

**LEARD FOREST REGIONAL
BIODIVERSITY STRATEGY
STAGE 2 – STRATEGY REPORT**

FINAL

August 2017

LEARD FOREST REGIONAL BIODIVERSITY STRATEGY STAGE 2 – STRATEGY REPORT

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Prepared by
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on behalf of
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List of Abbreviations and Acronyms

Abbreviation	Definition
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCIS	Biodiversity Conservation Investment Strategy
BMP	Biodiversity Management Plan
BNCCA Act	<i>Brigalow and Nandewar Community Conservation Area Act 2005</i>
BTM Complex	Collective term for Boggabri Coal Project, Tarrawonga Coal Project and Maules Creek Coal Project
CCC	Community Consultative Committee
CMA	Catchment Management Authority (now LLS)
COP	Code of Practice
DoE	Commonwealth Department of the Environment (now DoEE)
DoEE	Commonwealth Department of the Environment and Energy (formerly DoE)
DoI	Department of Industry (NSW)
DPE	Department of Planning and Environment (NSW) (formerly P&I)
DRE	NSW Division of Resources and Energy (now Division of Resources and Geoscience (DRG) within DPE)
DRG	Division of Resources and Geoscience
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
IBRA	Interim Biogeographic Regions of Australia
KTP	Key Threatening Process
LGA	Local Government Area
LLS	Local Land Services (formerly CMA)
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
NR	Nature Reserve
OEH	NSW Office of Environment and Heritage
P&I	NSW Planning and Infrastructure (now DPE)

Abbreviation	Definition
PAC	Planning Assessment Commission
PIA	Priority Investment Area
RBS	Regional Biodiversity Strategy
Regional Reference Area	A wider geographic extent that includes the Liverpool Plains, Kaputar and Peel IBRA sub-regions used for the consideration of other strategic regional priorities such as linkages from the Nandewar range to the Namoi.
RFS	Rural Fire Service
SAL	Strategic Agricultural Land
SCA	State Conservation Area
SF	State Forest
SOP	Standard Operating Procedures
Study Area	Geographic extent to which the Regional Biodiversity Strategy applies
TARP	Trigger, Action, Response Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>

1.0 Introduction and Strategy Framework

1.1 Background

The Leard State Forest is located approximately 16 kilometres north-east of Boggabri, in the Narrabri Local Government Area (LGA) of northern New South Wales (refer to **Figure 1.1**). The town of Narrabri lies approximately 46 kilometres to the north-west, and the town of Gunnedah approximately 45 kilometres to the south-east. The Kamilaroi Highway runs in a north-west/south-east direction approximately 12 kilometres to the west of Leard State Forest.

Three open cut coal mines currently have approval to operate within, and adjoining to, Leard State Forest, comprising the Boggabri Coal Project (Boggabri Coal Pty Limited), Tarrawonga Coal Project (Tarrawonga Coal Pty Limited) and Maules Creek Coal Project (Aston Coal 2 Pty Limited) (refer to **Figure 1.2** for context). In this report these are collectively referred to as the BTM Complex. The Leard Forest Regional Biodiversity Strategy was included as a condition of approval in the State Project Approval documents for all three coal mine projects to provide a framework for the development, implementation and management of biodiversity offset programs with regional perspective and context.

The Leard Forest Regional Biodiversity Strategy is required to be prepared and implemented in three stages (refer to **Section 1.3**), with this report (the Strategy document) being Stage 2 which provides the detail for the guidance of biodiversity management through a:

- Strategy Framework (refer to **Section 1.0**)
- Biodiversity Offset Management Framework (refer to **Section 2.1**)
- Offset Security Framework (refer to **Section 2.2**).

Information is also provided on the consultation process undertaken during the preparation of this report (refer to **Section 4.0**). The adaptive management and review process (refer to **Section 5.0**) will keep this document updated and responsive to ongoing improvements and any changes required following the implementation of the NSW biodiversity legislative reforms in 2017.

1.1.1 Statutory Requirement for the Regional Biodiversity Strategy

The Leard Forest Regional Biodiversity Strategy (RBS) is required to provide a framework for the development, implementation and management of biodiversity offset programs resulting from future mining proposals and other significant land use changes in the region. All of the mines within the BTM Complex have extensive existing approved offset areas (refer to **Figure 1.2** and **Figures A2** and **A6** in **Appendix 1**). Complementary management of these offsets will ensure they achieve the best possible biodiversity outcomes from a regional perspective.

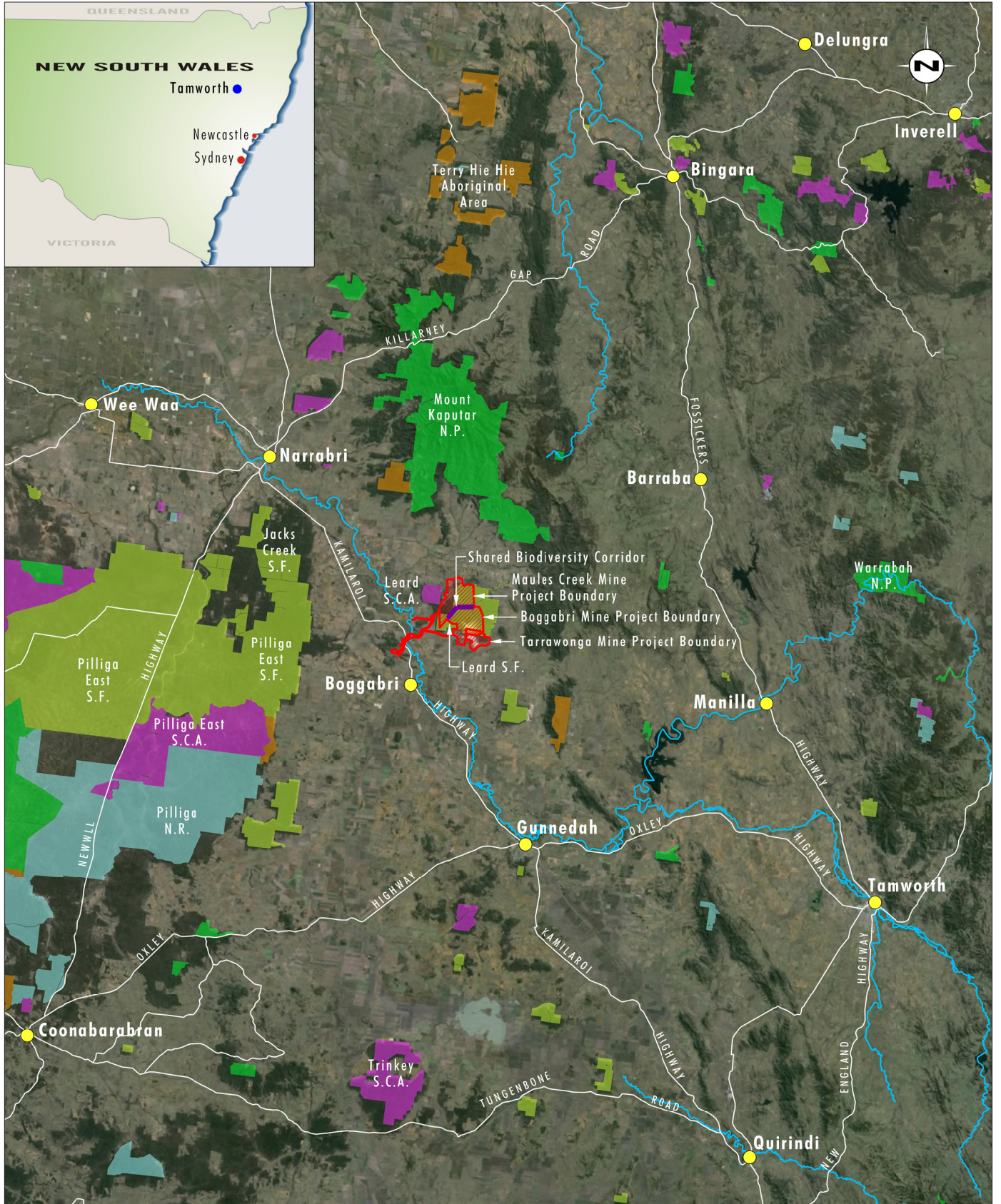


Image Source: Google Earth (2013)
 Data Source: DP&I (2014), MinView (2014), OEH (2013)

0 10 20 40km
 1:1 000 000

Legend

- Mine Project Boundary
- Shared Biodiversity Corridor
- State Forest
- National Park
- State Conservation Area
- Aboriginal Area
- Nature Reserve
- Road
- Drainage

FIGURE 1.1
Locality Map

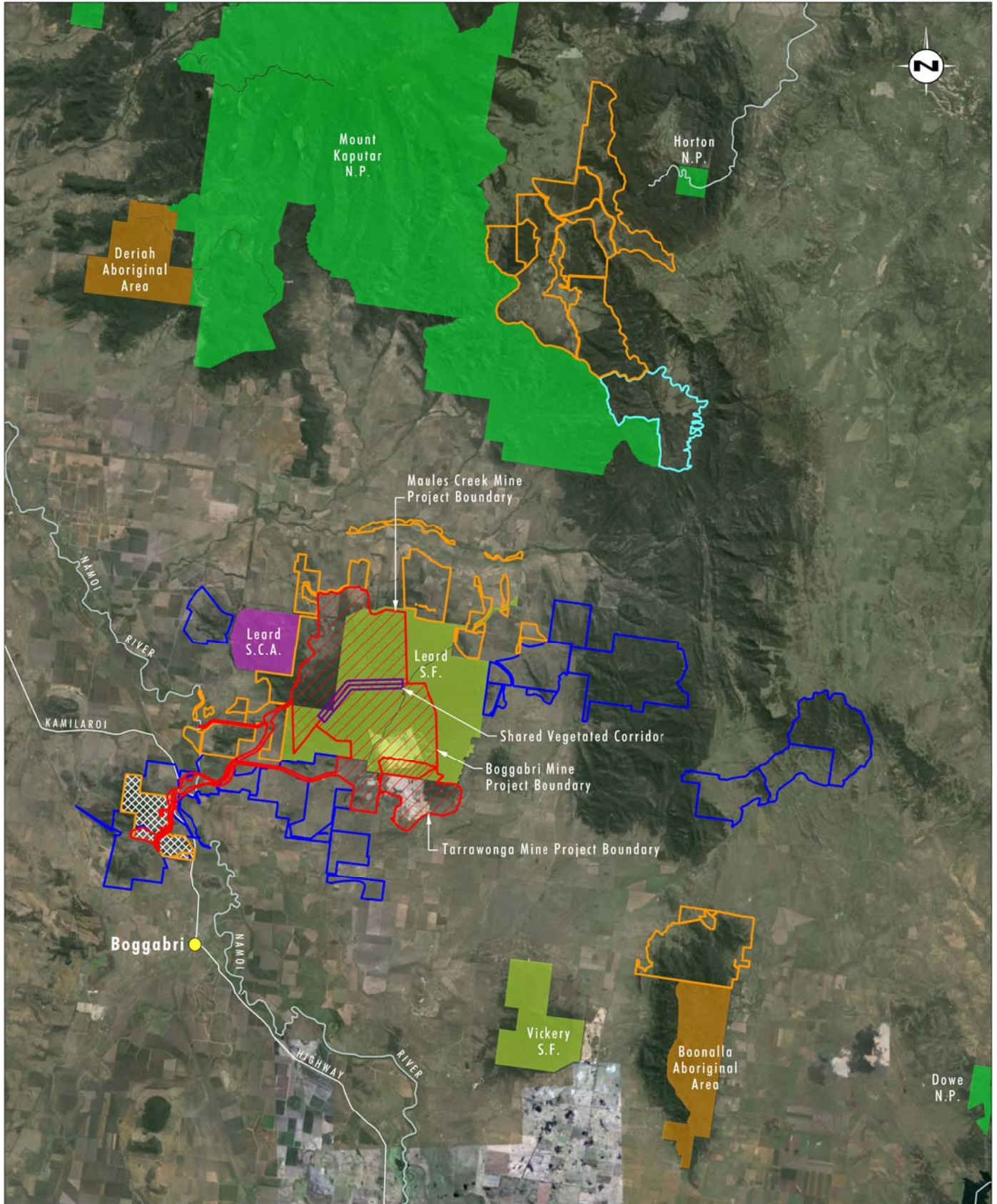


Image Source: Google Earth (2013)
 Data Source: DP&I (2014), MinView (2014), OEH (2013)
 Note: (1) In addition to the approved NSW offsets, additional offset areas are required to meet the requirements of the Commonwealth EPBC Act approval

0 5 10 15 km
 1:300 000

Legend

- Mine Project Boundary
- Shared Vegetated Corridor
- State Forest
- National Park
- State Conservation Area
- Aboriginal Area
- Boggabri Offset Property
- Tarrwonga Offset Property - Approved
- Maules Creek Offset Property - Approved (NSW only)⁽¹⁾
- Shared Offset Area
- Road
- Drainage

FIGURE 1.2

Geographic Context of Disturbance and Offset Areas of the BTM Complex

The NSW Planning Assessment Commission (PAC) Reports for the Boggabri Coal Project (February 2012) and the Maules Creek Coal Project (March 2012) recognise the need for the mines of the BTM Complex to prepare a coordinated RBS, specifically to:

Set out the long-term framework of management, monitoring and land-use security to be applied consistently across all biodiversity conservation areas in the region. It should have the scope and flexibility to accommodate new areas, as they may need to be provided to respond to future mining proposals or other significant land use changes.

The Project Approval for the Tarrawonga Coal Project states:

The proponent shall contribute to the funding and preparation of the Leard Forest Mining Precinct Regional Biodiversity Strategy.

In addition to this, the Commonwealth Approvals for the three mines in the BTM Complex state that:

The person taking the action must implement the regional biodiversity strategy as required under... the NSW state government project approval ... The required scoping report for the development of the strategy must be submitted to the Minister for approval...The approved strategy must be implemented.

The State-based project approvals for the BTM Complex require the RBS to be approved by the Secretary of the Department of Planning and Environment (DPE), following endorsement from the Office of Environment and Heritage (OEH). The PAC reports and approvals variously require the establishment of governance, consultation and reporting arrangements for the RBS.

1.2 Ecological Context for the RBS

The Boggabri, Tarrawonga and Maules Creek Coal Mine Projects are located within and adjoining the Leard State Forest, a large area of native woodland that is known to provide habitat for a range of locally-occurring threatened flora and fauna species which also forms significant regional habitat between Mount Kaputar National Park to the north-east and Pilliga East State Forest and conservation areas to the west.

Prior to the commencement of mining, the Leard State Forest covered an area of approximately 8,134 hectares of native vegetation, which had been routinely disturbed by logging practices. The Leard State Forest includes large areas of *White Box Yellow Box Blakely's Red Gum Woodland* endangered ecological community (EEC) under the TSC Act, and *White Box-Yellow Box-Blakelys Red Gum Grassy Woodland and Derived Native Grassland* critically endangered ecological community (CEEC) under the EPBC Act.

Vegetation within the region is highly fragmented, with large expanses of cleared land associated with extensive agricultural activities. However, the vegetation within the Leard State Forest provides a significant area of native vegetation in the otherwise fragmented landscape. Leard State Forest is part of a number of local corridors with partial connectivity to the Leard State Conservation Area and Namoi River in the west and the Nandewar Range in the east (refer to **Figure 1.1**).

The Regional Biodiversity Strategy Study Area (refer to **Section 1.4.1**) covers an area of approximately 295,000 ha and includes around 47,500 ha (around 16 percent) of land currently identified for biodiversity conservation purposes, including National Park estate and biodiversity offsets. The BTM offsets comprise some 24,500 ha of this conservation land within the study area.

In addition to the BTM Complex mines, there a number of other operating coal mine developments in the Study Area, including the Rocglen open cut and the Narrabri underground mines and the approved, but not yet commenced Vickery Coal Mine, with a further extension to this mine also proposed.

