</i> and <i>Caesia parviflora</i> var. minor be provided to BCS	Not required to be addressed in Management Plan
The BMP should include an appendix detailing Blue Mountains Water Skink research, results, and application	The Blue Mountains Water Skink management and research program is part of the Extraction Plan for Springvale Colliery (SSD 5594 S3 C10).
Copies of all research reports on Blue Mountains Water Skink should be provided to BCS	Not required to be addressed in Management Plan.

Appendix B.

Western Coal Services Site-Specific Appendix

1 OVERVIEW OF OPERATIONS

The Springvale Coal Services Site (SCSS) is a coal processing facility in the Western Coalfield of NSW located approximately 18 km north of Lithgow, as shown in Figure 1 and is part of the Western Coal Services (WCS) Project. The other components of the WCS Project include an overland conveyor system, the Kerosene Vale Stockpile Area and a system of private haul roads comprising Mount Piper Haul Road, Wallerawang Haul Road and a Link Haul Road between Mount Piper Haul Road and SCSS (Link Haul Road not yet scheduled for construction).

The SCSS currently operates under development consent SSD-5579 for the WCS Project. The SCSS receives coal from Springvale Mine by overland conveyor and provides coal storage, handling, and processing functions. Run of mine (ROM) coal is also transported by overland conveyor under SSD-5579 directly from Springvale Mine to Mount Piper Power Station (MPPS). Beneficiated (washed) coal is transferred by overland conveyor to Lidsdale Siding for export and domestically to MPPS.

1.1 STRUCTURE OF SCSS BIODIVERSITY SITE-SPECIFIC APPENDIX

This SCSS Site Specific Appendix has been prepared by RPS Australia East Pty Limited, and includes the following sections:

- **Biodiversity Consent Conditions**

The conditions of consent and statement of commitments are reproduced and identified where in this BMP they are addressed.

- **Baseline Data**

A description of baseline data for terrestrial ecology is presented including ecological communities, threatened ecological communities, habitat values, groundwater dependent ecosystems, flora, threatened flora, threatened fauna and aquatic ecology.

- **Management**

Identifies the following management types for management towards biodiversity outcomes: offset areas, operational areas, native vegetation and rehabilitation areas, areas of biodiversity significance and landscaping areas.

Management actions describes for each management area the management action, timing and frequency.

- **Site Specific Management Measures**

A description of management measures identified within the consent or statement of commitments not addressed under this management plan and where the management measures are be addressed.

- **Monitoring**

The ecological monitoring program to measure the effectiveness of management measures from Sections 3 and 4.

1.2 BIODIVERSITY CONSENT CONDITIONS

1.2.1 Development Consent

An extract of the Project Development Consent conditions and Statement of Commitments for SSD- 5579 relevant to the BMP are reproduced below in Table 1.

Table 1. Development Consent (SSD-5579)

Condition Number	Condition	Additional Comments / Addressed in Biodiversity Management Plan
OTHER DEVELOPMENTS ON THE SCSS		
Schedule 2 Condition 17	The Applicant must consult and engage with the proponents/applicants of other approved developments/projects on the SCSS, with the aim of maximising the outcomes of all developments/projects with respect to: biodiversity conservation.	Centennial has regular meetings with Energy Australia to discuss production, supply and environmental matters.
Biodiversity Offset Strategy		
Schedule 3 Condition 25	By the end of December 2016, the Applicant must, to the satisfaction of the Secretary.	
(a)	Provide an area that is suitable in its vegetation types and extent to satisfactorily offset the impacts of clearing 10.67 hectares of native vegetation (Coxs Permian Red Stringybark – Brittle Gum Woodland); and	The Western Region Biodiversity Offset Strategy identifies the impacted area from Western Coal Services are satisfied by the Carinya Lot 163 biodiversity offset site. Table 8 Credit Calculations identify the allocation of the credits at Carinya Lot 163. Table 16 Biodiversity Offset Ledger: Fauna Habitat/Ecosystem Credits provides the allocation by development consent condition for Western Coal Services Schedule 3 Condition 25. The Western Region Biodiversity Offset Strategy was approved by the Secretary on 23 April 2019.
(b)	Make suitable arrangements to manage, protect and provide long-term security for this area, consistent with the relevant NSW Offsets policy.	The Western Region Biodiversity Offset Strategy Section 4.1 Carinya Lot 163 identifies the securing mechanism for the site. A Conservation Agreement has been applied for to the Biodiversity Conservation Trust, in accordance with the requirements of OEH. Alternatively, Centennial is currently discussing with NSW NPWS for the transfer of the land to the Capertee National Park.
Additional Rehabilitation Initiatives		
Schedule 3 Condition 26	The Application must implement the Additional Rehabilitation Initiatives for the Lamberts Gully Creek catchment on the SCSS by the establishment and enhancement of locally endemic native vegetation species and improvement of fauna habitat values in the areas shown in Attachment 7, to the satisfaction of the Secretary.	The implementation of rehabilitation initiatives for the Lamberts Gully Creek Catchment on the SCSS Site will be completed through establishment and enhancement of locally endemic native vegetation species and improvement of fauna habitat. Site Specific Measures identifies that this is described in Section 4.1.1. The area as shown Attachment 7 of the SSD-5579 is replicated on Figure 4.
Riparian Habitat and Catchment Improvement Plan		
Schedule 3 Condition 27	The Applicant must prepare and implement a Riparian Habitat and Catchment Improvement Plan for the development to the satisfaction of the Secretary. This plan must;	A draft Riparian Habitat and Catchment Improvement Plan (RHCIP) was submitted to the Secretary for approval on 31 October 2017.
(a)	be prepared in consultation with Local Land Services, BCD, EPA and WaterNSW, and be submitted to the Secretary for	The RHCIP was developed in consultation with LLS, OEH, EPA and WaterNSW as identified in Appendix A and Appendix B of the RHCIP.