1.2.1 Biodiversity Impacts of the BTM Mine Projects

The impact of the BTM mine projects on the local and regional biodiversity was a key consideration in the determination of these projects by the State and Commonwealth governments and the PAC. This includes cumulative impacts resulting from the loss of large areas of native vegetation associated with Leard State Forest containing *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC*, and known habitat for a range of threatened woodland bird, micro-bat and arboreal mammal species. Impacts will also occur in relation to local corridor function with the loss of substantial portions of Leard State Forest. More specifically, under current approvals the BTM mine projects will impact approximately 3,800 hectares of native vegetation and fauna habitats, mainly within Leard State Forest, including 1,200 hectares of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC*.

These impacts are displayed in the vegetation community mapping for the three project sites for the BTM Complex mines in **Figures A1, A3 and A5** in **Appendix 1**. These maps show the location of native vegetation in the project boundaries as well as the distribution of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC* subject to impacts.

1.2.2 Biodiversity Offsets and Rehabilitation

In light of the anticipated impacts on Leard State Forest and to ensure the long-term success of the biodiversity conservation areas and corridors, the project approvals for the BTM Complex projects includes a range of measures to avoid, mitigate and offset the impacts with particular consideration of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and impacted threatened species.

Under current approvals, the BTM Complex mines have proposed up to approximately 24,500 hectares of biodiversity offsets to maintain and improve the biodiversity values in the wider region. **Figures A2, A4 and A6** in **Appendix 1** display the vegetation communities within these offset areas for the BTM Complex mines. This includes up to approximately:

- 16,500 hectares of native woodland vegetation and habitats
- 8,000 hectares of derived native grassland and/or cleared lands to be restored or regenerated to woodland.

This includes 9,300 hectares of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC*.

Biodiversity offsets are broadly located in lands surrounding the current Leard State Forest and Leard State Conservation Area, adjoining the Boonalla Aboriginal Area to the south-east and adjacent to Mount Kaputar National Park (refer to **Figure 1.2**). The cumulated offset sites and proposed restoration of grasslands aims to, in the long term, mitigate the loss of connectivity and habitats associated with Leard State Forest and the region.

Detailed mine rehabilitation programs propose to rehabilitate post-mine landforms that aim for biodiversity outcomes and overall ecosystem function. The Commonwealth and State approval conditions for the Boggabri Coal Project require the pre-mining vegetation to be re-established including progressive rehabilitation and revegetation of at least 650 hectares using species consistent with a *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland* and *Derived Native Grassland Ecological Community (Grassy Box Gum Woodland)*. The Maules Creek Coal Project approvals require the rehabilitation of at least 1665 hectares of native forest and woodland including 544 hectares using species consistent with a *Grassy Box Gum Woodland*. Finally, the Tarrawonga Coal Project approvals require the rehabilitation of at least 752 hectares of native forest and woodland in the project area, including 13 hectares using species consistent with a *Grassy Box Gum Woodland*. Both Maules Creek and Tarrawonga Coal Projects are

required to create potential habitat for the regent honeyeater, swift parrot and greater long-eared bat within their rehabilitation areas.

Overall, the key goal of the rehabilitation activities is to create landforms that are safe, stable, provide adequate post-mining drainage, and to recreate vegetated areas similar to the original forest corridors that is consistent with the types of naturally occurring landform features that occur in the region. Broad rehabilitation objectives for the BTM mines include the following over the life of the mine:

Short-term Objectives

- progressively reshape and stabilise disturbed areas
- provide structural erosion control measures
- manage soil suitability for beneficial use in rehabilitation
- ameliorate wastes and soils to address physical, chemical and biological constraints to revegetation and erosion stability
- establish species which will out compete potential weed species and provide rapid soil surface cover and
- refine rehabilitation methods.

Medium-term Objectives

- establishment of the structural dominant species from the relevant native vegetation communities
- demonstrating rehabilitation succession in comparison with analogue sites and
- reducing reliance on structural drainage and erosion control methods.

Long-term Objectives

- monitor rehabilitation areas to ensure stable and sustainable rehabilitation including succession of planted native vegetation toward analogue native vegetation communities
- apply adaptive management measures if natural succession is not occurring
- demonstrating rehabilitation performance
- enhance local vegetation communities with the prioritisation of the reestablishment of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC* and
- encourage fauna movement and connectivity.

Rehabilitation across the sites is proposed to include approximately 3,366 hectares of native woodland and forest areas including targeting the re-establishment of *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC* and habitat for threatened fauna species. A key objective of the rehabilitation will be to, in conjunction with offsets, restore and improve the regional east-west wildlife corridor and create linkages to remnant vegetation between the Namoi River through the Leard State Forest and to the Nandewar Range.

1.2.3 The Post-mining Landscape

The project approvals included the requirement to commission and fund the Leard Forest Mining Precinct Regional Biodiversity Strategy (RBS), as outlined in **Section 1.1.1** above. The RBS will aid in providing a long-term biodiversity vision for the region by providing standards for regional approaches for conservation projects and identifying potential future locations for conservation and reservation.

The post-mine landscape across the region should represent a stable landform that supports a mosaic of self-sustaining vegetation communities, provides habitat for a variety of native fauna species (including threatened species) as well as facilitating corridor functionality between areas of mine rehabilitation, remnant forest and conserved biodiversity offset sites. Connectivity in the region will be improved and provide suitable linkages between the Namoi River through the Leard State Forest and to the Nandewar Range.

The rehabilitation of the post-mine landscape with native vegetation will comprise a mixture of native grassy woodland, shrubby woodland/ open forest, riparian forest vegetation types and *White Box Yellow Box Blakely's Red Gum Woodland EEC* and *CEEC* with fauna habitat for threatened species to encourage the re-establishment of pre-mining biodiversity values. The inclusion of in-perpetuity offset sites will aim to maintain and improve the biodiversity values in the offset areas, including the regeneration of derived native grasslands to woodlands which will provide suitable habitat for threatened species listed in the project approvals.

Overall, the management and conservation commitments outlined in the Biodiversity Management Plans (BMPs), Rehabilitation Management Plans (RMPs) and Biodiversity Offset Strategies (BOSs) for the BTM mine projects will provide for the restoration and long-term management of self-sustaining native vegetation communities, diverse fauna habitats and corridor functionality in the locality and region.

1.3 Staging of the Regional Biodiversity Strategy

In accordance with the requirements of the project approvals for the mines of the BTM Complex, the RBS is to be prepared and implemented in the following stages:

- **Stage 1 – Scoping Report:** to include the terms of reference, scope and objectives for the RBS, including recommendations for a geographic extent (study area) for the RBS.
- **Stage 2 – Strategy Document (this report):** to be developed according to the process set out in the approved Scoping Report and include a strategy framework, spatial framework, biodiversity offset management framework and offset security framework.
- **Stage 3 – Strategy Review:** to be completed by the end of December 2018, following the completion of the required rehabilitation and offset area audits. These are to be completed by suitably qualified, experienced and independent person/s whose appointment has been endorsed by OEH and subsequently approved by DPE.

Umwelt (Australia) Pty Limited (Umwelt) was engaged to prepare the Stage 1 Scoping Report in consultation with DPE (including OEH), the BTM Complex mines and the Commonwealth Department of the Environment (DoE) (now the Department of the Environment and Energy (DoEE)). The Stage 1 Scoping Report (Umwelt 2015) was finalised in July 2015.

1.4 Strategy Geographical Coverage

The RBS study area covers approximately 294,500 hectares and is displayed in **Figure 1.3**. **Section 1.4.1** describes the key drivers behind the study area delineation and the specific criteria used to map the study area boundary.

1.4.1 The Regional Biodiversity Strategy Study Area

The biological features affected by the BTM Complex occur within particular biophysical landscapes whose occurrence can be predicted within the broader region and, for some, are supported by existing mapping. Targeting areas with similar biophysical features (as much as possible) increases the likelihood of protection of similar features (e.g. soil types, vegetation types, fauna habitat types) to those being impacted.

The RBS Study Area primarily occurs within the Liverpool Plains IBRA Subregion within the Brigalow Belt South IBRA Bioregion (refer to **Figure 1.3**). Although the Study Area was selected primarily based on the biophysical attributes captured by this subregion, subjective boundary cropping was employed to remove irrelevant areas such as strategic agricultural land in the south-west and the town of Narrabri in the north-west. The eastern boundary broadly follows the Namoi River catchment boundary and the Narrabri LGA boundary in the north-east, east and south.

The RBS Study Area boundary deviates from existing key boundaries in the north eastern and south eastern corners to include additional offset areas identified for the Boggabri and Maules Creek Coal Mines. Where logical, the study area boundary was adjusted to abut other significant regional boundaries, such as those of Mount Kaputar National Park in the north and to Pilliga East State Forest in the west.

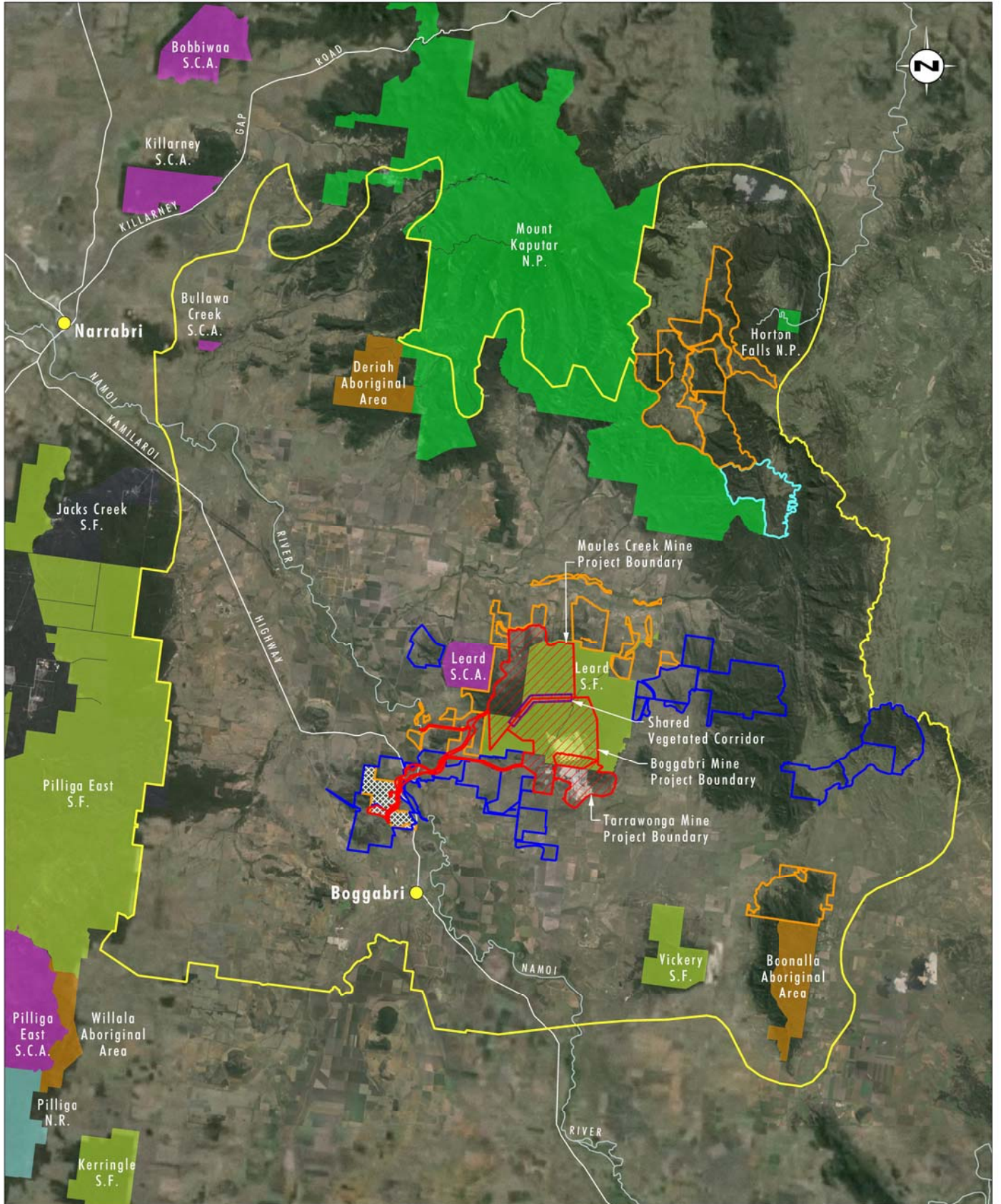
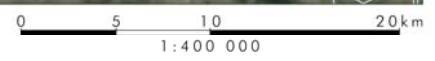


Image Source: Google Earth (2013)
 Data Source: DP&I (2014), MinView (2014), OEH (2013),
 Australian Government Department of the Environment (2012)
 Note: (1) In addition to the approved NSW offsets, additional offset areas are required
 to meet the requirements of the Commonwealth EPBC Act approval



Legend

- | | | |
|---------------------------|---|----------|
| Mine Project Boundary | Aboriginal Area | Road |
| Shared Vegetated Corridor | Nature Reserve | Drainage |
| Precinct Study Area | Boggabri Offset Property | |
| State Forest | Tarrawonga Offset Property - Approved | |
| National Park | Maules Creek Offset Property - Approved (NSW only) ⁽¹⁾ | |
| State Conservation Area | Shared Offset Area | |

FIGURE 1.3
Precinct Study Area

1.4.2 The Regional Reference Area

The Regional Reference Area was identified for the RBS to allow for the consideration of other strategic regional priorities such as linkages from the Nandewar range to the Namoi and strategic additions to regional conservation estates. This regional reference area provides broader focus for conservation outcomes, while providing context for the precinct study area for the RBS.

The Regional Reference Area (as identified in **Figure 1.4**) includes the Liverpool Plains, Kaputar and Peel IBRA sub-regions and covers approximately 2,452,300 hectares. These subregions occur in two bioregions – Brigalow Belt South (incorporating the Liverpool Plains subregion) and Nandewar (incorporating the Kaputar and Peel subregions). The Regional Reference Area is not wholly contained within one bioregion as the mine sites and the biodiversity offset areas are located within different bioregions. IBRA subregions were used as the method for delineating the regional reference area as they have similar ecological, geological and landform characteristics.

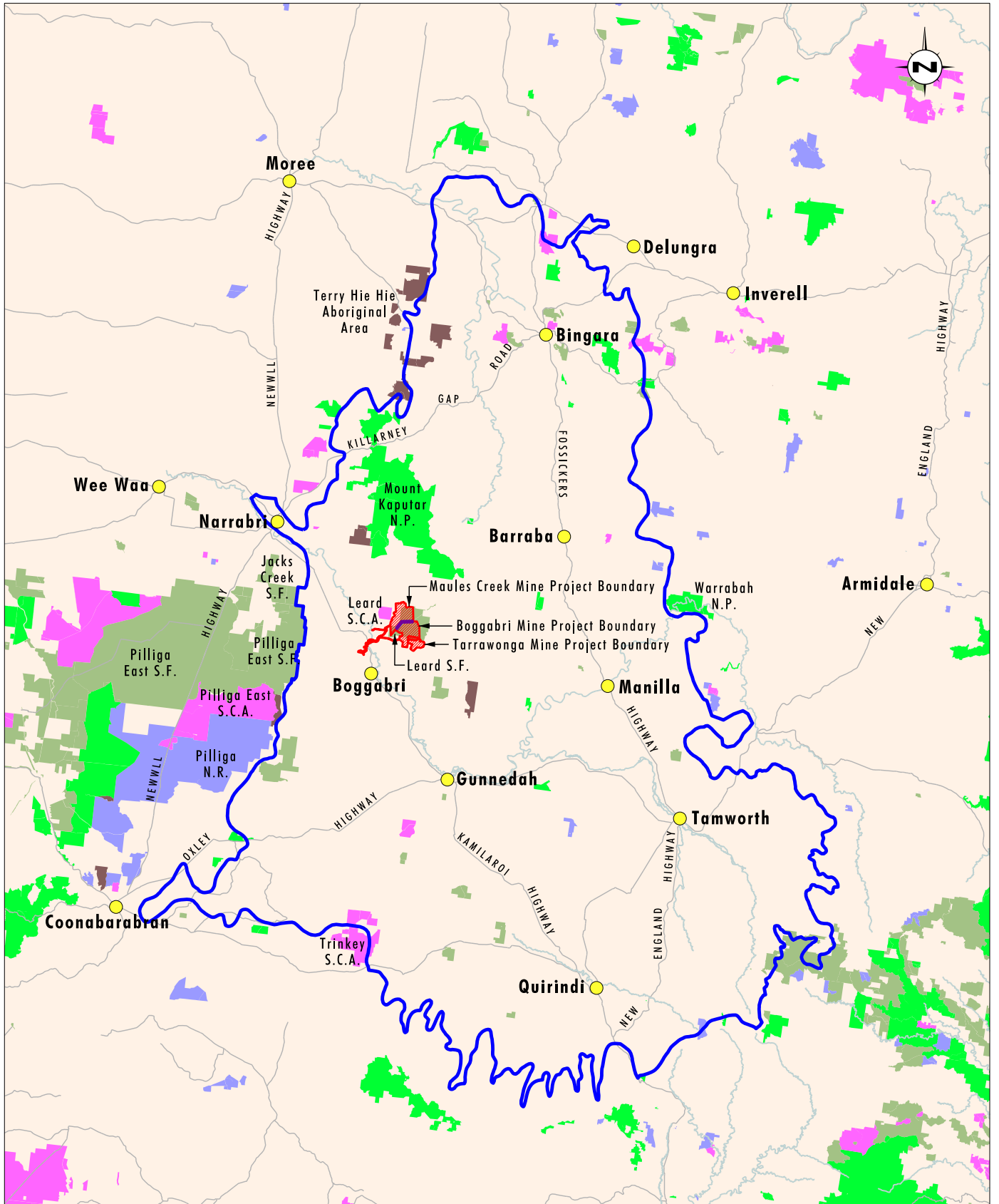
The regional reference area consists of the western slopes of the New England Tablelands along the eastern boundary encompassing Bingara and Barraba in the north down to Tamworth and Nundle in the south. The area extends west to the Liverpool Range and Nandewar Range and beyond to the plains country around Boggabri and Narrabri. Mount Kaputar is located in the north-west of the regional reference area. The major watercourses within the area are the Gwydir, Horton, Mehi, Mooki, Namoi and Peel Rivers. The Gunnedah Basin coalfields occur in the central and western area of the Regional Reference Area.

1.5 Terms of Reference

1.5.1 Purpose of the Regional Biodiversity Strategy

The primary purpose of the RBS is to provide a strategic framework for the management and implementation of the biodiversity offset programs already established by the BTM Complex and to provide guidance for co-ordinated management with other land managers within the precinct area.

In addition, the RBS proposes to provide a strategic framework for additional biodiversity offsets associated with any future relevant projects and land use changes to contribute to regional conservation outcomes.



Data Source: DP&I (2014), MinView (2014), OEH (2013)
 Australian Government Department of the Environment (2012)

0 25 50 75 km
 1:1 500 000

Legend

- Mine Project Boundary
- Regional Reference Area
- Shared Biodiversity Corridor
- State Forest
- National Park
- State Conservation Area
- Aboriginal Area
- Nature Reserve
- Road
- Drainage

FIGURE 1.4

Regional Reference Area

1.5.2 Objectives of the Regional Biodiversity Strategy

To facilitate the achievement of the purposes documented above, a number of objectives were established as part of the approved Stage 1 Scoping Report, as documented in **Table 1.1**.

Table 1.1 Objectives of the Regional Biodiversity Strategy

Objectives	Location in Report
<ul style="list-style-type: none"> Identify existing conservation areas including existing offsets from the three coal projects within the study area (required under the relevant conditions of approval under the NSW <i>Environmental Planning and Assessment Act 1979</i> and Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>). 	Section 1.0 Figure 1.2
<ul style="list-style-type: none"> Develop a regional biodiversity offset management framework, including recommended complex-wide performance measures and preliminary completion criteria and complex-wide trigger, action and response plan. 	Section 2.1
<ul style="list-style-type: none"> Identify options for offset security mechanisms considering project approval requirements and current NSW government policy. 	Section 2.2
<ul style="list-style-type: none"> Identify opportunities for cross-tenure/jurisdictional land management issues (such as weed, feral animal and bushfire management) to be managed in a coordinated manner across the BTM Complex, in order to achieve maximum biodiversity gain in the most efficient manner. 	Section 2.3
<ul style="list-style-type: none"> Identify funding mechanisms and management responsibilities to ensure that ongoing, long-term improve or maintain conservation outcomes are achieved. 	Section 2.2.5
<ul style="list-style-type: none"> Allow consideration of other strategic regional priorities such as linkages from the Nandewar range to the Namoi and strategic additions to regional conservation estates. In this case, the regional reference area includes the Liverpool Plains, Kaputar and Peel IBRA sub-regions. This regional reference area provides broader focus for conservation outcomes, while providing context for the precinct study area for the RBS. 	Section 3.0
<ul style="list-style-type: none"> Identify the key regional biodiversity values of the study area, primarily relying on the analysis of existing mapping products to be provided by OEH and the BTM Complex mines, ensuring the broader regional reference area is considered for context. 	Section 3.0
<ul style="list-style-type: none"> Develop key factors to determine where in the landscape any additional future offsets and corridors are best placed within the study area. 	Section 3.0
<ul style="list-style-type: none"> Assess land uses that may be incompatible with biodiversity conservation (e.g. strategic agricultural land, current mining interests), primarily relying on the analysis of existing mapping products. 	Section 3.0
<ul style="list-style-type: none"> Provide a spatial framework to facilitate strategic placement of offsets for any future proposals in the study area. 	Section 3.0
<ul style="list-style-type: none"> Involve relevant stakeholders in strategy development and implementation. 	Section 4.0
<ul style="list-style-type: none"> Identify threatening processes that may hinder the achievement of conservation outcomes, and relevant actions to address such processes. 	Section 5.1.2

The proposed objectives in **Table 1.1** relating to the spatial assessment of future offsetting opportunities and constraints in the RBS study area have been largely overtaken by the NSW land management and biodiversity conservation reforms, which includes development of mapping products for priority investment areas. It is proposed to progress this as part of the Stage 3 review of the RBS once these mapping products have been developed, following public consultation. This is discussed in **Section 3.0**.

1.6 Key Information Sources Used

A number of information sources have been consulted in the preparation of this Stage 2 Strategy Report. Those key sources are listed below:

- Mine site, offset site boundaries, vegetation mapping and management zones provided by Boggabri, Maules Creek and Tarrawonga coal mines
- Interim Biogeographic Regionalisation for Australia (IBRA) Version 7 mapping layers
- Wildlife Corridors for Climate Change - Nandewar and New England Tablelands Bioregions, Department of Environment and Climate Change (2007 mapping)
- Strategic Agricultural Lands (SAL) spatial data, as used within the Strategic Regional Land Use Plan – New England North West, Department of Planning and Infrastructure (September 2012)
- NSW National Parks and Wildlife Service Estates (National Parks, State Conservation Areas, Nature Reserves), NPWS (2013 spatial data)
- State Forest boundaries, Forestry Corporation NSW (2014 spatial data)
- Mitchell Landscapes, NPWS (2002 spatial data)
- Existing project area and biodiversity offset area boundaries for the mines of the BTM Complex (provided by DPE)
- Catchment Management Authority area and sub-catchment boundaries (taken to be representative of the new LLS boundaries - NSW Community Access to Natural Resources Information (CANRI) (2002))
- Local Government Area boundaries (Department of Lands (Sept 2003))
- Border Rivers-Gwydir and Namoi Vegetation Classification and Mapping (OEH 2015)
- Information provided from Division of Resources and Geoscience (DRG) regarding known and probable coal resources
- Draft Prioritising Land for Conservation in Northern NSW – A Component of the Leard Forest Regional Biodiversity Strategy Stage 2 – Strategy Report (OEH 2016)
- NSW (EP&A Act) and Commonwealth (EPBC Act) project approvals for the BTM Complex mines.

2.0 Biodiversity Offset Management and Monitoring Framework

2.1 Management and Monitoring Framework

This section provides a high-level management and monitoring framework to target consistency and efficiencies across the region and includes recommended monitoring standards, offset management measures, performance measures and preliminary completion criteria, trigger, action and response plans (TARPs) for underperformance and consistent reporting approaches. It focuses on key strategic management areas where a co-ordinated approach is warranted to achieve consistency whilst being in accordance with the relevant mines' State and Commonwealth project approval conditions.

While the key strategic management and monitoring actions are outlined here, specific details on implementation and methodologies are outlined in individual Biodiversity Management Plans, which are to be revised to demonstrate consistency with the recommendations and objectives outlined in this report as per the State approval conditions. Furthermore, this high-level framework can also be applied to future projects and conservation programs in the region, where relevant.

The management and monitoring framework comprises the following strategic focus areas for the BTM Complex:

- **Strategic Focus Area 1** – Enhance the quality of habitats and landscapes at the offset sites for *White Box – Yellow Box – Blakely's Red Gum Woodland* EEC and CEEC
- **Strategic Focus Area 2** – Provide ongoing management and enhancement of existing habitats at the offset sites for threatened species¹
- **Strategic Focus Area 3** – Promote a consistent and coordinated approach to weed management and pest animal control
- **Strategic Focus Area 4** – Promote a consistent and coordinated approach to fire management for biodiversity
- **Strategic Focus Area 5** – Enhance the connectivity of habitats through corridor and buffer area establishment and management
- **Strategic Focus Area 6** – Consult and workshop biodiversity issues with local stakeholders and land managers.

It should be noted that the strategic focus areas, while relevant to the BTM Complex, may also have relevance to other land managers in the precinct study area who are managing for conservation outcomes (for example Crown Land reserves, National Park estates, property vegetation plans (PVPs)). Additionally, vegetation communities and flora and fauna species, other than those that are listed as threatened under the TSC and EPBC Acts, may also be enhanced through the implementation of actions under Strategic Focus Areas 1 and 2.

¹ Threatened species relevant to this document are outlined in Condition 45 of the Boggabri approval (09_0182) and Condition 49 of the Maules Creek approval (10_0138) and broadly include locally-occurring threatened woodland birds, arboreal mammal and microbat species. These are further documented in the Threatened Fauna Implementation Plans for the Maules Creek and Tarrawonga Coal Mines as referenced in this document.

The management and monitoring framework has referenced and considered the information outlined in the following biodiversity documents (available at the time of writing) prepared for the BTM Complex:

- Biodiversity Management Plans for Boggabri, Maules Creek and Tarrawonga Coal Mines
- Biodiversity Offset Strategies for Boggabri and Maules Creek Coal Mines
- Threatened Fauna Implementation Plans for Maules Creek and Tarrawonga
- White-Box Yellow-Box Blakely's Red-Gum Woodland Endangered Ecological Community Implementation Plans for Maules Creek and Tarrawonga
- Investigation and Implementation Plan for Boggabri Coal Mine.

2.1.1 Strategic Biodiversity Offset Management Actions

Table 2.1 identifies opportunities for biodiversity offset management measures that can be undertaken in a coordinated manner across the BTM Complex to maximise environmental outcomes. These measures may also provide cost efficiencies. Reviewing the BMPs and amending these in accordance with the RBS may provide cost efficiencies relating to consistent reporting across the sites (i.e. no need for duplication) whilst fulfilling the approval conditions, BMP requirements and RBS recommendations concurrently.

While **Table 2.1** provides information on the recommended management actions to be undertaken at the offset sites, it is acknowledged that the detailed methodology for how these are achieved are to be clearly detailed in the BMPs for individual project sites.

Table 2.1 Strategic Biodiversity Offset Management Actions

Management Component	Management Actions
Strategic Focus Area 1 - Enhance the quality of habitats and landscapes at the offset sites for White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC	
<p>1.1 Natural regeneration (undertaken in semi-cleared and remnant native woodland vegetation in good condition)</p>	<ul style="list-style-type: none"> • Natural regeneration is promoted through management of threatening processes including: <ul style="list-style-type: none"> ○ the management of weeds (refer to Strategic Focus Area 3) ○ the management of pest animals (refer to Strategic Focus Area 3) ○ livestock restriction (where appropriate, in conjunction with strategic grazing). • Natural regeneration management options (such as thinning, slashing, controlled burning) can be undertaken to promote canopy species regeneration in dense grasslands and cypress pine regrowth areas. Methods and results of this should be communicated and made available for future similar regeneration efforts in the region.
<p>1.2 Collect and propagate seed</p>	<ul style="list-style-type: none"> • Seed collection, management and storage should be undertaken in consideration of the Florabank Guidelines (www.florabank.org.au/).
<p>1.3 Active revegetation (undertaken in semi-cleared woodland, derived native grasslands and cleared land)</p>	<ul style="list-style-type: none"> • When restoring areas of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC, active revegetation should be undertaken generally in accordance with the <i>Guide to Managing Box Gum Grassy Woodlands</i> (Rawlings <i>et al.</i> 2010). • Direct seeding and/or tubestock planting should be undertaken in areas where natural regeneration is unlikely to occur (such as low-diversity derived native grassland, pasture and cultivated land) and where natural regeneration areas require supplementary actions (as per TARPs in Table 2.4). • Seed and tubestock used in revegetation should include a variety of grasses, low shrubs, mid-sized shrubs and trees, characteristic of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC (as per the NSW Final Determination and Commonwealth Listing Advice for the communities), to create structurally diverse habitat.

Management Component	Management Actions
Strategic Focus Area 2 – Provide ongoing management and enhancement of existing habitats at the offset sites for threatened species	
2.1 Salvage of habitat resources	<ul style="list-style-type: none"> • Salvage of habitat resources should be undertaken within approved disturbance areas for re-use in the areas surrounding the disturbance areas, rehabilitation areas and offset sites. This should include the salvage of one or more of the following habitat features where they are available and of suitable structural integrity: <ul style="list-style-type: none"> ○ fallen timber ○ arboreal hollows ○ hollow logs ○ bush rock.
2.2 Habitat augmentation and nest box installation	<ul style="list-style-type: none"> • Habitat augmentation, using salvaged resources or nest boxes, should be undertaken in habitats identified as having low habitat resources. • Where nest boxes are to be installed: <ul style="list-style-type: none"> ○ they are to be made from high quality and durable materials that, ideally, provide for a long lifespan. ○ designs should be targeted to the hollow-dependent threatened species known to occur in the locality of the offset site such as woodland birds, arboreal mammals and micro-bats. • The total number of hollows (existing hollows and nest boxes combined) at the offset sites should be at least the same as the number of hollows with signs of use (nesting material, feathers, fur, scratches, etc) and of suitable dimensions for species occupancy (suitable entrance size and a hollow chamber extending into the branch/trunk) removed from the impact site. • It is expected that the installation of nest boxes would be staged over time to mirror the regeneration of the woodland and the species that are utilising each site.
2.3 Access control	<ul style="list-style-type: none"> • Where offset sites share common boundaries fencing designs should not be restrictive to native fauna movement or connectivity between habitats. The need for fencing between contiguous offset sites that are managed in the same way should be investigated and wherever possible removed/avoided. • Alternatives to barbed-wire fencing should be used, where appropriate, to avoid obstructing the flight paths of birds, bats and gliders. Any new fencing, where fence lines do not currently exist, should be installed in a way to avoid, or minimise clearing of any native trees or shrubs, where appropriate (Note: clearing/maintenance may still be required in accordance with relevant legislation of the time such as the <i>Native Vegetation Act 2003</i> or <i>Rural Fires Act 1997</i>).