Condition Number	Condition	Additional Comments / Addressed in Biodiversity Management Plan
	approval by the end of October 2017;	
(b)	describe the measures that would be implemented to improve and maintain the riparian habitat of Wangcol Creek for at least 100 metres downstream of the proposed Link Haul Road bridge crossing of the creek;	The RHCIP Section 3.2.1 identifies the measures to implement and improve the riparian habitat of Wangcol Creek.
(c)	detail additional compensatory water quality and catchment improvement measures to the value of at least \$250,000 which must be undertaken prior to the commissioning of the Springvale Water Treatment Project; and	The RCHIP Section 3.2.2 identifies compensatory water and catchment improvement measures.
(d)	make arrangements to manage, protect and provide for the long-term security for the measures proposed to respond to (b) and (c) above.	The RCHIP Section 1.3 and 3 identifies arrangements to manage, protect and long-term security of (b) and (d).
Habitat for Threatened Fauna Species		
Schedule 3 Condition 28	The Applicant must ensure that the Biodiversity Offset Strategy and Additional Rehabilitation Initiatives areas, in combination, provide suitable habitat for threatened fauna species recorded on the SCSS, namely the: ▪ Brown Treecreeper; ▪ Gang-gang Cockatoo; ▪ Little Eagle; ▪ Scarlet Robin; ▪ Large-eared Pied Bat; ▪ Eastern Falsistrelle; ▪ Eastern Bent Wing bat; and ▪ Yellow Bellied Sheathtail Bat.	The Western Region Biodiversity Offset Strategy Section 4.1.3.3 Western Coal Services Habitat for Threatened Fauna Species demonstrates biodiversity offset site Carinya Lot 163 provides habitat for the listed species.
Biodiversity Management Plan		
Schedule 3 Condition 29	The Applicant must prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must:	This submission of this BMP to DPE is provided in Appendix A Consultation Log.
(a)	Be prepared in consultation with BCD and Forestry Corporation of NSW and be submitted to the Secretary by the end of December 2016.	Appendix A of the BMP outlines consultation undertaken with OEH and Forestry Corporation of NSW in 2016.
(b)	Describe the short, medium and long-term measures that would be implemented to:	Measures to manage and enhance the quality of existing vegetation and fauna habitat are addressed in the BMP Section 6.5 Surface disturbance activities. The section describes the procedure for all surface disturbance activities.

Condition Number	Condition	Additional Comments / Addressed in Biodiversity Management Plan
	Manage remnant vegetation and habitat on the Site; and	Management measures of this BMP identify the land management actions for the site including bush fire, weed management and water management.
	Implement the Biodiversity Offset Strategy.	Measures to be implemented for the Biodiversity Offset Strategy are specified in Section 4.1.3 Carinya Lot 163 of the Western Region Biodiversity Offset Strategy. The site has been secured and managed in accordance with a Conservation Agreement CA0292. The Department of Climate Change, Energy, the Environment and Water NSW Biodiversity Conservation Trust undertake inspections and Centennial completes routine reporting for CA0292.
(c)	Include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and triggering any necessary remedial action.	Performance and completion criteria for Carinya Lot 163 are listed in the Western Region Biodiversity Offset Strategy Table 19 for transfer to the Capertee National Park and Table 20 where managed under a Conservation Agreement.
(d)	Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3-year period following initial preparation of the plan) for: - Enhancing the quality of existing vegetation and fauna habitat; - Establishing native vegetation and fauna habitat in the Additional Rehabilitation Initiatives area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary); - Enhancing the landscaping of the Site and along public roads to minimise visual and lighting impacts, particularly along the Castlereagh Highway; - Protecting vegetation and soil outside the approved disturbance area; - Maximising the salvage of resources within the approved disturbance area – including tree hollows and vegetative and soil resources – for beneficial reuse in the biodiversity offset strategy; - Collecting and propagating seed; - Minimising the impacts to fauna on Site, including	Table 5 to Table 8, of the BMP identifies the measures for: - Landscape enhancement of the Site; - Management of salinity, weeds and feral pest, erosion, unauthorised access and bushfire risk; - Protection of surface disturbance outside approved areas and - Managing any potential conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives area and any Aboriginal heritage values (both cultural and archaeological); The RHCIP will contribute to the establishment of landscaping of the site and along public roads. Lighting audits completed by WCS with no actions related to impacts on the Castlereagh Highway. The development of a program is identified in Table 8 - Management Measures. The Western Coal Services Rehabilitation Management Plan (RMP) overlaps with this Biodiversity Management Plan. This document has been prepared to be consistent with the RMP. The Western Coal Services RMP address: - Collection of propagating seed; - Identification of potential conflicts between restoration works and Aboriginal cultural heritage sites; - Enhancing the quality of existing vegetation and fauna habitat; and - Establishing native vegetation and habitat in the additional rehabilitation initiatives area.

Condition Number	Condition	Additional Comments / Addressed in Biodiversity Management Plan
	undertaking pre-clearance surveys; - Managing any potential conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives area and any Aboriginal heritage values (both cultural and archaeological); - Managing salinity; - Controlling weeds and feral pests; - Controlling erosion; - Controlling access; and - Managing bushfire risk.	
(e)	Include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria.	Management Section and Monitoring Section of this Site-Specific BMP includes the management actions, timing of actions and monitoring of actions to demonstrate success. Detailed performance and completion criteria for rehabilitation areas are included in the Western Coal Services Mining Operations Plan.
(f)	Identify the potential risks to the successful implementation of the Biodiversity Offset Strategy and include a description of the contingency measures that would be implemented to mitigate against these risks.	High level potential risks for implementation of the Strategy were considered in the development of the previous Biodiversity Offset Strategy (2014) and during the assessment process for the Springvale Extension Project SSD 5594.
(g)	Include details of who would be responsible for monitoring, reviewing, and implementing the plan.	The Western Region Biodiversity Management Plan Section 7.1 Roles and Responsibilities identifies roles and responsibilities of those tasked with monitoring, reviewing and implementing the plan.
Conservation Bond		
Schedule 3 Condition 30	Within 6 months of the approval of the Biodiversity Management Plan, unless the Secretary agrees otherwise, the Applicant must lodge a Conservation Bond with the Department to ensure that the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond must be determined by: (a) calculating the full cost of implementing the Biodiversity Offset Strategy (other than land acquisition costs); and (b) employing a suitably qualified quantity surveyor to verify the calculated costs.	Section 4.1.3.2 of the Western Region Biodiversity Offset Strategy covers the conservation bond for Western Coal Services.