Management Component	Management Actions
Strategic Focus Area 3 - Promote a consistent and coordinated approach to weed management and pest animal control	
3.1 Weed and pest prevention and communication	<ul style="list-style-type: none"> • Weed management and pest control conditions and trends are to be communicated across the BTM Complex and should include: <ul style="list-style-type: none"> ○ reviewing monitoring reports for up-to-date information on weeds and pests ○ discussing and prioritising weed and pest animal prevention, control methods and target species across the BTM Complex for the following year ○ liaising with local land managers and stakeholders on control measures and schedules. • Develop a feedback loop to alert the BTM Complex of any new or emerging weeds or pest animal species recorded to be occurring on any of the offset sites. • Public communication on pest animal records may be reported through FeralScan (www.feralscan.org.au).
3.2 Weed control	<ul style="list-style-type: none"> • Weed control should be undertaken in consideration of the control recommendations outlined in: <ul style="list-style-type: none"> ○ Noxious and Environmental Weeds Control Handbook (6th Edition) (DPI 2014) ○ Narrabri Shire Council Weed Management Plans (http://www.narrabri.nsw.gov.au/weeds-management-plans-1115.html) ○ resources on the NSW WeedWise website (http://weeds.dpi.nsw.gov.au/). • Adopt best-practice active and adaptive management of the density of invasive native plants such as white cypress pine (<i>Callitris glaucophylla</i>) and black cypress pine (<i>Callitris endlicheri</i>) such as ecological thinning, targeted grazing and prescribed fire as per the recommendations set out in <i>Actively Managing for Better Ecological Outcomes for the Brigalow and Nandewar State Conservation Areas</i> (NRC 2014). • Undertake a coordinated approach to weed monitoring across the offset sites for consistent reporting and data analysis.
3.3 Pest animal control	<ul style="list-style-type: none"> • Pest animal control should be undertaken in consideration of the control recommendations outlined in the Department of Primary Industries <i>Vertebrate Pest Control Manual</i> (DPI 2014). • Control strategies may include the destruction of burrows, shooting, trapping and baiting and should be undertaken following the NSW Codes of Practices (COPs) and Standard Operating Procedures (SOPs) (http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/publications/model-codes-of-practice). • A coordinated approach to pest animal monitoring should be undertaken across the offset sites for consistent reporting and data analysis.

Management Component	Management Actions
Strategic Focus Area 4 - Promote a consistent and coordinated approach to fire management for biodiversity	
4.1 Managing fuel loads	<ul style="list-style-type: none"> • The accessibility of fire trails and access tracks should be regularly maintained within the offset sites in accordance with relevant legislation of the time such as the <i>Native Vegetation Act 2003</i> or <i>Rural Fires Act 1997</i>. • A fuel load assessment and an assessment of the feasibility of completing fuel load reduction should be undertaken as identified on a risk basis or as recommended by the Rural Fire Service (RFS). • Fuel reduction in the form of strategic grazing could be trialled in appropriate management zones within the offset sites. The timing of any fuel reduction strategies should be determined based on fuel loads, vegetation maturity and weather/seasonal conditions; however it should generally be undertaken in autumn to encourage native species recruitment.
4.2 Ecological control burns	<ul style="list-style-type: none"> • Control burns should consider the recommendations outlined in Section 9 of the <i>Guide to Managing Box Gum Grassy Woodlands</i> (Rawlings <i>et al.</i> 2010). • Control burns should avoid burning trees containing hollow resources, where possible, to minimise impacts on roosting and nesting availability in the landscape. • If controlled burning is undertaken, implement mosaic burning to reduce the extent of any negative outcomes, provide refuge for wildlife and promote structural and species diversity.
Strategic Focus Area 5 – Enhance the connectivity of habitats through corridor establishment and management	
5.1 Connected landscapes and broader regional corridors	<ul style="list-style-type: none"> • Offset sites and conservation areas should be managed to improve habitat connectivity and corridor function using management actions techniques such as: <ul style="list-style-type: none"> ○ targeted revegetation including supplementary tubestock planting and seeding, ○ targeted weed and pest management, and ○ habitat augmentation with nest boxes and salvaged habitat resources. • Enhancement efforts should be focused to improve habitat connectivity within and between existing offset areas in the region. These broad areas of BTM complex managed land include: <ul style="list-style-type: none"> ○ land south of Mount Kaputar National Park linking offset areas east of Leard State Forest, ○ land south of Leard State Forest linking areas to Boonalla Aboriginal Area and Vickery State Forest, ○ land west and northwest of Leard State Forest linking to Pilliga East.

Management Component	Management Actions
<p>5.2 Mine rehabilitation and the vegetated buffer corridor for habitat connectivity</p>	<ul style="list-style-type: none"> • Where possible, mine rehabilitation should focus on providing habitat connectivity across the BTM Complex between areas of existing native vegetation to provide the best possible habitat linkages across the wider regional landscape. • Disturbed areas around the Leard State Forest are to be revegetated to contain vegetation communities, habitat and landforms characteristic of: <ul style="list-style-type: none"> ○ Leard State Forest, ○ White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC, and ○ habitat for threatened species. • Rehabilitation of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC is to be consistent with the <i>National Recovery Plan for White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland</i> (DECCW 2010) and the recommendations outlined in the <i>Guide to Managing Box Gum Grassy Woodlands</i> (Rawlings et al. 2010). • Progressive disturbance limits for White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC for the years 5, 10, 15 and 21 at the Boggabri and Maules Creek Coal Mines are to be assured by clearly marking the limits of disturbance with no stockpiling, equipment or machinery occurring beyond each staged boundary. • Specifically for the Boggabri and Maules Creek Coal Mines vegetated buffer corridor: <ul style="list-style-type: none"> ○ The mines should consult each other regarding clearing limits to ensure an appropriate vegetated buffer from the east and west of the project areas is maintained, and ○ The mines should coordinate weed and pest animal control measures, habitat augmentation, fencing and signage, and ecological monitoring within the vegetated buffer corridor.

Management Component	Management Actions
Strategic Focus Area 6 – Consult and workshop biodiversity issues with local stakeholders and land managers	
6.1 Biodiversity management consultation	<ul style="list-style-type: none"> • Biodiversity issues should be communicated across sites through the appropriate forums, including environmental representatives from each site (and the inclusion of relevant agencies, as relevant, such as OEH and DPE), to meet to discuss biodiversity issues within offset sites. • This communication (across the BTM Complex, for example) should facilitate the preparation of an annual summary report detailing the overall biodiversity performance and outcomes of the offset sites using the information provided from annual biodiversity monitoring reports. • This should include liaison with adjoining land owners and managers, as appropriate, to discuss concerns including offset site indirect impacts on adjoining agricultural land, emerging weed and pests, and opportunities to improve biodiversity links across properties. • This should include liaison with local stakeholders such as the National Parks and Wildlife Service (NPWS), Landcare, Forestry Corporation of NSW, Narrabri Shire Council and Local Land Service (LLS), as appropriate, to discuss biodiversity management actions and issues.

2.1.2 Strategic Biodiversity Offset Monitoring Opportunities

The effectiveness and long-term success of conservation management actions must be evaluated against key outcomes, which necessitate regular and consistent scientific monitoring. Formal monitoring programs periodically examine measurable changes over time and provide information on impacts and the success or otherwise of management actions.

Table 2.2 identifies opportunities for biodiversity offset monitoring programs and reporting to be undertaken in a coordinated manner across the BTM Complex to maximise environmental outcomes and cost efficiencies. An overall recommendation in relation to the BTM Complex is the development of a monitoring summary report template (to be prepared by the BTM mines) to allow for a consistent approach for reporting on monitoring data for the ease of comparing information across the BTM Complex offset sites.

While **Table 2.2** provides information on the recommended monitoring actions to be undertaken at the offset sites, it is acknowledged that the detailed methodology of how these are achieved are to be clearly detailed in the BMPs for individual project sites.

Table 2.2 Strategic Biodiversity Offset Monitoring Opportunities

Monitoring Component	Monitoring Actions
Strategic Focus Area 1 - Enhance the quality of habitats and landscapes at the offset sites for White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC	
<p>1.1 Natural regeneration (undertaken in semi-cleared and remnant native woodland vegetation in good condition)</p>	<ul style="list-style-type: none"> • Monitoring of regenerating White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC should be undertaken annually and across offset sites. It is recommended that the season for the monitoring sites is rotated every year to assess the community during different seasons. For example: <ul style="list-style-type: none"> ○ half of the monitoring sites surveyed in autumn (to maximise the detection of native perennials); and ○ half of the monitoring sites surveyed in spring (to identify the extent of exotic annuals in the community). • Monitoring should be undertaken in accordance with either the BioBanking Assessment Methodology (BBAM) (2014) or Biodiversity Assessment Method (BAM), whichever is determined to be the most appropriate through consultation with OEH, to analyse trends against benchmark data by: <ul style="list-style-type: none"> ○ undertaking plot and transect surveys, ○ undertaking at least the minimum number of plots and transects per vegetation zone, and ○ photographic monitoring at permanent monitoring points conducted using a consistent methodology across the offset sites. • During monitoring surveys, specific notes should be taken on any dense or emerging stands of exotic plant species, such as Coolatai grass (<i>Hyparrhenia hirta</i>) and invasive native species such as white cypress pine (<i>Callitris glaucophylla</i>) or black cypress pine (<i>Callitris endlicheri</i>), that may result in the suppression of native understorey species establishment. • Monitoring should be undertaken within the offset sites at least annually for the first five years and then every two years until preliminary completion criteria (refer to Table 2.3) are met. • For the BTM Complex, monitoring results should be outlined in a consistent summary report template to allow for the comparison of results and a consistent understanding of the condition of naturally regenerating White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC broadly across the offset sites.
<p>1.2 Collect and propagate seed</p>	<ul style="list-style-type: none"> • The completion of an Annual Summary Report should be undertaken following each collection event. This should include records of species, qualities, dates and locations as per the Florabank Guideline 4 (www.florabank.org.au/).

Monitoring Component	Monitoring Actions
<p>1.3 Active revegetation (undertaken in semi-cleared woodland, derived native grasslands and cleared land)</p>	<ul style="list-style-type: none"> • Monitoring of revegetated White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC should be undertaken annually and across the BTM Complex offset sites. It is recommended that the season for the monitoring sites is rotated every year to assess the community during different seasons. For example: <ul style="list-style-type: none"> ○ half of the monitoring sites surveyed in autumn (to maximise the detection of native perennials) ○ half of the monitoring sites surveyed in spring (to identify the extent of exotic annuals in the establishing community). • Monitoring should be undertaken in accordance with either the BioBanking Assessment Methodology (BBAM) (2014) or Biodiversity Assessment Method (BAM) (in prep.), whichever is determined to be the most appropriate through consultation with OEH, to analyse trends against benchmark data by: <ul style="list-style-type: none"> ○ undertaking plot and transect surveys ○ undertaking the minimum number of plots and transects per vegetation zone ○ photographic monitoring at permanent monitoring points conducted using a consistent methodology across the offset sites. • During monitoring surveys, specific notes should be taken on any dense or emerging stands of exotic plant species, such as Coolatai grass (<i>Hyparrhenia hirta</i>) and invasive native species such as white cypress pine (<i>Callitris glaucophylla</i>) or black cypress pine (<i>Callitris endlicheri</i>), that may result in the suppression of native understorey species establishment. • Monitoring should be undertaken within the offset sites at least annually for the first five years and then every two years until the preliminary completion criteria (refer to Table 2.3) are met. • For the BTM Complex, monitoring results should be outlined in a consistent summary report template to allow for the comparison of results and a consistent understanding of the condition of naturally regenerating White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC broadly across the offset sites.
<p>Strategic Focus Area 2 – Provide ongoing management and enhancement of existing habitats at the offset sites for threatened species and communities</p>	
<p>2.1 Salvage of habitat resources</p>	<ul style="list-style-type: none"> • Salvaged arboreal hollows located within areas surrounding the disturbance areas, rehabilitation areas and the offset sites should be monitored for their use and condition in conjunction with other annual fauna monitoring. • Monitoring may include the use of remote camera surveys targeting areas where salvaged hollows and fallen timber is installed into habitat. Detailed monitoring techniques are to be outlined in the relevant management plans.

Monitoring Component	Monitoring Actions
2.2 Habitat augmentation and nest box installation	<ul style="list-style-type: none"> • An assessment of the number of nest boxes required should be undertaken (the total number of hollows (existing hollows and nest boxes combined) at the offset sites should be at least the same as the number of hollows with signs of use (nesting material, feathers, fur, scratches, etc) and of suitable dimensions for species occupancy (suitable entrance size and a hollow chamber extending into the branch/trunk) removed from the impact site). • Nest boxes installed within the offset sites should be monitored for their signs of use² and condition at consistent times of the year (preferably spring) across the offset sites targeting species type based on nest box design. • Signs of use monitoring may be undertaken using a pole camera that allows viewing of the inhabitants of the boxes as well as a view of the condition of the top of the boxes from the ground with minimal disturbance to the fauna occupying the boxes. Detailed monitoring techniques are to be outlined in the relevant management plans. • Monitoring results of next box usage should be reported in the relevant Annual Summary Report.
2.3 Access control	<ul style="list-style-type: none"> • Ongoing monitoring and site inspections should note any damage or disrepair of fences and must be communicated to the Environmental Representative of the relevant site. • If, during the course of monitoring, the use of barbed-wire fencing is found to be damaging to local wildlife (e.g. gliders/bats caught in fencing), this is to be communicated to the Environmental Representative of the relevant site and ecologically-friendly alternatives are to be investigated.
Strategic Focus Area 3 - Promote a consistent and coordinated approach to weed management and pest animal control	
3.1 Weed and pest prevention and communication	<ul style="list-style-type: none"> • Key messages on weed control and pest prevention should be available to employees via toolbox talks and inductions to raise awareness of biodiversity issues in the region (e.g. weed spread prevention through the washing of vehicles and equipment).

² Signs of use can be entrance chew marks, the presence of nesting material, signs of activity inside nest boxes, and the presence of animals.

Monitoring Component	Monitoring Actions
3.2 Weed control	<ul style="list-style-type: none"> • Weed occurrences in the offset sites should be identified as part of the annual flora monitoring, but also opportunistically recorded during any other offset site inspections to examine the effectiveness of control measures. • For major weed infestations or newly recorded species, the location, size, density and species should be recorded and communicated to the Environmental Representative of the relevant site. • During monitoring surveys, specific notes should be taken on any dense or emerging stands of exotic plant species, such as Coolatai grass (<i>Hyparrhenia hirta</i>) and invasive native species such as white cypress pine (<i>Callitris glaucophylla</i>) or black cypress pine (<i>Callitris endlicheri</i>), that may result in the suppression of native understorey species established in White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC. • For the BTM Complex, monitoring results should be outlined in a consistent summary report template to allow for the comparison of results and a consistent understanding of the key weed issues in a broad regional context.
3.3 Pest animal control	<ul style="list-style-type: none"> • Observations of pest animals should be undertaken as part of the annual fauna monitoring, but also opportunistically recorded during any other offset site inspections. • Monitoring of pest animals should be undertaken prior to and following the application of control measures to examine the effectiveness of these measures. • Monitoring for pest animals should consider the recommendations in the Department of Primary Industries <i>Monitoring Techniques for Vertebrate Pests</i> (http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/publications/monitoring-techniques). • For significant pest animal occurrences or observed pest animal damage, the date, location, activity, density and pest animal species should be recorded and communicated to the Environmental Representative of the relevant site. • For the BTM Complex, monitoring results should be outlined in a consistent summary report template to allow for the comparison of results and a consistent understanding of the key pest animal issues in a broad regional context.
Strategic Focus Area 4 - Promote a consistent and coordinated approach to fire management for biodiversity	
4.1 Managing fuel loads	<ul style="list-style-type: none"> • Monitoring of fuel levels will take place as part of the overall annual inspection of the offset sites but also as identified on a risk basis or as recommended by the RFS. • The accessibility and functionality of fire trails and access tracks should be regularly monitored within the offset sites.

Monitoring Component	Monitoring Actions
4.2 Ecological control burns	<ul style="list-style-type: none"> • If fuel reduction is undertaken in the form of controlled burning, additional flora monitoring points will be required to assess the impacts of control measures on native vegetation communities (particularly within White Box - Yellow Box - Blakely's Red Gum Woodland EEC and CEEC). • In habitat restoration areas and regeneration/revegetation zones, monitoring will be required to record the response to a fire event and guide the need for potential active and adaptive management.
Strategic Focus Area 5 – Enhance the connectivity of habitats through corridor and buffer area establishment and management	
5.1 Connected landscapes and broader regional corridors	<ul style="list-style-type: none"> • Monitoring undertaken as part of other ecological monitoring at the offset sites should consider the connected landscapes and corridors in the locality and region by including survey techniques to demonstrate fauna movement across these areas such as: <ul style="list-style-type: none"> ○ remote camera surveys ○ radio tracking and/or woodland bird banding. • Detailed monitoring techniques are to be outlined in the relevant management plans.
5.2 Mine rehabilitation and the vegetated buffer corridor for habitat connectivity	<ul style="list-style-type: none"> • The success of mine rehabilitation should be monitored against the specific criteria outlined in the Rehabilitation Management Plans (RMPs). These techniques may include: <ul style="list-style-type: none"> ○ Landscape Function Analysis ○ weed, pest animal and edge effects monitoring ○ targeted floristic surveys to be compared to reference sites in Leard State Forest and/or offset sites, and/or ○ targeted fauna monitoring. • For the BTM Complex, monitoring results should be outlined in a consistent summary report template to allow for the comparison of results and an understanding of the overall success of mine rehabilitation in the area. • Monitoring of the vegetated buffer corridor should be undertaken cooperatively between the Boggabri and Maules Creek Coal Mines and may include: <ul style="list-style-type: none"> ○ weed, pest animal and edge effects monitoring ○ targeted floristic surveys to be compared to analogue sites in Leard State Forest, and/or ○ targeted fauna monitoring including techniques such as inspection cameras for nest box monitoring, salvaged resource monitoring and remote camera surveys. The use of the corridor by woodland birds and micro-bats would indicate some effectiveness as a movement corridor.

Monitoring Component	Monitoring Actions
Strategic Focus Area 6 – Consult and workshop biodiversity issues with local stakeholders and land managers	
6.1 Biodiversity management consultation	<ul style="list-style-type: none"> • Minutes, actions and key recommendations from biodiversity management consultation forums should be made available to attendees. • Any research or monitoring data in relation to biodiversity should be made available across the BTM Complex to facilitate the sharing of knowledge for the broader conservation of the offset sites. This may include reports, guidelines and/or expert input into management of cypress pine regrowth, species translocation success, pest animal and weed outcomes and control and techniques. • The Annual Summary Report will detail the overall biodiversity performance and outcomes of the offset sites using the information provided from the monitoring reports.

2.1.3 Biodiversity Performance Measures and Preliminary Completion Criteria

Table 2.3 identifies opportunities for consolidated performance measures and preliminary completion criteria across the region to maximise environmental outcomes in the region across the offset sites.

The following performance measures and preliminary completion criterion apply the SMART principles:

- **Specific** – specific outcomes relevant to biodiversity matters.
- **Measurable** – include quantifiable performance measures that can be compared over time.
- **Achievable** – realistic goals that can be compared to baseline information.
- **Relevant** – outcomes are directly relevant to the biodiversity matter.
- **Timely** – includes specific timeframes for the completion of the outcome.

While Table 2.3 provides information on the recommended performance measures and preliminary completion criteria for the offset sites, it is acknowledged that further detail in relation to particular offset sites is to be clearly detailed in the BMPs for individual project sites.

Table 2.3 Strategic Biodiversity Performance Measures and Preliminary Completion Criteria

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
Strategic Focus Area 1 - Enhance the quality of habitats and landscapes at the offset sites for White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC			
1.1 Natural regeneration (in semi-cleared and remnant native woodland vegetation in good condition)	<ul style="list-style-type: none"> • 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites across the relevant vegetation zones in each offset site show all locally-occurring canopy species recruiting³ (i.e. canopy tree species occurring in the moderate to good condition PCT at the offset site or surrounds are recruiting in the semi-cleared and remnant native woodland vegetation). Where monitoring is undertaken according to the BBAM sampling should occur across each entire vegetation zones. Where monitoring is undertaken according to the BAM sampling should be undertaken in the monitoring sites of each vegetation zone. 	Annually	By year 10

³ To meet the definition of “canopy species recruiting” there should be evidence of recruitment of at least 5 saplings per hectare.

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
	<ul style="list-style-type: none"> Naturally regenerated areas of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites conform to the condition assessment outlined on page 5 of the EPBC Policy Statement 3.5 White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands across the relevant vegetation zones in each offset site. 	Annually	By year 10
	<ul style="list-style-type: none"> 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across the relevant vegetation zones in each offset site show evidence of occupation or presence of at least 80% of the native fauna species comparative to approved benchmark or monitoring reference sites. 	Annually	By year 10
	<ul style="list-style-type: none"> 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites across the relevant vegetation zones in each offset site is within the benchmark ranges for the cover scores (i.e. overstorey, midstorey and groundcover) and at 80% or above for species richness benchmarks. 	Annually	By year 10
1.2 Collect and propagate seed	<ul style="list-style-type: none"> Seed collection records, including location of plantings and success rates (where available), are reported on in the Annual Summary Report. 	Annually	-
	<ul style="list-style-type: none"> Seed is collected over a range of sites across the locality to adequately capture local variations within the offset sites and disturbance areas. 	Annually	-
1.3 Active revegetation (in semi-cleared woodland, derived native grasslands and cleared land)	<ul style="list-style-type: none"> 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites across the relevant vegetation zones in each offset site show all locally-occurring canopy species recruiting³ (i.e. canopy tree species occurring in the moderate to good condition PCT at the offset site or surrounds are recruiting in the semi-cleared woodland, derived native grasslands and cleared land). Where monitoring is undertaken according to the BBAM sampling should occur across each entire vegetation zones. Where monitoring is undertaken according to the BAM sampling should be undertaken in the monitoring sites of each vegetation zone. 	Annually following active revegetation	By year 15 following active revegetation

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
	<ul style="list-style-type: none"> Active regeneration areas of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites conform to the condition assessment outlined on page 5 of the EPBC Policy Statement 3.5 White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands areas across the relevant vegetation zones in each offset site. 	Annually following active revegetation	By year 15 following active revegetation
	<ul style="list-style-type: none"> 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across the relevant vegetation zones in each offset site show evidence of occupation or presence of at least 80% of the native fauna species comparative to approved benchmark or monitoring reference sites. 	Annually following active revegetation	By year 20 following active revegetation
	<ul style="list-style-type: none"> 100% of the White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC monitoring sites across the relevant vegetation zones in each offset site is within the benchmark ranges for the cover scores (i.e. overstorey, midstorey and groundcover) and at 80% or above for species richness benchmarks. 	Annually following active revegetation	By year 20 following active revegetation
Strategic Focus Area 2 – Provide ongoing management and enhancement of existing habitats at the offset sites for threatened species and communities			
2.1 Salvage of habitat resources	<ul style="list-style-type: none"> Salvaged resources that are reused or relocated in rehabilitated areas or offset sites are in structurally good condition. 	Annually following placement	By year 5 following placement.
2.2 Habitat augmentation and nest box installation	<ul style="list-style-type: none"> 80% of the nest boxes installed are being utilised or show signs of use by native species across the offset sites. Utilisation of nest boxes by pest species such as European honey bee (<i>Apis mellifera</i>), common myna (<i>Acridotheres tristis</i>), common starling (<i>Sturnus vulgaris</i>) and feral rodent species (<i>Rattus</i> and <i>Mus</i> spp.) should be recorded. 	Each nest box should be monitored at least once every 5 years	Ongoing
	<ul style="list-style-type: none"> Each nest box installed within the offset sites should be in good structural condition and functioning in the landscape. 	Annually following installation	Ongoing
2.3 Access control	<ul style="list-style-type: none"> Livestock are excluded from restoration areas following planting and high quality woodland vegetation at the offset sites (it is acknowledged that strategic grazing may be required in some areas). 	Annually	Ongoing

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
	<ul style="list-style-type: none"> Wildlife-friendly fencing is utilised, where appropriate, within the offset sites. 	1 year	By year 10
Strategic Focus Area 3 - Promote a consistent and coordinated approach to weed management and pest animal control			
3.1 Weed and pest prevention and communication	<ul style="list-style-type: none"> Weed trends and control schedules are communicated across the BTM Complex in the relevant forums. 	Annually	Ongoing
	<ul style="list-style-type: none"> The most recent offset monitoring summary reports containing information on weed and pest records, trends and issues are provided across the BTM Complex and reported on in the Annual Summary Report. 	Annually	Ongoing
	<ul style="list-style-type: none"> Key messages on weeds are effectively communicated, where appropriate, with relevant local land holders, managers and stakeholders. 	Annually	Ongoing
3.2 Weed control	<ul style="list-style-type: none"> Offset site flora monitoring shows an overall reduction in exotic plant cover following control measures implemented across the offset sites. 	Annually	Ongoing
	<ul style="list-style-type: none"> Weed species do not comprise more than 20% of any strata in the native vegetation communities within the offset sites. 	Annually	Ongoing
	<ul style="list-style-type: none"> Weed control is undertaken across the offset sites using methods outlined in the Noxious and Environmental Weeds Control Handbook (6th Edition) (DPI 2014), Narrabri Shire Council Weed Management Plans, and/or the NSW WeedWise website. 	Annually	Ongoing
	<ul style="list-style-type: none"> Significant weed infestations or newly identified weed species within the offset sites are reviewed and control measures implemented within 1 year of identification of the issue. 	Annually	Ongoing
3.3 Pest animal control	<ul style="list-style-type: none"> Offset site fauna monitoring shows an overall reduction in pest animal species and population sizes targeted by control measures implemented across the offset sites (in consideration of potential drought conditions and seasonal trends). 	Annually	By year 5

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
	<ul style="list-style-type: none"> Pest animal control is undertaken across the offset sites using methods approved under the NSW Codes of Practices (COPs) and Standard Operating Procedures (SOPs). 	Annually	Ongoing
	<ul style="list-style-type: none"> Significant pest animal occurrences or newly identified pest species within the offset sites are reviewed and control measures implemented (if required) within 1 year of identification of the issue. 	Annually	Ongoing
Strategic Focus Area 4 - Promote a consistent and coordinated approach to fire management for biodiversity			
4.1 Managing fuel loads	<ul style="list-style-type: none"> If determined to be suitable following recommendations from monitoring or the RFS, strategic grazing in appropriate management zones is undertaken to manage fuel loads. 	Every 2 years	Ongoing
4.3 Ecological control burns	<ul style="list-style-type: none"> Fuel reduction is undertaken in the form of controlled burning (as per recommendations in Rawlings <i>et al.</i> 2010) as deemed required and in consultation with the RFS. 	Every 5 years	Ongoing
	<ul style="list-style-type: none"> The impacts of control and mosaic burning on native and weed species diversity is reported on and information made available to all BTM Complex sites. 	Within 1 year of completed monitoring reports.	Ongoing
Strategic Focus Area 5 – Enhance the connectivity of habitats through corridor and buffer area establishment and management			
5.1 Connected landscapes and broader regional corridors	<ul style="list-style-type: none"> Corridors within the offset sites are in accordance with the performance indicators outlined in Strategic Focus Area 3 in relation to weeds and pests. 	As per Strategic Focus Area 3 .	As per Strategic Focus Area 3 .
	<ul style="list-style-type: none"> Targeted fauna monitoring indicates that the offset site corridors provide habitat for native fauna species in the locality through monitoring as outlined in Table 2.2. 	Annually	By year 10
5.2 Mine rehabilitation and the vegetated buffer corridor for habitat connectivity	<ul style="list-style-type: none"> The rehabilitated habitat in mine rehabilitation and the vegetated buffer corridor provides a wildlife corridor linking habitats from conservation areas in the east, linking Leard State Forest and to west towards the Namoi River. 	Annually following rehabilitation	By year 30 (subject to relinquishment of mining lease by DRG)

Strategic Focus Areas/ Management Component	Performance Measures and Preliminary Completion Criteria	Timeframe (following offset establishment)*	
		Ongoing Performance Measured	Completion Timeframe
Strategic Focus Area 6 – Consult and workshop biodiversity issues with local stakeholders and land managers			
6.1 Biodiversity management consultation	<ul style="list-style-type: none"> Targeted consultation with key stakeholders, land managers and agencies regarding biodiversity issues is demonstrated through the development of resources and workshops involving stakeholders. 	Annually	Ongoing
	<ul style="list-style-type: none"> An annual summary report is to be prepared detailing the overall biodiversity performance and outcomes of the offset sites across the region. 	Annually	Ongoing

* Where a specific completion timeframe is specified (such as by Year 15), for the BTM mines this means:

- for offsets identified in the relevant project approval, the timeframe from commencement of the project;
- for offsets approved in subsequent project modifications, the timeframe from approval of the modification, and
- for offsets identified in any revised Biodiversity Offset Strategy required under the relevant project approval, the timeframe from approval of the revised offset strategy.

2.1.4 Biodiversity Trigger, Action and Response Plan

Trigger Action Response Plans (TARPs) are tools that document the threshold or ‘trigger point’ of a variable that is being monitored and outline the indicative actions required when it is observed that the threshold has been exceeded or not met. **Table 2.4** below outlines the TARPs applicable to the RBS.

While **Table 2.4** provides information on the recommended TARPs for the offset sites, it is acknowledged that further detail in relation to particular offset sites is to be clearly detailed in the BMPs for individual project sites.

Table 2.4 Strategic Biodiversity Trigger Action Response Plan

Aspect	Trigger	Action/Response
<p>Strategic Focus Area 1 - Enhance the quality of habitats and landscapes at the offset sites for White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC</p>		
<p>1.1 Natural regeneration (in semi-cleared and remnant native woodland vegetation in good condition)</p>	<ul style="list-style-type: none"> • Canopy species are not recruiting across 100% of the relevant vegetation zones in the offset sites after 5 years following offset establishment. • Naturally regenerated areas do not conform to the definition of the community in the EPBC Policy Statement 3.5 White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands after 10 years following offset establishment. 	<ul style="list-style-type: none"> • Review the likely reasons for success in other naturally regenerating areas within the offset sites and the potential cause of plant species failure. • Targeted removal of non-characteristic species and weeds, following supplementary planting with tubestock and seed, if deemed required. • Consider additional monitoring to examine the establishment of tubestock and seed.
	<ul style="list-style-type: none"> • Naturally regenerated grassland areas are regenerating into vegetation community types other than White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC (such as grey box (<i>Eucalyptus microcarpa</i>) or poplar box (<i>Eucalyptus populnea</i>) dominated vegetation). 	<ul style="list-style-type: none"> • Undertake consultation with OEH on whether actions are required. • Targeted removal of non-characteristic species, following supplementary planting with tubestock and seed, if deemed required.
	<ul style="list-style-type: none"> • White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across 100% of the relevant vegetation zones in each offset site do not show evidence of occupation or presence of at least 80% of the native fauna species comparative to approved benchmark or monitoring reference sites after 10 years following offset establishment. 	<ul style="list-style-type: none"> • Investigate and prioritise augmentation of habitat resources for the targeted threatened species.
	<ul style="list-style-type: none"> • White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across the relevant vegetation zones in each offset site is not within the benchmark ranges for the cover scores (i.e. overstorey, midstorey and groundcover) and at 80% or above for species richness benchmarks; OR the benchmark ranges for the cover scores and 80% or more of the species richness benchmarks are met but not across 100% of the offset sites after 10 years following offset establishment. 	<ul style="list-style-type: none"> • Review the likely reasons for success in other naturally regenerating areas within the offset sites and the potential cause of below benchmark performance. • Undertake consultation with OEH on whether actions are required. • Evaluate whether supplementary planting with appropriate tubestock and seed is required.

Aspect	Trigger	Action/Response
1.2 Collect and propagate seed	<ul style="list-style-type: none"> Seed collection records are not reported on in the Annual Review. 	<ul style="list-style-type: none"> Make appropriate notations in the Annual Summary Report on environmental documentation performance.
	<ul style="list-style-type: none"> Seed is not collected over a range of sites across the locality and local variations in species mixes are not captured. 	<ul style="list-style-type: none"> Review seed inventory and propagated plants and investigate the need to collect seed in other areas. Review the success or otherwise of rehabilitation/revegetation that has used seed and tubestock and determine if more diversity is required.
1.3 Active revegetation (in semi-cleared woodland, derived native grasslands and cleared land)	<ul style="list-style-type: none"> Canopy species are not recruiting across 100% of the relevant vegetation zones in each offset site after 15 years following offset establishment. Actively revegetated areas do not conform to the definition of the community in the EPBC Policy Statement 3.5 White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands broadly across the offset sites after 15 years following offset establishment. 	<ul style="list-style-type: none"> Review the likely reasons for success in other actively revegetated areas within the offset sites and the potential cause of plant species failure. Targeted removal of non-characteristic species and weeds following further supplementary planting with tubestock and seed, if deemed required. Consider additional monitoring to examine the success or otherwise of management measures.
	<ul style="list-style-type: none"> White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across 100% of the relevant vegetation zones in each offset site do not show evidence of occupation or presence of at least 80% of the native fauna species comparative to approved benchmark or monitoring reference sites after 15 years following offset establishment. 	<ul style="list-style-type: none"> Investigate and prioritise augmentation of habitat resources for locally-occurring fauna species.