Condition Number	Condition	Additional Comments / Addressed in Biodiversity Management Plan																					
	If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond. If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works																						
Schedule 3 Condition 30A	Unless otherwise agreed by the Secretary, the Applicant must retire the relevant biodiversity credits specified in Table 10A, prior to commencing vegetation clearing for each MOD 4 element. The retirement of credits must be carried out in consultation with BCD and in accordance with the Biodiversity Offsets Scheme of the Biodiversity Conservation Act 2016. <i>Table 10A: Biodiversity credit requirements</i> <table><tr><th>Credit Type</th><th>MOD 4 element</th></tr><tr><td colspan="2">Ecosystem Credits</td></tr><tr><td rowspan="3">PCT 731 Broad-leaved Peppermint – Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion</td><td>DWP – A and Clean water diversion</td></tr><tr><td>DWP – B</td></tr><tr><td>Angus Place pipeline raw water offtake</td></tr><tr><td rowspan="4">PCT 1191 Snow Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion</td><td>DWP – A and Clean water diversion</td></tr><tr><td>SCSS/Regis Transfer System and SC</td></tr><tr><td>DWP - B</td></tr><tr><td>Angus Place pipeline raw water offtake</td></tr><tr><td colspan="2">Species Credit Species</td></tr><tr><td rowspan="2">Eucalyptus aggregate (Black Gum)</td><td>DWP – B</td></tr><tr><td>Angus Place pipeline raw water offtake</td></tr><tr><td rowspan="2">Paralucia spinifera (Bathurst Copper Butterfly)</td><td>DWP – A and Clean water diversion</td></tr><tr><td>DWP - B</td></tr></table> <i>Note: Retirement of credits must be completed for each MOD 4 element prior to the construction of each MOD 4 element in isolation. MOD 4 element 5A.</i>	Credit Type	MOD 4 element	Ecosystem Credits		PCT 731 Broad-leaved Peppermint – Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion	DWP – A and Clean water diversion	DWP – B	Angus Place pipeline raw water offtake	PCT 1191 Snow Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	DWP – A and Clean water diversion	SCSS/Regis Transfer System and SC	DWP - B	Angus Place pipeline raw water offtake	Species Credit Species		Eucalyptus aggregate (Black Gum)	DWP – B	Angus Place pipeline raw water offtake	Paralucia spinifera (Bathurst Copper Butterfly)	DWP – A and Clean water diversion	DWP - B	The Western Region Biodiversity Management Plan Section 6.8.2 outlines requirements surrounding biodiversity credits.
Credit Type	MOD 4 element																						
Ecosystem Credits																							
PCT 731 Broad-leaved Peppermint – Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion	DWP – A and Clean water diversion																						
	DWP – B																						
	Angus Place pipeline raw water offtake																						
PCT 1191 Snow Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	DWP – A and Clean water diversion																						
	SCSS/Regis Transfer System and SC																						
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Eucalyptus aggregate (Black Gum)	DWP – B																						
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Paralucia spinifera (Bathurst Copper Butterfly)	DWP – A and Clean water diversion																						
	DWP - B																						

1.3 STATEMENT OF COMMITMENTS

Appendix 8, Table 67 of the Consent (SSD-5579) outlines the following statement of commitments that pertain to this operation (Table 2).

Table 2. Statement of Commitments (SSD 5579)

Rehabilitation	Commitment	Addressed in Biodiversity Management Plan
Rehabilitation of the Springvale Coal Services Site is conducted in accordance with Industry Standards	Within six months of Project Approval a single Rehabilitation Plan will be prepared for the entire PAA in consultation with the Department and will include the timeframes provided within the EIS, details of the rehabilitation methods, monitoring and reporting framework. Results arising from the implementation of the program will be reported each year in the Annual Review (currently referred to as the AEMR).	The WCS Mining Operations Plan was submitted on 21/12/2015 and approved on 23/12/2015. The WCS Mining Operations Plan (MOP) was developed in consultation with DRE and DP&E. The WCS MOP was revised and resubmitted with approval received in 2018. Western Coal Services now implement Rehabilitation Management Plan (RMP) has been prepared in accordance with the NSW Resources Regulator's Form and Way: Rehabilitation Management Plan (RMP), as associated with the Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021.
	The rehabilitation program will include previous commitments from the Lamberts Gully Project Approval (06-0017) including <i>Eucalyptus cannonii</i> .	Section 3.2.5 of the WCS MOP identifies the seeding mix will include <i>Eucalyptus cannonii</i>. Seed mix will be collected within the vicinity of the SCSS where feasible. Section 6.2.5 of the 2024 Rehabilitation Management Plan additionally references this requirement.

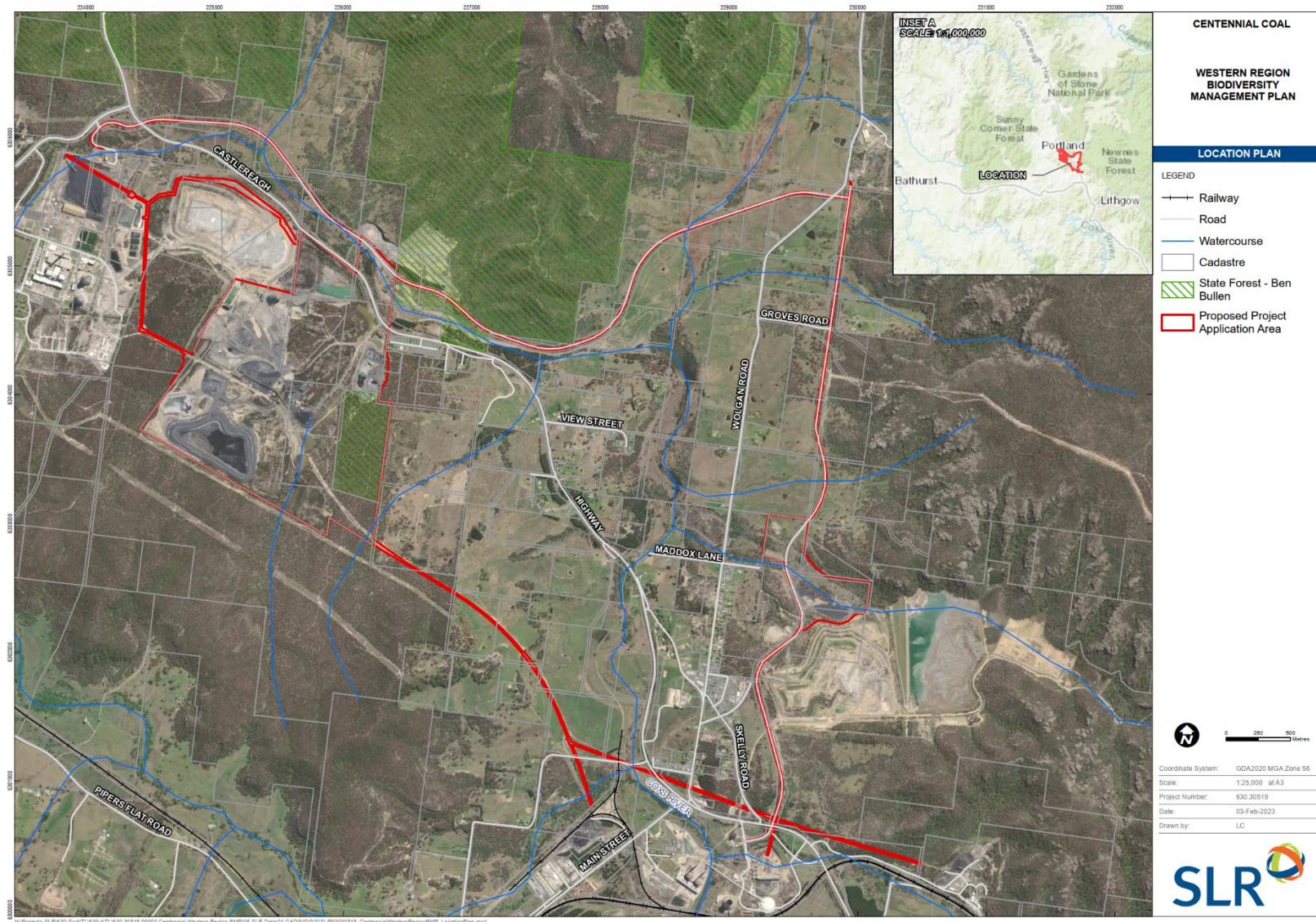


Figure 1. Location Plan

2 BASELINE DATA – TERRESTRIAL ECOLOGY

2.1 HABITAT VALUES

Vegetation within the SCSS is classified into two fauna habitat types including:

- Sclerophyll Woodland/forest; and
- Cleared/disturbed areas.