Aspect	Trigger	Action/Response
	<ul style="list-style-type: none"> White Box – Yellow Box – Blakely’s Red Gum Woodland EEC and CEEC across the relevant vegetation zones in each offset site is not within the benchmark ranges for the cover scores (i.e. overstorey, midstorey and groundcover) and at 80% or above for species richness benchmarks; OR the benchmark ranges for the cover scores and 80% or more of the species richness benchmarks are met but not across 100% of the offset sites after 15 years following offset establishment. 	<ul style="list-style-type: none"> Review the likely reasons for success in other naturally regenerating areas within the offset sites and the potential cause of below benchmark performance. Undertake consultation with OEH on whether actions are required. Evaluate whether supplementary planting with appropriate tubestock and seed is required.
Strategic Focus Area 2 – Provide ongoing management and enhancement of existing habitats at the offset sites for threatened species and communities		
2.1 Salvage of habitat resources	<ul style="list-style-type: none"> Salvaged resources are damaged, have deteriorated or are no longer present. 	<ul style="list-style-type: none"> Re-establish salvaged resources, if appropriate. Review and identify the need to replace hollow loss with nest boxes. Review and identify appropriate measures to reduce loss, damage or deterioration of salvaged resources in the future.
2.2 Habitat augmentation and nest box installation	<ul style="list-style-type: none"> Loss or damage of nest boxes or evidence of deterioration of nest box condition. 	<ul style="list-style-type: none"> Identify and replace all lost and damaged nest boxes. Review and identify appropriate measures to reduce loss, damage or deterioration nest boxes in the future.
	<ul style="list-style-type: none"> Monitoring shows less than 80% sign of use of nest boxes across the offset sites after 5 years following installation. 	<ul style="list-style-type: none"> Review the performance of nest boxes and naturally occurring hollows at reference sites to investigate the need for new nest box designs, replacements, or change in location of nest boxes.
	<ul style="list-style-type: none"> Nest boxes are not in good structural condition or found to be utilised by pest species such as European honey bee (<i>Apis mellifera</i>), common myna (<i>Acridotheres tristis</i>), common starling (<i>Sturnus vulgaris</i>) and feral rodent species (<i>Rattus</i> and <i>Mus</i> spp.). 	<ul style="list-style-type: none"> Remove pest animals. Consider the need for nest box replacement or repair.

Aspect	Trigger	Action/Response
2.3 Access control	<ul style="list-style-type: none"> Livestock are accessing and causing damage in areas where they should be excluded. 	<ul style="list-style-type: none"> Identify location of entry and repair fencing as required. Specifically monitor livestock occupancy in conservation areas.
	<ul style="list-style-type: none"> Reports of fauna being injured or killed as a result of barbed wire fencing within the offset sites. 	<ul style="list-style-type: none"> Review the incident/s and advise on whether alternative fencing materials are required or should be investigated.
Strategic Focus Area 3 - Promote a consistent and coordinated approach to weed management and pest animal control		
3.1 Weed and pest prevention and communication	<ul style="list-style-type: none"> Weed trends and control schedules are not communicated across the BTM Complex or with relevant local land holders, managers and stakeholders. 	<ul style="list-style-type: none"> Mine Site Environmental Representative to be responsible for making information available for meetings and forums as appropriate.
3.2 Weed control	<ul style="list-style-type: none"> Offset site flora monitoring show an increased level of exotic plant cover following control measures implemented across the offset sites. Weed species collectively comprise more than 20% of any strata in the native vegetation communities within the offset sites during any year following offset establishment. 	<ul style="list-style-type: none"> Identify location of weed issues and review the need for further control measures such as physical removal, herbicides, strategic grazing and control burns. Consider additional monitoring to examine the success or otherwise of additional control measures.
	<ul style="list-style-type: none"> Weed control is not undertaken across the offset sites using methods outlined in the Noxious and Environmental Weeds Control Handbook (6th Edition) (DPI 2014), Narrabri Shire Council Weed Management Plans, and/or the NSW WeedWise website. 	<ul style="list-style-type: none"> Review the methods being used and consult with agencies on the other suitable methods of weed control. Discuss alternative control methods with contractors hired to undertake weed control.
	<ul style="list-style-type: none"> Significant weed invasions or newly identified weeds species within the offset sites are identified through site inspections and monitoring. 	<ul style="list-style-type: none"> Review the issues and facilitate additional control measures as required within 1 year of identification of the issue.

Aspect	Trigger	Action/Response
3.3 Pest animal control	<ul style="list-style-type: none"> Offset site fauna monitoring shows an increase of pest animal species following control measures implemented across the offset sites. 	<ul style="list-style-type: none"> Identify location of pest animal issues and review the need for further control measures in accordance with NSW Codes of Practices (COPs) and Standard Operating Procedures (SOPs). Consider additional monitoring to examine the success or otherwise of additional control measures. Consider the potential impact of drought conditions and seasonal trends.
	<ul style="list-style-type: none"> Pest animal control is not being undertaken using methods approved under the NSW Codes of Practices (COPs) and Standard Operating Procedures (SOPs). 	<ul style="list-style-type: none"> Review the methods being used and consult with DPI on the other suitable methods of pest animal control. Discuss alternative control methods with contractors hired to undertake pest animal control.
	<ul style="list-style-type: none"> Significant pest animal occurrences or newly identified pest species within the offset sites are identified through site inspections and monitoring. 	<ul style="list-style-type: none"> Review the issues and facilitate additional control measures as required within 1 year of identification of the issue.
Strategic Focus Area 4 - Promote a consistent and coordinated approach to fire management for biodiversity		
4.1 Managing fuel loads	<ul style="list-style-type: none"> Fuel loads are assessed as being moderate or high risk for intense and damaging bushfires. 	<ul style="list-style-type: none"> Undertake controlled burning as required but in consideration of the recommendations in Rawlings <i>et al.</i> (2010) and in consultation with the RFS. Consider the implementation of strategic grazing in appropriate management zones where control burning is not considered suitable.
4.2 Ecological control burns	<ul style="list-style-type: none"> The impacts of control and mosaic burning on weed species and native species diversity is found to be detrimental to the Strategic Focus Areas of biodiversity conservation. 	<ul style="list-style-type: none"> Investigate suitable actions and reinstate restoration activities. Review the most up to date advice and information on control burning in relation to the restoration of Box-Gum Woodland and fauna habitats.

Aspect	Trigger	Action/Response
	<ul style="list-style-type: none"> Fuel reduction in the form of controlled burning is not undertaken as recommended in Rawlings <i>et al.</i> (2010). 	<ul style="list-style-type: none"> Review monitoring reports and inspection reports to determine the level of fuel loads in the offset sites and discuss the appropriateness of control burning with the local Rural Fire Services and adjacent land managers. Review the most up to date authoritative advice and information on the frequency of control burning in relation to the restoration of Box-Gum Woodland and fauna habitats. Consider the implementation of strategic grazing in appropriate management zones where control burning is not considered suitable.
Strategic Focus Area 5 – Enhance the connectivity of habitats through corridor and buffer area establishment and management		
5.1 Connected landscapes and broader regional corridors	<ul style="list-style-type: none"> Corridors within the offset sites are not in accordance with the TARPs outlined in Strategic Focus Area 3 in relation to weeds and pests. Targeted fauna monitoring does not indicate that the offset site corridors provide habitat for native fauna species in the locality 10 years following offset establishment. 	<ul style="list-style-type: none"> As per Strategic Focus Area 3. Investigate the need for further habitat augmentation (such as nest boxes, fallen timber) to provide suitable ‘stepping stone’ habitat across the offset sites. Investigate the need for and implement additional or different monitoring methods to monitor fauna movement.
5.2 Mine rehabilitation and the vegetated buffer corridor for habitat connectivity	<ul style="list-style-type: none"> Rehabilitation and the vegetated buffer corridor does not provide linking habitats from conservation areas in the east, linking Leard State Forest and west towards the Namoi River 30 years following the approval of the Strategy. 	<ul style="list-style-type: none"> Investigate the need for further habitat augmentation (such as nest boxes, fallen timber) to provide suitable ‘stepping stone’ habitat across the offset sites. Review the mine rehabilitation status and confirm whether further targeted canopy tree planting is required. Investigate the opportunity to secure other land holdings that would, with appropriate management, increase the habitat connectivity of the mine rehabilitation.

Aspect	Trigger	Action/Response
	<ul style="list-style-type: none"> Boggabri and Maules Creek Coal Mines do not demonstrate a coordinated approach to monitoring in the vegetated buffer corridor. 	<ul style="list-style-type: none"> Undertake an annual meeting to discuss and coordinate monitoring within the vegetated buffer corridor.
Strategic Focus Area 6 – Consult and workshop biodiversity issues with local stakeholders and land managers		
6.1 Biodiversity management consultation	<ul style="list-style-type: none"> Targeted consultation with key stakeholders, land managers is not undertaken through the development of resources and workshops involving stakeholders. Meetings have not included relevant authorities and agencies (OEH, DPE, LLS, NPWS) and the CCC. 	<ul style="list-style-type: none"> Mine Site Environmental Representative to be responsible for invitations sent out with an appropriate lead time to allow for key stakeholders, land managers, relevant authorities and agencies are given the opportunity to engage in the biodiversity management issues.

2.2 Offset Security

2.2.1 Mechanisms for Securing Offset Sites

The long-term security of the BTM Complex offset sites is outlined in the State and Commonwealth project approval conditions for the individual projects. **Table 2.5** below provides a summary of the security mechanisms available for each of the mines, as specified in the respective approvals. For completeness, the table below also includes reference to offset security specified in approvals for rehabilitation areas of mine disturbance or for the 500m vegetated buffer corridor between the Maules Creek and Boggabri Coal Mines.

Table 2.5 Security Mechanisms for Offsets Specified in the Project Approvals

Mine	Offset Type	State Approval Offset Mechanisms	Commonwealth Approval Offset Mechanisms
Boggabri	Offset areas specified in Table 15 of the project approval owned, under option or committed by Boggabri Coal.	Conservation Agreement(s) under the <i>National Parks and Wildlife Act 1974</i> (NPW Act).	Legally binding conservation covenant over a subset of NSW approved offsets.
	Offset areas specified in Table 15 of the project approval identified as Crown Land and Additional Land managed for corridor enhancement.	Binding agreement acceptable to the Secretary.	Not applicable.
	Vegetated buffer corridor between Boggabri and Maules.	Not applicable.	Legal mechanism equivalent that would provide an equivalent protection of a conservation covenant.

Mine	Offset Type	State Approval Offset Mechanisms	Commonwealth Approval Offset Mechanisms
Maules Creek	Offset areas specified in Table 16 of the project approval not subject to final approval as part of the revised Biodiversity Offset Strategy.	Conservation Agreement(s) under the NPW Act. Transfer to National Park Estate.	Legally binding conservation covenant.
	Additional offsets identified in Table 16 of the project approval that were approved in the revised Biodiversity Offset Strategy.	Suitable arrangements to the satisfaction of the Secretary.	Legally binding conservation covenant.
	Rehabilitation Areas.	Suitable arrangements to the satisfaction of the Secretary.	Not applicable.
	Vegetated buffer corridor between Boggabri and Maules.	Not applicable.	Legally binding conservation covenant.
	Alternative offsets agreed by Commonwealth. (For areas additional to the State offsets)	Not applicable.	Legally binding conservation covenant.
Tarrawonga	Offset area specified in the project approval.	Conservation Agreement(s) under the NPW Act. Transfer to National Park Estate.	Legally binding covenant.

Since the project approval of the BTM Complex mines, the NSW Government has released the NSW Biodiversity Offsets Policy for Major Projects. Under this policy, securing offsets using BioBanking agreements is the preferred security mechanism option and is required for State Significant Developments (SSD). BioBanking agreements have now been replaced under the *Biodiversity Conservation Act 2016* (BC Act) by the introduction of biodiversity stewardship agreements.

While this offset mechanism is not a requirement for the BTM Complex mines, the opportunity to use biodiversity stewardship agreements as offset mechanisms should be considered.

It is also important to note that securing all the BTM Complex offset areas through Conservation Agreements or through transfer to National Park Estate can only occur if these mechanisms are ultimately acceptable to OEH/NPWS, in that the areas meet strategic conservation priorities and/or relevant statutory and policy requirements.

2.2.2 Offset Sites for Potential Inclusion in the National Park Estate

Based on the spatial data analysis and proximity to existing conservation areas, some of the BTM Complex offset sites may be a priority of inclusion into the National Park estate pending agreement between NPWS and the mines as to the terms of the transfer. It is recommended that properties be investigated to be transferred into the management of National Parks and zoned as National Parks/State Conservation Areas as appropriate.

NPWS is currently reviewing the BTM Complex offsets to identify offset areas of interest to potentially transfer to National Park estate, identify areas where it has no interest and possible areas of interest subject to further investigation. Following this review, remaining areas would need to be secured through either Conservation Agreements, BioBanking Agreements or Biodiversity Stewardship Agreements, subject to modification of the approvals and due diligence/financial assessment by the mines.

2.2.3 Long-term Security of Mine Rehabilitation in Leard State Forest

The long-term security and tenure of the mine rehabilitation to be undertaken within the boundaries of Leard State Forest requires ongoing discussions with the mines, government authorities and the NSW Forestry Corporation. The Boggabri, Maules Creek and Tarrawonga project approval conditions for mine rehabilitation favour biodiversity conservation land use objectives for the re-establishment of native vegetation communities, biodiversity improvement and habitat connectivity. It is acknowledged that this is contrary to the likely forest resource-orientated objectives for the current landholder, NSW Forestry Corporation.

Leard Forest is currently zoned 4 under the *Brigalow and Nandewar Community Conservation Area Act 2005* (BNCCA Act) for the purposes of forestry, recreation and mineral extraction. It is recommended that appropriate discussions are undertaken between the mines, DRG, DPE and NSW Forestry Corporation regarding the long-term management of Leard State Forest post mining. This may include opportunities to re-zone and manage the forest for biodiversity outcomes.

2.2.4 Requirements for a Vegetated Buffer Corridor

The retention of a vegetated buffer corridor of 500 metres between the Boggabri and Maules Creek mining projects was recommended by the PAC, OEH and DPE, and subsequently included in the Boggabri (09_0182) and Maules Creek (10_0138) project approvals. It is acknowledged that under the State approvals this corridor is not an official offset, but a mitigation measure to provide a corridor for movement of fauna between the east and west sides of the mine sites.

As per the approval conditions in 09_0182 and 10_0138, an alternative corridor of at least 500 metres in width and with equivalent or better ecosystem value may be proposed by the Boggabri and Maules Creek mines and would require the endorsement of OEH and approval from the Secretary. This approval would be required prior to any disturbance within the vegetated buffer corridor.

Management and monitoring actions outlined in **Section 2.0** relate to the existing vegetated buffer corridor as shown on **Figure 1.2**. If the BTM Complex mines wish to mine this area in the future and therefore provide an alternative corridor, the recommendations in the RBS will need to be reviewed and amended where deemed appropriate in consultation with OEH, DPE and DoEE.

As identified in **Table 2.5** above, the Commonwealth approval also requires that this corridor be secured through a conservation covenant. To date (May 2017) no conservation covenant has been established over the corridor.

2.2.5 Offset Funding

The individual mines are responsible for funding all biodiversity offset management actions through the implementation of the individual mine biodiversity management plans. However, the project approvals for each mine also include a requirement to lodge a conservation bond, similar to rehabilitation bond requirements of DRG, to ensure that funding is available to undertake offset management actions.

All or part of these conservation bonds would be required if the offset strategy for each mine is not completed in accordance with performance and completion criteria specified in the individual biodiversity management plans.

The project approvals recognise that a conservation bond may not be required pending the establishment of a security mechanism. For example, if some offset lands were transferred to National Park estate, then this would be subject to an agreed transfer of funds for capital and operating expenditure. Similarly, if BioBanking or biodiversity stewardship agreements were to be a viable security option, this would include up-front (or potentially deferred) transfer of funds to the Biodiversity Stewardship Payments Fund (which will be replacing the BioBanking Trust Fund).