Vegetated habitat types comprise woodlands and open forests, hollow bearing trees, ground timber, flowering/fruited vegetation and vegetation structures for shelter or foraging (e.g., groundcover and leaf litter).

2.2 ECOLOGICAL COMMUNITIES

Native vegetation cover comprising three native vegetation communities and regenerating or cleared lands was mapped within the SCSS area, as shown in Table 3 and Figure 2. Listed conservation status under the *Biodiversity Conservation Act 2016* (BC Act) is identified.

Table 3. Table 3: Ecological Communities

MU	PCT	Vegetation Map Unit Number (MU)/ Description (DEC 2006) and listing status	(ha)
11	1100	MU 11: Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest	9.65
15	677	MU 15: Tableland Hollows Black Gum – Black Sally Open Forest	0.56
37	1093	MU 37: Coxs Permian Red Stringybark – Brittle Gum Woodlands	57.24
59	-	MU 59: Non-native Vegetation – Pine plantation / woodlot / shelter	1.24
-	-	Planted/Regenerating Vegetation	71.73
-	-	Phragmites Wetland	1.99
-	-	Sub-Total (Vegetated)	142.41
-	-	Cleared/Disturbed (water management, REA, Kerosene Vale Stockpile, existing conveyors, private roads, car parks and buildings)	154.3
		Total	296.71

Of the above vegetation communities, MU 11 and MU 15 are commensurate with *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions* endangered ecological community (EEC) listed under the BC Act. A total of 296.71 ha of land is included within the SCSS. Table 3 identifies all categorised land areas. Reject Emplacement Area (REA) has been constructed following the issue of SSD 5589.

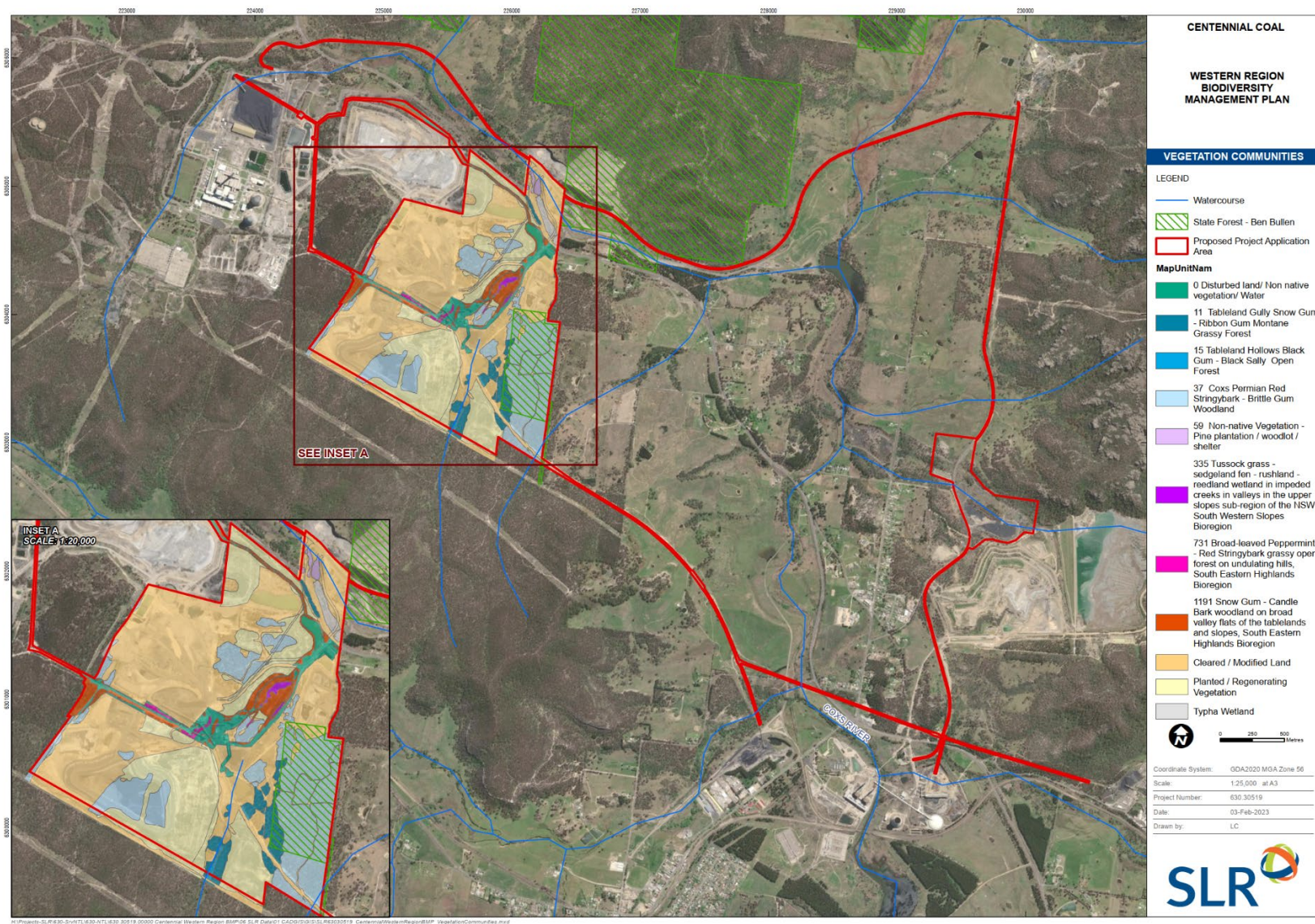


Figure 2. Vegetation Communities

2.3 THREATENED FLORA

A total of 118 flora species were detected within the SCSS during surveys. One threatened flora species was detected within a section of MU 15 Tableland Hollows Black Gum – Black Sally Open Forest in the SCSS (Figure 3) during surveys conducted for the impact assessment and subsequent modifications:

- *Eucalyptus aggregata* (Black gum) listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and BC Act.

Operational activities are not identified as having an impact on this species.