2.3 Biodiversity Management Forum

It is proposed that a Biodiversity Management Forum would be established involving key environmental representatives from each mine site and key stakeholders to meet and discuss biodiversity management issues and biodiversity outcomes across the BTM Complex offset sites. The Forum should meet every two years as a minimum and seek, where required, input from stakeholders including local land managers, landholders (particularly landholdings adjoining offset areas), public authorities, and conservation groups. Membership of the forum should include the Government agencies in the Working Group and other key land management agencies that have a management or regulatory role in the area including for example, Rural Fire Service, DPI Lands, NPWS and representatives from the BTM complex Community Consultative Committees.

The Forum should be a platform to review broad biodiversity management issues and outcomes from monitoring surveys at a regional context and to identify solutions that can be targeted to benefit biodiversity at a broad scale across the offset sites. The Forum will enable the BTM Complex to update stakeholders on the progress of the offset sites in relation to the RBS and biodiversity outcomes for the region.

Topics to be discussed would include the implementation of the strategic biodiversity management actions including:

- biodiversity monitoring outcomes
- regeneration and revegetation successes and failures
- cooperation on seed collection, storage and propagation
- emerging or significant weed and pest issues, including in relation to neighbours
- fire management issues, and
- knowledge-sharing.

The first meeting of the Biodiversity Management Forum should be undertaken within 12 months of the approval of this strategy.

3.0 Future Offset and Priority Conservation Areas

3.1 Purpose

Section 1.5 documents the purpose and objectives of the Regional Biodiversity Strategy in relation to the identification of future potential offset sites for regional conservation outcomes. As documented in **Table 1.1**, the Regional Biodiversity Strategy seeks to meet a number of objectives in relation to future regional conservation outcomes. Specifically, these objectives comprise:

- Identify the key regional biodiversity values of the study area, primarily relying on the analysis of existing mapping products to be provided by OEH and the BTM Complex mines, ensuring the broader regional reference area is considered for context.
- Develop key factors to determine where in the landscape any additional future offsets and corridors are best placed within the study area.
- Assess land uses that may be incompatible with biodiversity conservation (e.g. strategic agricultural land, current mining interests), primarily relying on the analysis of existing mapping products.
- Provide a spatial framework to facilitate strategic placement of offsets for any future proposals (mining or otherwise) in the study area.

However, many of these objectives have either been achieved or superseded by other NSW Government initiatives, as discussed below. The BTM Complex mines have either finalised or are currently in the process of finalising additional biodiversity offsets with OEH and DPE as required by their State project approvals.

Priority Investment Area (PIA) mapping is being undertaken by OEH across NSW and it will guide the Biodiversity Conservation Investment Strategy (BCIS) to be developed under the BC Act as outlined in **Section 3.2** below. PIAs will identify areas in the landscape where funding for conservation management will have the greatest benefits for biodiversity outcomes.

Priority investment areas may include:

- core areas—being large remnant native vegetation whose management will contribute the greatest benefit to the conservation of key State and regional biodiversity values within a region
- state and regional biodiversity corridors—being linear areas that link core areas and play a crucial role in maintaining connections between animal and plant populations that would otherwise be isolated and at greater risk of local extinction
- areas containing the least protected ecosystems of public or private land
- areas required to increase the comprehensiveness, adequacy and representativeness of biodiversity in protected areas of public or private land.

3.2 Biodiversity Legislative Reforms and Land Conservation

The NSW Government reviewed biodiversity and land management legislation during 2015 and 2016. Following public consultation the BC Act and the *Local Land Services Amendment Act 2016* were assented to in parliament in November 2016 and took effect on 25 August 2017 following the commencement of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*. These Acts have replaced the *Native Vegetation Act 2003*, *Threatened Species Conservation Act 1995* and parts of the *National Parks and Wildlife Act 1974*.

In regard to private land conservation the Biodiversity Conservation Trust will work with landholders to provide information, advice and assistance to protect biodiversity values on their properties. It will be able to assess property, then enter into and administer private land conservation agreements with landholders. The Trust will also have a role in the NSW Biodiversity Offsets Scheme, where a development applicant may pay into a Biodiversity Conservation Fund to offset biodiversity impacts.

The Trust will be guided by a Biodiversity Conservation Investment Strategy which will be approved by the Minister for the Environment. This strategy will set conservation priorities to guide investment in biodiversity conservation in NSW. This will take into account areas in NSW where biodiversity is currently protected on public and private land.

The Biodiversity Conservation Investment Strategy is to comprise:

- principles that guide the identification of priority investment areas for biodiversity conservation
- principles that guide investment in those priority investment areas
- a map of identified priority investment areas.

It is proposed that the RBS is revised as part of the Stage 3 review and any prioritisation and/or mapping that is developed as part of the new legislation will be included.

4.0 Governance and Consultation

The preparation of the RBS has been coordinated by DPE and supported by OEH and the BTM Complex mines, through the Steering Group, in addition to feedback provided by the Working Group. DPE has met the required Project Coordinator role through the provision of a staff member to facilitate the strategy development. DPE has also overseen the relevant consultation required for the strategy implementation.

Input to the RBS was sought from a number of parties, at a number of stages throughout the project. The following sections identify the consultation undertaken and the anticipated consultation process for the future of the RBS.

4.1 Relevant Parties Involved

4.1.1 Steering Group

The function of the Steering Group was to contribute to the development of the RBS by providing technical input or data as needed, review of the RBS from the position of their organisation and to assist in resolving matters. Representatives of the following groups were members of the Steering Group:

- DPE
- OEH
- BTM Complex representatives.

DoEE advised DPE that it preferred to have an observer role in the ongoing development of Stage 2 of the Strategy. Relevant information has been provided to DoEE in preparing the strategy.

4.1.2 Working Group

The Working Group included broader consultation with government agencies and organisations. The following organisations formed the Working Group:

- Independent Chairperson (Mr Gordon Kirkby)
- Members of the Steering Group (as above)
- Division of Resources and Energy (now Division of Resources and Geoscience within DPE)
- Forestry Corporation of NSW
- North West Local Land Services (LLS) (formerly Namoi CMA) and
- Narrabri Shire Council.

4.2 Consultation Completed

Meetings and workshops were held to ensure adequate and appropriate input from relevant parties. The meeting schedule outlined in **Table 4.1** was undertaken during the Stage 2 reporting development.

A key concern raised in consultation with the mine CCCs was that the strategy did not include any spatial assessment including identification of priority areas and constraints for future biodiversity opportunities in the regional strategy area. The priority investment area mapping products are being developed under the legislative reform as outlined in **Section 3.2** and would subsequently be considered in the Stage 3 revisions to the strategy.

Table 4.1 Summary of Consultation Undertaken for the Development of the RBS

Type/Date	Attendance List	Key Discussion Points
Steering Group Meeting 25 March 2015	<ul style="list-style-type: none"> • DP&I (now DPE) • OEH • DoE (now DoEE) • Umwelt • Boggabri Coal • Whitehaven Coal 	<ul style="list-style-type: none"> • Stage 1 Scoping Report • Additional offsetting requirements • Draft contents for Stage 2 Strategy report • Spatial data requirements
Working Group Meeting 13 October 2015	<ul style="list-style-type: none"> • DP&I (now DPE) • OEH • Umwelt • DRE (now DRG) • LLS • Narrabri Shire Council • Forestry Corporation of NSW • Boggabri Coal • Whitehaven Coal 	<ul style="list-style-type: none"> • Outline of approved Stage 1 Scoping Report • Status of additional offset areas • Draft Table of Contents for Stage 2 Strategy report • Expected coordination with land managers and government • Ongoing involvement of DoEE • Constraints mapping resources and agricultural land • Security mechanisms – implications for Council rates • Private Forestry opportunities • Key focus areas for Stage 2 of the Strategy
Steering Group Meeting 17 March 2016	<ul style="list-style-type: none"> • DP&I (now DPE) • OEH • Umwelt • Boggabri Coal • Whitehaven Coal 	<ul style="list-style-type: none"> • Review of preliminary draft Stage 2 report • OEH corridors spatial product • Offset security mechanisms

Type/Date	Attendance List	Key Discussion Points
Working Group Meeting 28 April 2016	<ul style="list-style-type: none"> • DP&I (now DPE) • OEH • Umwelt • DRE (now DRG) • LLS • Narrabri Shire Council • Forestry Corporation of NSW • Boggabri Coal • Whitehaven Coal 	<ul style="list-style-type: none"> • Review of previous working group meeting. • Review of draft Stage 2 report. • Spatial framework methodology and results.
Steering Group Meeting 9 June 2016	<ul style="list-style-type: none"> • DPE • OEH • Umwelt • Boggabri Coal • Whitehaven Coal 	<ul style="list-style-type: none"> • Review of draft Stage 2 report.
BTM Mine Community Consultative Committee meetings (May-November 2016)	<ul style="list-style-type: none"> • Maules Creek CCC • Boggabri CCC • Tarrrawonga CCC • BTM Complex Joint CCC 	<ul style="list-style-type: none"> • Incorporation of spatial assessment and mapping products. • Impacts on landowners surrounding offsets (feral animals/ native fauna migration) • Extent of consultation • Security of offsets • Cumulative impacts – future projects

5.0 Adaptive Management and Review

5.1 Adaptive Management Process

This report will be responsive to any relevant new information available in relation to biodiversity, new developments and mapping products within the BTM Complex and the regional study area. Relevant authorities such as DPE or OEHL may request modifications to the report based on the availability of this new information. Under the project approval conditions, the BTM complex mines are also required to review any management plans or strategies as a result of information in annual reviews, incident reports, audits or modifications to the project approvals.

Annual reviews and independent audits as required through the consent conditions for each BTM mine will provide the opportunity for further adaptive management to drive ongoing improvement through regular updates of the BMPs. Any new information or approaches in BMPs should be considered in reviews and updates of the Regional Strategy, which will provide for adaptive management at a regional level.

A clear feedback loop between monitoring and management will be established between the BTM Complex mines through ongoing consultation using existing forums and the establishment of the Biodiversity Management Forum. Adaptive management of the offset sites and rehabilitation areas will be responsive to any new ecological data that may arise through the monitoring described in **Table 2.2** and the BMPs, legislative change or any other studies completed at the site. This will enable a flexible approach to management requirements, allowing ongoing feedback and refinement of the RBS for the regional biodiversity management context.

5.1.1 Biodiversity Legislative Reforms

As outlined in **Section 3.2**, the NSW Government has reviewed biodiversity and land management legislation and new legislation will commence in 2017. The implementation of the new Acts may result in changes to existing standard methods for monitoring and offsetting requirements.

The RBS will be subject to ongoing reviews and changes to legislation and policy frameworks can be incorporated as appropriate in subsequent revisions and with the endorsement of OEHL and DPE.

5.1.2 Threatening Processes

Threatening processes relevant to the successful implementation and the achievement of the conservation outcomes outlined in the RBS have been considered to help avoid or minimise the potential for them to occur. These include potential financial and resource constraints, but also threatening processes in relation to mechanisms that adversely affect threatened species, populations or ecological communities in the landscape as listed under State and Commonwealth legislation.

Threatening processes that may be relevant to the proposed outcomes of the RBS include:

- Financial viability for implementation of the offsets and biodiversity management measures.
- Pest animals, weeds and pathogens that can degrade natural habitats and displace native plant and animal species.
- Adverse environmental conditions such as bushfire events and extended drought conditions.

- Climate change resulting in changes to weather patterns that can impact on species composition and ecological communities in the landscape.

In order to ensure delivery of the stated outcomes of the RBS, and compliance with the approval conditions, a range of further actions may be required in the event it becomes apparent that performance indicators are not being met (as outlined in **Section 2.1.4**). Examples where this may occur include:

- Habitat improvement targets are not achieved
- Habitat values as determined by regular monitoring and reporting identifies a declining trend
- Populations of threatened species are in decline across the offset sites.

5.2 Review of RBS

The RBS will be reviewed and amended in the Stage 3 Strategy Review, to be completed by the end of December 2018. The Stage 3 Strategy Review is to be completed by suitably qualified, experienced and independent person/s whose appointment has been endorsed by OEH and subsequently approved by the Secretary of DPE.

Further review and refinement of the RBS will be undertaken following a schedule proposed by the Stage 3 Strategy Review and approved by OEH and DPE. The review is to be undertaken by an independent party and take into consideration any new relevant information or mapping products available for use by OEH to inform future biodiversity conservation opportunities and constraints in the RBS study area.

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APPENDIX 1

**Vegetation Mapping for the BTM
Complex Mines**

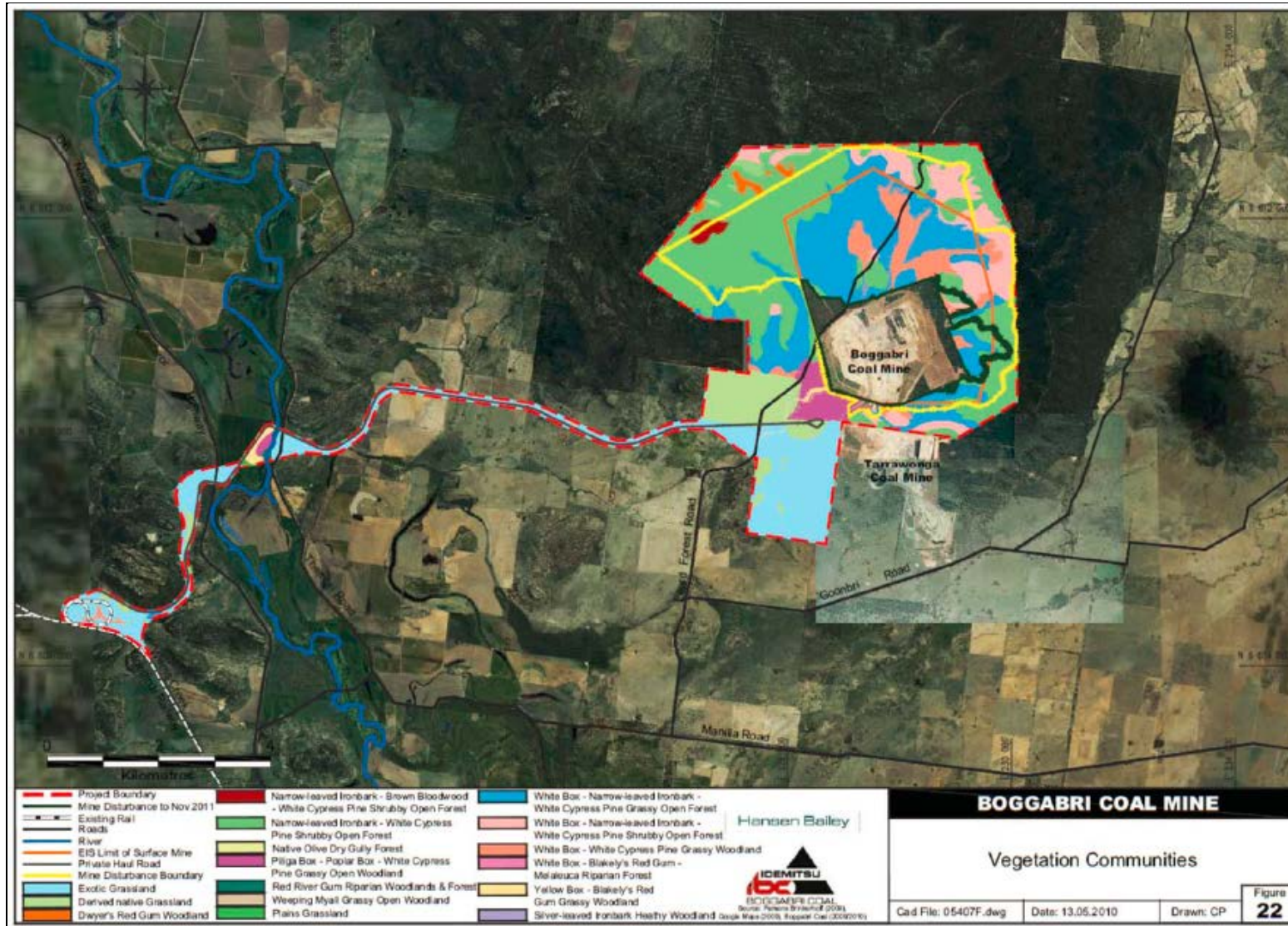


Figure A.1 Boggabri Disturbance (original Environmental Assessment) Site Vegetation Communities