2.4 THREATENED FAUNA

A total of 50 fauna species were detected within the SCSS during surveys. Eight threatened fauna species were detected during surveys in 2010, 2011 and 2012 and during subsequent modifications (Figure 3), as listed in Table 4 below.

Table 4. Threatened Fauna Species

Scientific Name	Common Name	BC Act	EPBC Act
<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable	-
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	-
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Vulnerable	-
<i>Petroica boodang</i>	Scarlet Robin	Vulnerable	-
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Vulnerable	-
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	Vulnerable	-
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	-

2.5 AQUATIC ECOLOGY

According to government mapping, a number of Key Fish Habitat (KFH) occur within the lease boundaries (i.e., Coxs River, Wangcol Creek, and the two sub-catchment drainages to Wangcol Creek). Numerous dams exist in the lease boundaries and ultimately discharge at Licensed Discharge Point (LDP) 006 near the entrance to the lease boundary, on Castlereagh Highway, into Wangcol Creek.

Watercourses in the vicinity of WCS Project are located within the upper Hawkesbury River catchment, which includes the greater Warragamba Dam catchment and the upper Coxs River sub-catchment. The Coxs River is a perennial river that drains a catchment area of approximately 1,700 km² and is part of the greater Hawkesbury/Nepean catchment.

The river rises within the Ben Bullen State Forest east of Cullen Bullen and flows generally in a south-east direction into Lake Burragorang (impounded by Warragamba Dam), which is the primary reservoir for drinking water supply to Sydney.

The flow in Coxs River is regulated by three reservoirs, Lake Wallace, Thompsons Creek Reservoir and Lake Lyell, which are used to supply water for power generation activities at Mount Piper Power Station.

The SCSS is located within the Wangcol Creek catchment. This creek is a highly modified stream that drains into the Coxs River approximately 3 km to the east of SCSS.

Wangcol Creek has also been diverted to assist in mining land uses historically.

The runoff from the SCSS concentrates into two natural watercourses, Huon Gully to the west and

Lamberts Gully to the east.

The hydrology of the Site has been significantly changed due to historical open cut and underground mining and related activities.

The natural watercourse in Huon Gully now terminates in a surface water storage, Huon Gully sediment pond 1 (SHG1), as the gully has been disturbed by open cut mining and lower down filled by the MPPS ash emplacement area.

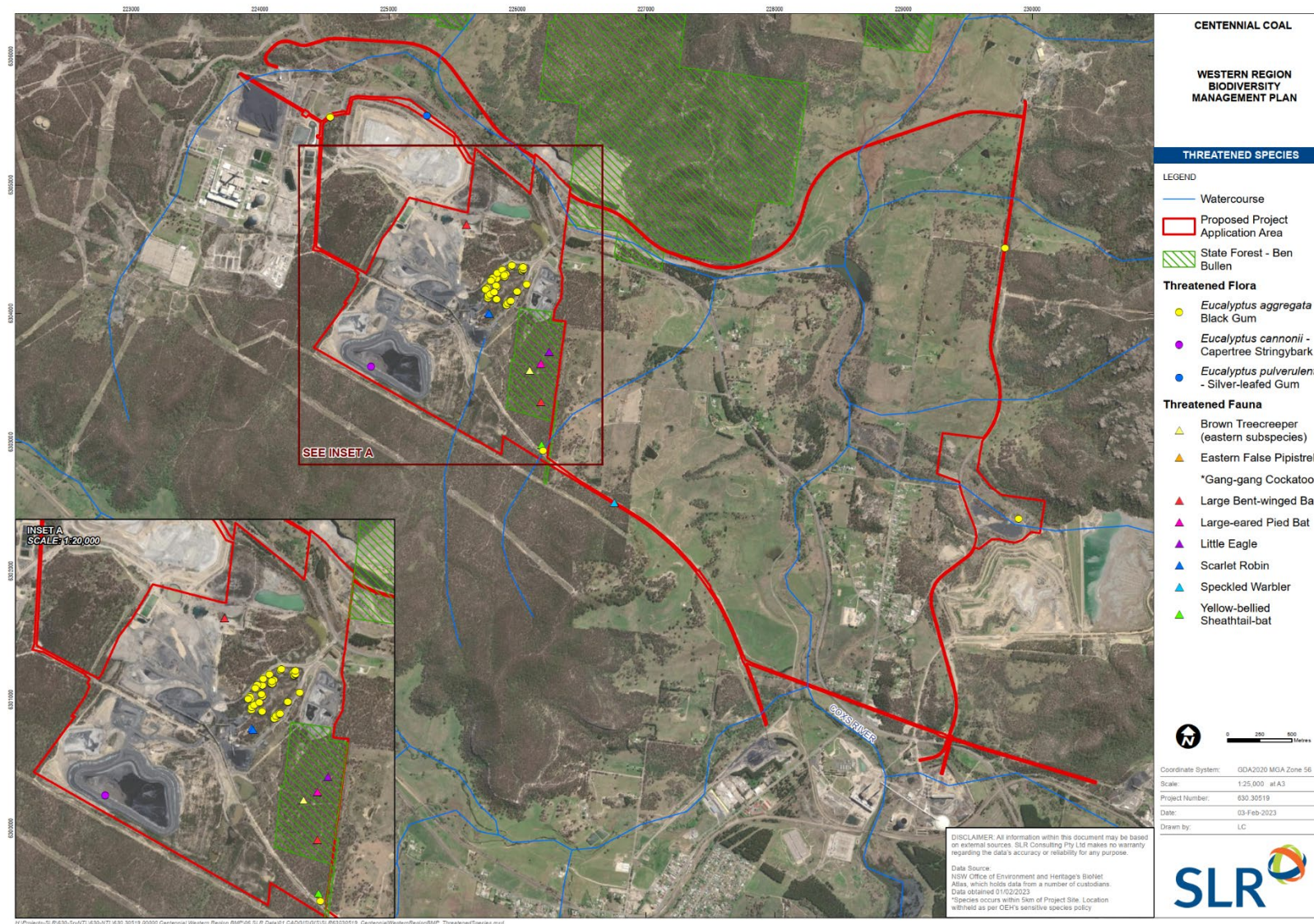


Figure 3. Threatened Species

3 MANAGEMENT ZONES

Management areas are based on operational activities, vegetation type and proposed management objectives. Management areas are summarised below and are shown in Figure 4 and actions presented in Table 5 to Table 8.

3.1 OPERATIONAL AREAS

The management objective for operational areas is to manage environmental values to maintain biodiversity values in accordance with relevant approvals.

Operational areas include the REA, washery, workshops, coal conveyor system, private haul roads and other infrastructure. Biodiversity management within operational areas will be restricted during operational activities due to the absence of vegetation and the impracticality of conducting surveys or management actions within an active coal handling and processing plant. Management activities are restricted to:

- Bushfire management;
- Manage salinity;
- Manage erosion;
- Surface water management;
- Access management; and
- Pre-clearance surveys for vegetated areas proposed to be cleared for surface infrastructure.

At the cessations of operational activities, rehabilitation measures will be implemented in accordance with final landforms consistent with relevant approved mine closure plans.

3.2 AREAS OF BIODIVERSITY SIGNIFICANCE

The management objective for areas of biodiversity significance is to undertake management, as required, to maintain compliance with the Development Consent and maintain biodiversity values where possible.

This management area encompasses areas of biodiversity significance such as threatened flora, threatened fauna habitat and EECs situated within Centennial owned lands, including:

- *Eucalyptus aggregata*; and
- *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland* EECs.

These areas require the following measures:

- Weed management;
- Pest management;
- Collecting and propagating seed of *Eucalyptus aggregata*;
- Monitoring of *Eucalyptus aggregata* and *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland* EEC to document condition and extent and prevent potential impacts from mining related activities.

3.3 NATIVE VEGETATION AND REHABILITATION AREAS

The management objective of the native vegetation and rehabilitation management areas is to maintain or improve environmental biodiversity values.

These areas are defined as native vegetation and rehabilitation areas within Centennial owned lands that do not constitute an offset or areas of biodiversity significance. To enhance areas of existing remnant vegetation the following management measures are required:

- Weed and pest management;
- Management of conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives Area and cultural heritage issues;
- Introduction of naturally scarce fauna habitat features i.e., ground hollows;
- Active vegetation establishment;
- Manage rubbish;
- Manage salinity;
- Manage erosion; and
- Access restrictions.

3.4 LANDSCAPED AREAS

The following measures are required to achieve this objective:

- Landscaping along the Site entry and along all public roads with native species.

The objective of the landscaped areas is to minimise visual and lighting impacts surrounding the operations area, particularly along Castlereagh Highway.

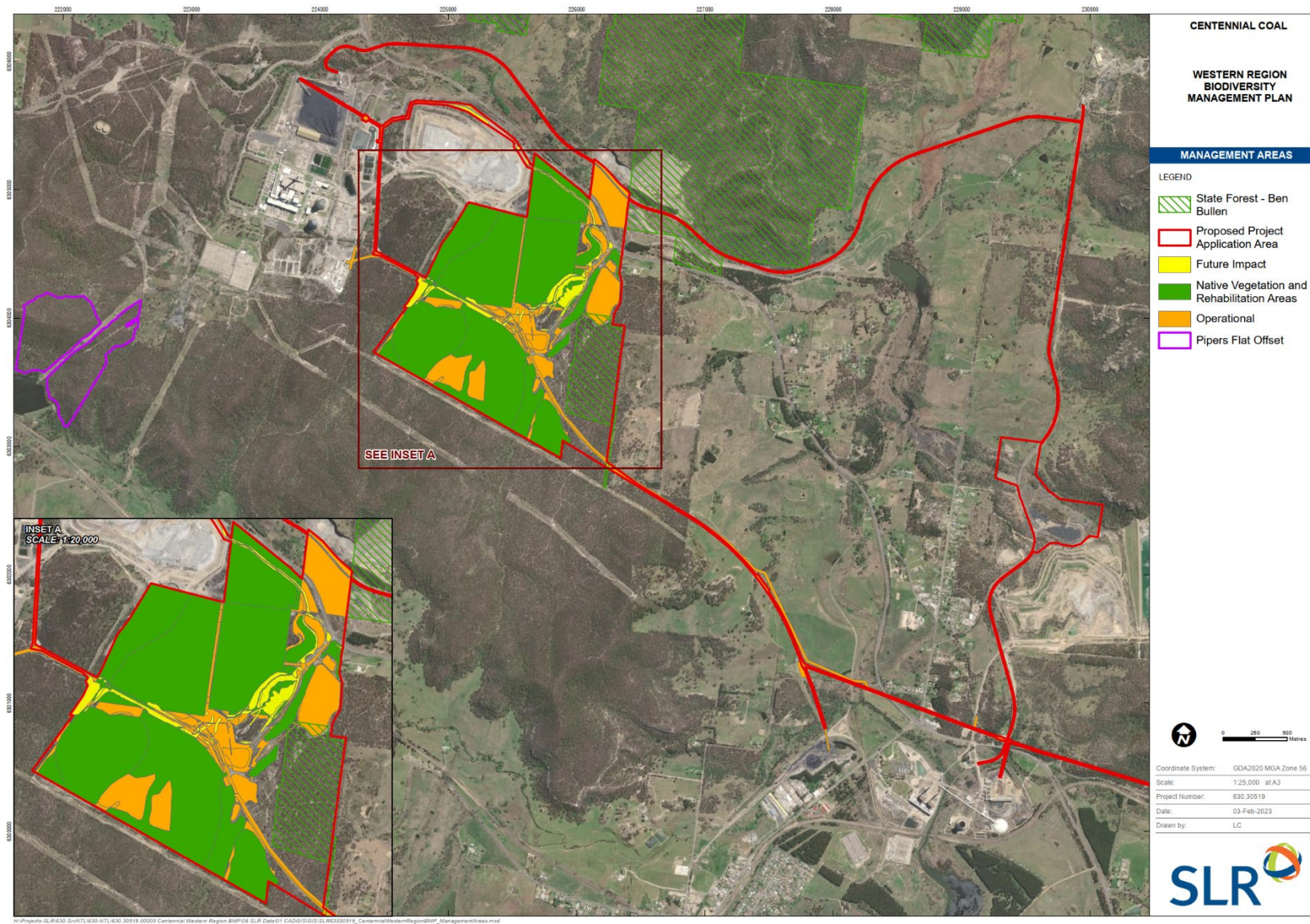


Figure 4. Management Areas

4 MANAGEMENT ACTIONS

Land management activities are presented in Table 5 to Table 8 with identified management areas on SCSS in Figure 4.

Table 5. Operational Areas Management Activities

Management Actions	Short, Medium or Long Term Measure	Timing	Frequency
Access management – signage and gates where required	Short	Commencing at the implementation of this BMP	To be installed once and maintained in perpetuity
Bushfire Management - Review bushfire management plan with objective to identify ecological improvement opportunities.	Long	Commencing at the implementation of this BMP	As required
Erosion to be controlled: - Inspection of water control structures as part of operational inspections; and - Clearing only areas required; - Clearing immediately before works are required; - Drainage from disturbed areas is directed towards the ponds; - Maintenance of water control structures as required.	Long	In response to inspections	As required
Manage Salinity: - Scheduled monitoring of surface water and groundwater quality and levels. - Scheduled monitoring of rehabilitation soil chemistry	Long Long	On an as required basis At the commencement of rehabilitation activities	As required Monitored Annually
Pre-clearance surveys (to Protecting vegetation and soil outside the approved disturbance area and managing any potential conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives area and any Aboriginal heritage values (both cultural and archaeological))	Short	Prior to vegetation clearing	As required when vegetation clearing/land disturbance is scheduled

Table 6. Native Vegetation and rehabilitation Areas Management Actions

Management Actions	Short, Medium or Long Term Measure	Timing	Frequency
Weed Management in accordance with Section 6.6.	Medium	Annually	Annually during operations in accordance with weed management program
Access management – signage and gates where required	Short	Commencing at the	To be installed once and maintained in perpetuity

Management Actions	Short, Medium or Long Term Measure	Timing	Frequency
		implementation of this BMP	
Management of weeds - Treatment in accordance with Section 6.6 of the BMP.	Medium	Seasonally	As required
Pest management - Treatment in accordance with Section 6.7 of the BMP.	Short	Spring	As required based on evidence of pest activity.
Manage Salinity and Erosion as per Table 5	Long	On an as required basis	As required
Manage Rubbish	Short	On an as required basis	As required
Revegetation within rehabilitation areas	Short	In accordance with the RMP	In accordance with the RMP
Re-use of natural hollows as ground habitat, and introduction of naturally scarce fauna habitat features	Long	In accordance with the RMP	In accordance with the RMP
Bushfire Management - Review bushfire management plan with objective to identify ecological improvement opportunities.	Short	As per document control requirements and specified review time.	Engagement completed.
Management of conflicts between additional Rehabilitation Initiatives Area and cultural heritage issues		On an as required basis	As required

Table 7. Areas of Significant Biodiversity Management Actions

Management Actions	Short, Medium or Long Term Measure	Timing	Frequency
Removal of weeds, particularly WoNS/ noxious weed infestations, identified through ongoing monitoring – Treatment in accordance with Section 6.6 of the BMP.	Medium	Seasonally	As required
Management of weeds - Treatment in accordance with Section 6.6 of the BMP.	Medium	Seasonally	As required
Collecting and propagating seed of <i>Eucalyptus aggregata</i>	Short	During flowering period of <i>Eucalyptus aggregata</i>	Annually for 3 years where feasible
Monitoring of <i>Eucalyptus aggregata</i> and Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC to document condition and extent, and prevent potential impacts from mining related activities	Long	Spring	Annually for 3 years (refer to Table 13)
Bushfire Management - Review bushfire management plan with objective to identify ecological improvement opportunities.	Long	As per document control requirements and specified review time.	Engagement completed

Table 8. Landscaping Management Actions

Management Actions	Short, Medium or Long Term Measure	Timing	Frequency
Landscaping along Site entry points and along public roads with native flora species	Short	At the implementation of this BMP	Planting to occur once, and replacements as required if plants cease to survive where feasible.

4.1 SITE SPECIFIC MEASURES

4.1.1 Additional Rehabilitation Initiatives

Additional Rehabilitation initiatives will be undertaken by SCSS in accordance with Condition 26 of Schedule 3 of SSD5579 for the Lamberts Gully Catchment within the SCSS boundary (Figure 4). The initiatives will include the establishment and enhancement of native vegetation species and improvement of fauna habitat values. The areas for management are identified within the in SCS SSD-5579 MOD 4, replicated in Figure 4.

The Springvale Coal Services Rehabilitation Management Plan (SLR 2024) Section 6.2.6 identifies the actions and activities required for establishing and enhancing locally endemic native vegetation species as well as improving native fauna habitat in these areas. The overarching here goal is to create sustainable ecosystems that achieve comparable characteristics of remnant undisturbed vegetation in the area.

Ongoing rehabilitation maintenance activities designed to minimise rehabilitation risk include:

- Undertaking adaptive management and remedial works where characteristics of the rehabilitation are not trending toward desired outcomes.
- Re-seeding and, where necessary, re-soiling and/or the application of specialised treatments such as composted mulch or bio-solids to areas with poor vegetation establishment.
- Use of tube stock if required to improve coverage and diversity across rehabilitation.
- Replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife.
- Where monitoring indicates the presence of excessive weeds or the potential for noxious weed infestation, necessary precautions to prevent the development of weeds within the rehabilitated areas will be undertaken.
- Maintain tube stock plantings of endemic eucalypt species in areas where trees densities are unsatisfactory.
- Installation of artificial habitat structures such as rock or timber emplacements, nest boxes, logs or water features to improve habitat value and encourage fauna re-colonisation (whilst provide sheltered sites for plant regeneration).
- Implementation of the weed control program specifically targeting listed weed species (St John' Wort, Blackberry, Serrated Tussock); and
- Implementation of a feral pests control program specifically targeting goats and rabbits.

Throughout the ecosystem and land use development phase, rehabilitation monitoring will be undertaken until it can be demonstrated that areas of rehabilitation have met completion criteria and all conditions for relinquishment. Rehabilitation monitoring will identify areas of rehabilitation

that require maintenance activities and ongoing, longer term maintenance requirements will be reported annually in the Annual Rehabilitation Report and Forward Program.

4.1.2 Improvement of Wangcol Creek riparian habitat downstream of proposed Link Haul Road Bridge

Riparian habitat 100m downstream of the proposed Link haul road bridge crossing Wangcol Creek will be improved. The improvement to habitat is detailed in the draft WCS Riparian Habitat Catchment Improvement Plan.

4.1.3 Fire Management Plan

The Bushfire Management Plan has been reviewed to ensure the recommended bushfire mitigation measures support the objectives of the BMP.

4.1.4 Monitoring Program

The terrestrial ecology monitoring program will commence for remnant native vegetation as identified in Table 9.

Table 9. Areas of Biodiversity Significance Area Monitoring Requirements

Type	Purpose	GPS Location	Sampling Methods	Data Analysis	Frequency	Reporting Frequency
Vegetation surveys	Document condition and extent of Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC	To be confirmed at commencement of program	BAM plots	BACI Photo monitoring locations	Annually in spring for the first three monitoring events. Five yearly for every monitoring event thereafter.	Annually
Flora surveys	Document condition and extent of individual Eucalyptus aggregata	To be confirmed at commencement of program	Individual condition assessments: Condition. Crown extent. Growth changes. Associated species; and Biomass.	BACI	Annually in spring for the first three monitoring events. Five yearly for every monitoring event thereafter.	Annually

Note: Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC is now known as Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions.

4.2 TRIGGER ACTION RESPONSE PLAN

A Biodiversity Trigger Action Response Plan (TARP) has been developed for Western Coal Services to provide a framework to manage potential key risks to biodiversity. The Biodiversity TARP includes:

- Identification of the principal contributing factors and impacts for each major risk to biodiversity.

- Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and
- Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.

Note: This TARP does not cover rehabilitation areas. Rehabilitation areas are covered in the site-specific Rehabilitation Management Plan (RMP).

The biodiversity TARP provides management responses for lower (first tier) and upper (second tier) trigger values. First tier trigger values identify opportunities for closer monitoring or early intervention that may mitigate potential impacts before notable impact to biodiversity occurs. Second tier trigger values identify when indicators have reached a threshold that requires more substantive or widespread remedial actions to remediate or mitigate biodiversity impacts.

Should any trigger conditions be met resulting in the requirement for intervention or adaptive management, actions will be reported in the Annual Review.

The three-year timeframe associated with the triggers has been set to allow for natural fluctuations associated with climate, flora and fauna behaviours.

Table 10 – Western Coal Services Biodiversity Values TARP

Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
1. Species Diversity	1	Trigger	Total native flora species diversity stable over three-year period.	Total native flora species diversity gradually decreases over a three-year period.	Total native flora species diversity significant decreases by over a three-year.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to implement biodiversity management measures to address decline.	Undertake a review to determine the actual factors in the decline and develop an action plan to return native species diversity to previous levels.
		Trigger	Exotic weed species diversity stable or in gradual decline over a three-year period.	Exotic weed species diversity and cover increase gradually over a three-year period.	Exotic weed species diversity and cover scores significant or increase rapidly over a three-year period.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to implement biodiversity management measures to address increase in exotic weed species.	Develop and implement a targeted weed action plan for the monitoring site and surrounding vegetation.
2. Ground Cover	2	Trigger	Native groundcover stable or gradual increase over a three-year period or more.	Native ground cover decreases over a three-year period.	Native ground cover decreases significantly or rapidly over a three-year period.

Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to implement biodiversity management measures to address decrease in native species cover.	Undertake a review to determine the actual factors in the decline and develop an action plan to return native ground cover to previous levels.
3. Habitat Value	3	Trigger	Habitat assessment value stable or gradual/slight increase.	Habitat assessment value falls to or steady (using assessment methodology in fauna monitoring report).	Habitat assessment value decreases (using assessment methodology in fauna monitoring report).
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to implement biodiversity management measures to address decrease in habitat assessment value.	Undertake a review to determine the causal factors in the decline and develop an action plan to improve habitat resources.

Appendix C. Overview of *Caesia parviflora* var. minor Genetic Research Program

1 INTRODUCTION

One of the outcomes of the WRBOS resulted in a requirement to retire 42 species credits for the assumed loss of three individual *Caesia parviflora* var. *minor* arising from the construction of the Springvale Water Treatment Project. After unsuccessfully pursuing the appropriate 'like-for-like' offsets, Centennial proposed to undertake a supplementary measure and conduct a *Caesia parviflora* var. *minor* genetic research program.

Caesia parviflora var. *minor* is currently listed as an endangered species under the BC Act. However, the taxonomy of this species is unresolved, and may represent a morphological form of the common species *Caesia parviflora* var. *parviflora*. If *C. parviflora* var. *minor* is actually a morph of *C. parviflora* var. *parviflora*, then there is a strong case to request that this species to be delisted as a threatened species.

Centennial Coal will undertake a genetic research program of *C. parviflora* var. *minor* and *C. parviflora* var. *parviflora*. This knowledge-gap is identified by the Flora of Australia, which notes whilst discussing the taxonomy of the varieties in the genus *Caesia* in Australia, and specifically *Caesia parviflora* var. *minor* that "further study may show that this taxon warrants recognition at a higher rank," and that "the relationship between *C. p. minor* and *C. p. alpina*, that occurs at higher elevation also needs investigation". Consequently, there is confusion regarding the taxonomy of this species.

1.1 AIMS

The primary aim of the genetic study is to determine if *C. parviflora* var. *minor* is genetically distinct or the same species as *Caesia parviflora* var. *parviflora*.

Stage 1 of the genetics study will provide a foundational understanding of the genetic variance within the genus. Based on the results of Stage 1, Stage 2 would provide further evidence to conclusively inform the taxonomic identification of *C. parviflora* var. *minor*.

1.2 METHODS

Stage 1 will test the effectiveness of using a molecular genetic approach to understand the taxonomy of *Caesia parviflora* var. *minor*. This study will determine the level of genetic distance among the species/varieties/subspecies of plants from the genus *Caesia*. Once demonstrated that the application of the genetic methods proposed here are suitable, Stage 2 would expand the study to include the sample collections from a wider geographic distribution required to achieve a more representative understanding of this species' taxonomy.

Studies of species level taxonomy, as in the case for *C. parviflora*, rely on determining the level of genetic diversity among species/subspecies/varieties of the target taxon and describing that diversity as it relates to morphological forms and geographic distribution. For this reason, the project will have both genetic and morphological components to the study.

1.2.1 Sampling Method

A sampling strategy is to be established; e.g., up to 10 individual plants of *Caesia parviflora* var. *minor* from separate patches (metapopulation) for the pilot study. It is important to sample from across the geographic area in an unbiased manner (e.g., the Newnes Plateau population will be sampled, and up to 10 individuals that are approximately 200 m apart). All sampled plants would be uniquely tagged in the field and their GPS location recorded.

A small sample of living tissue (e.g., a leaf or stem) will be removed from each plant to be tested and immediately frozen to preserve the DNA (it may be suitable to store the plant material in silica if the time between collections and processing is only a matter of weeks). The unique tag number of the individual plant should be recorded on the sample tube along with other important field information (e.g., date, GPS co-ordinates, collector).

Tissue samples will be sent to a genetic testing laboratory where the DNA is extracted and then digested into fragments using specific enzymes prior to the genetic diversity being determined.

1.2.2 Analysis

Newly developed DNA sequencing techniques, including the selected RADseq method of analyses will enable genotyping of individuals that produce thousands of genetic markers enabling many questions in ecology and conservation management to be addressed.

High-throughput techniques based on restriction site-associated DNA sequencing (including RADseq) will provide a method for the discovery and genotyping of thousands of genetic markers for *C. parviflora*. Specific bioinformatics analysis will be conducted once the single nucleotide polymorphisms (SNP) are generated.

1.3 OUTCOMES

The project will be delivered in two stages with reports documenting the aim, method, results and scientific outcomes.

The pilot conservation genomic study of *C. parviflora* var. *minor* (Stage 1) was conducted to test the effectiveness of using whole-genome scanning approaches for gaining an understanding of lineage distinctness and genetic diversity. DArTseq preliminary results have been attained, but currently awaiting targeted sequencing results from the facility and expert interpretation. The Stage 2 which entails a wider sampling and comparison to Newnes Plateau samples results are currently being reviewed.

A copy of reports prepared for the program will be provided to the Natural Heritage Office for the threatened species.