Sourced from the Continuation of Boggabri Coal Mine Environmental Assessment (December 2010)

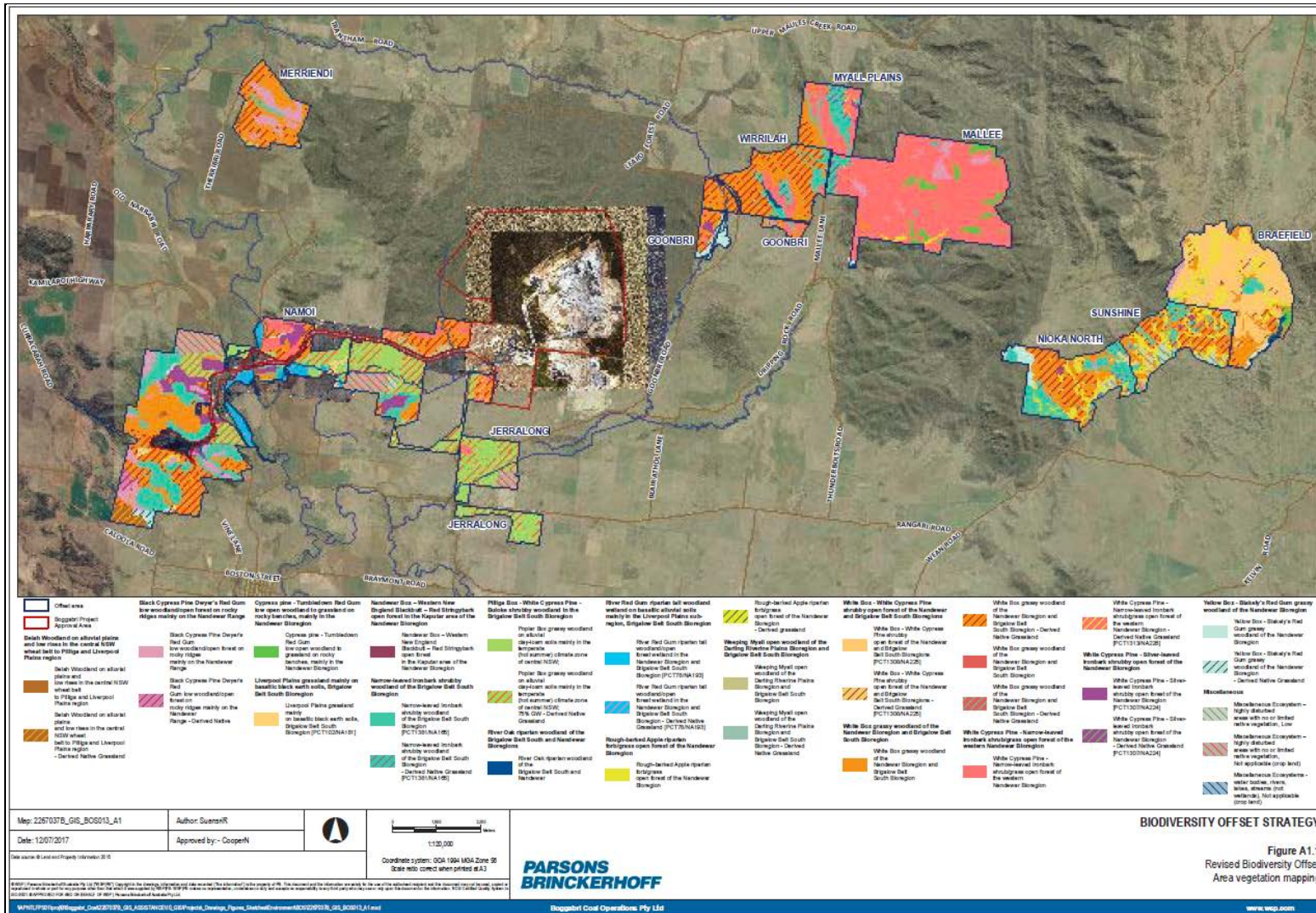


Figure A.2 Boggabri Offset Site Vegetation Communities

Sourced from the Boggabri Coal Mine Biodiversity Offset Strategy (July 2017)

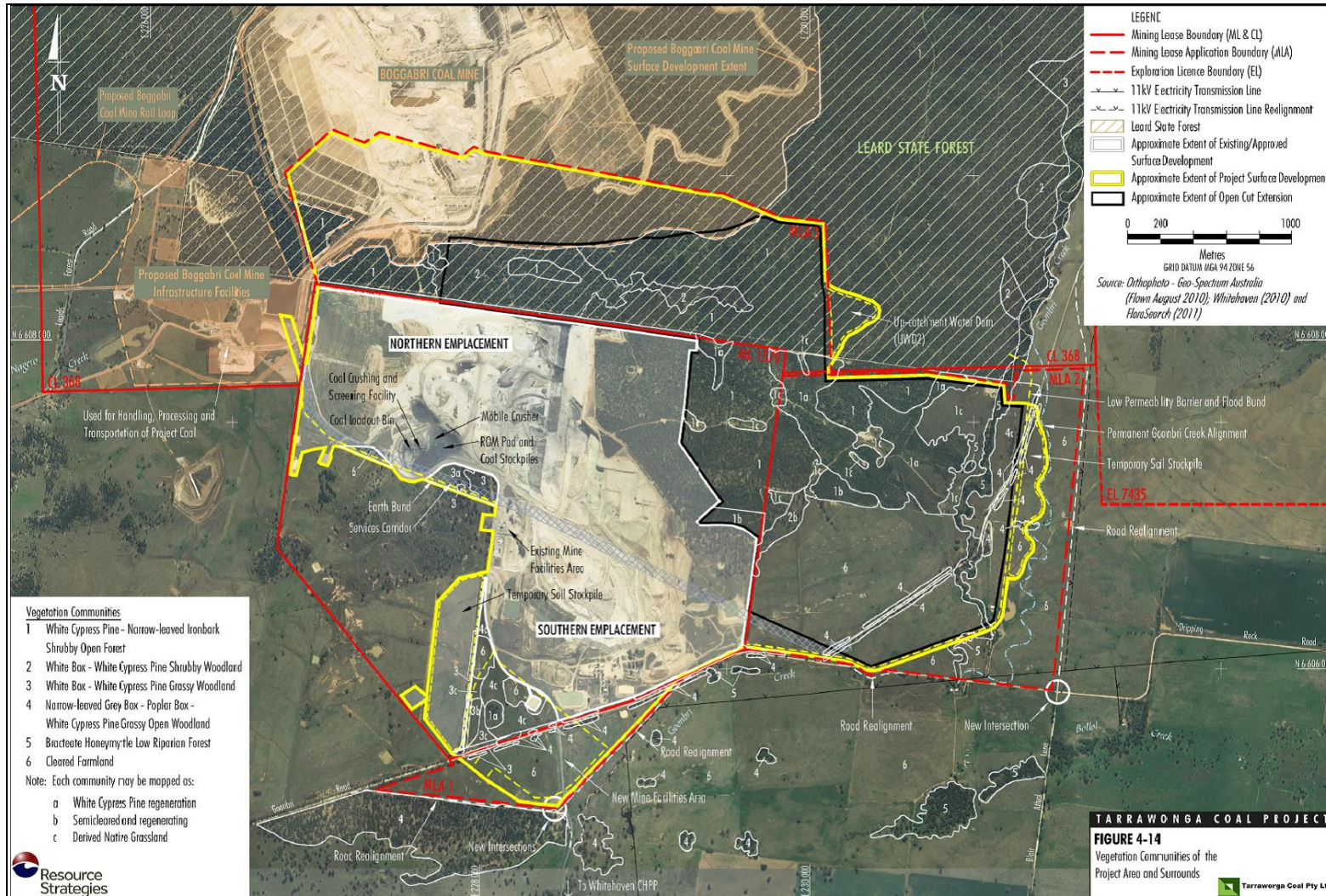


Figure A.3 Tarrawonga Disturbance Site Vegetation Communities

Sourced from the Tarrawonga Coal Project Environmental Assessment 2011.

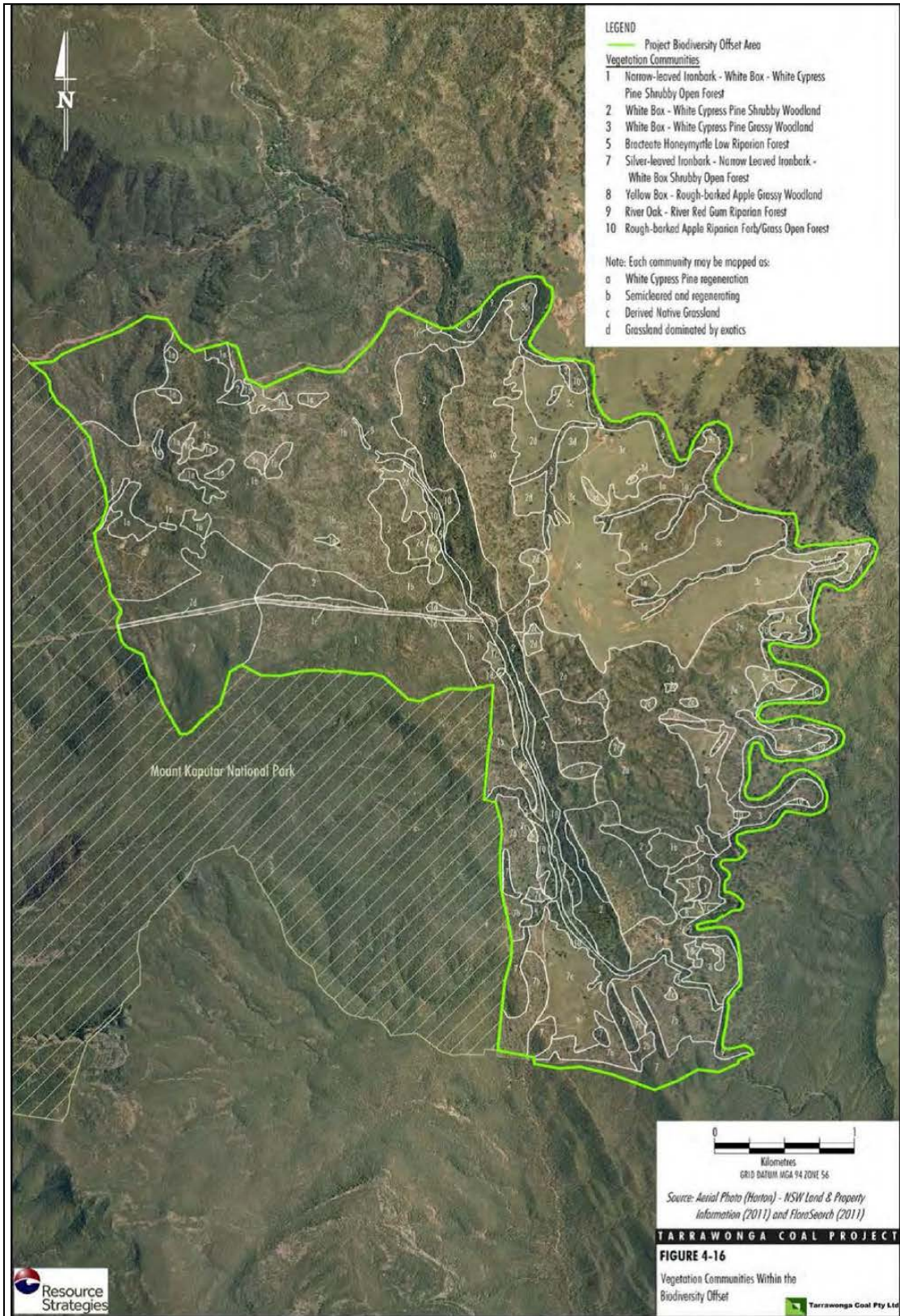


Figure A.4 Tarrawonga Offset Site Vegetation Communities

Sourced from the Tarrawonga Coal Project Environmental Assessment 2011.

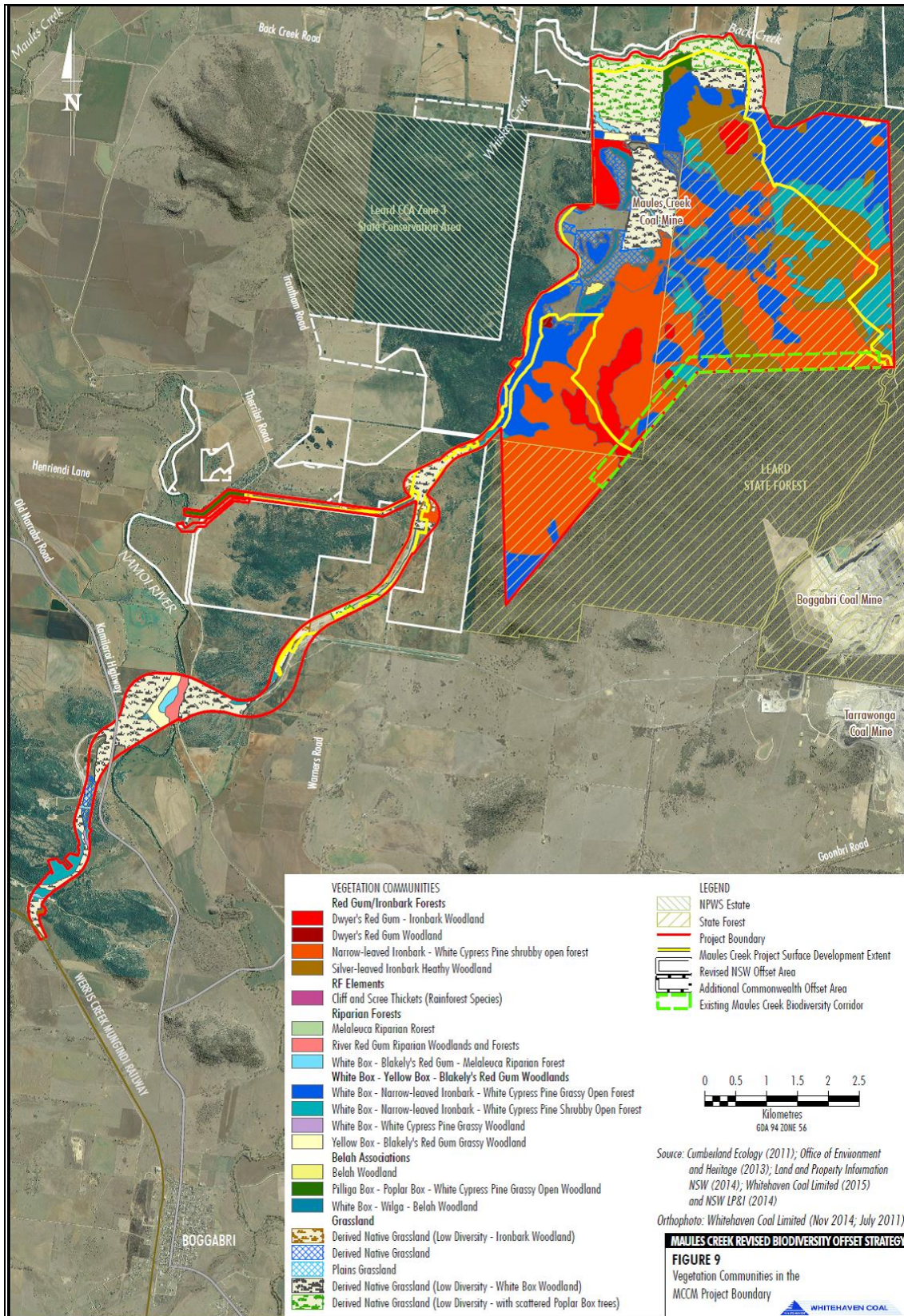


Figure A.5 Maules Creek Disturbance Site Vegetation Communities

Sourced from Maules Creek Revised Biodiversity Offset Strategy (August 2015)

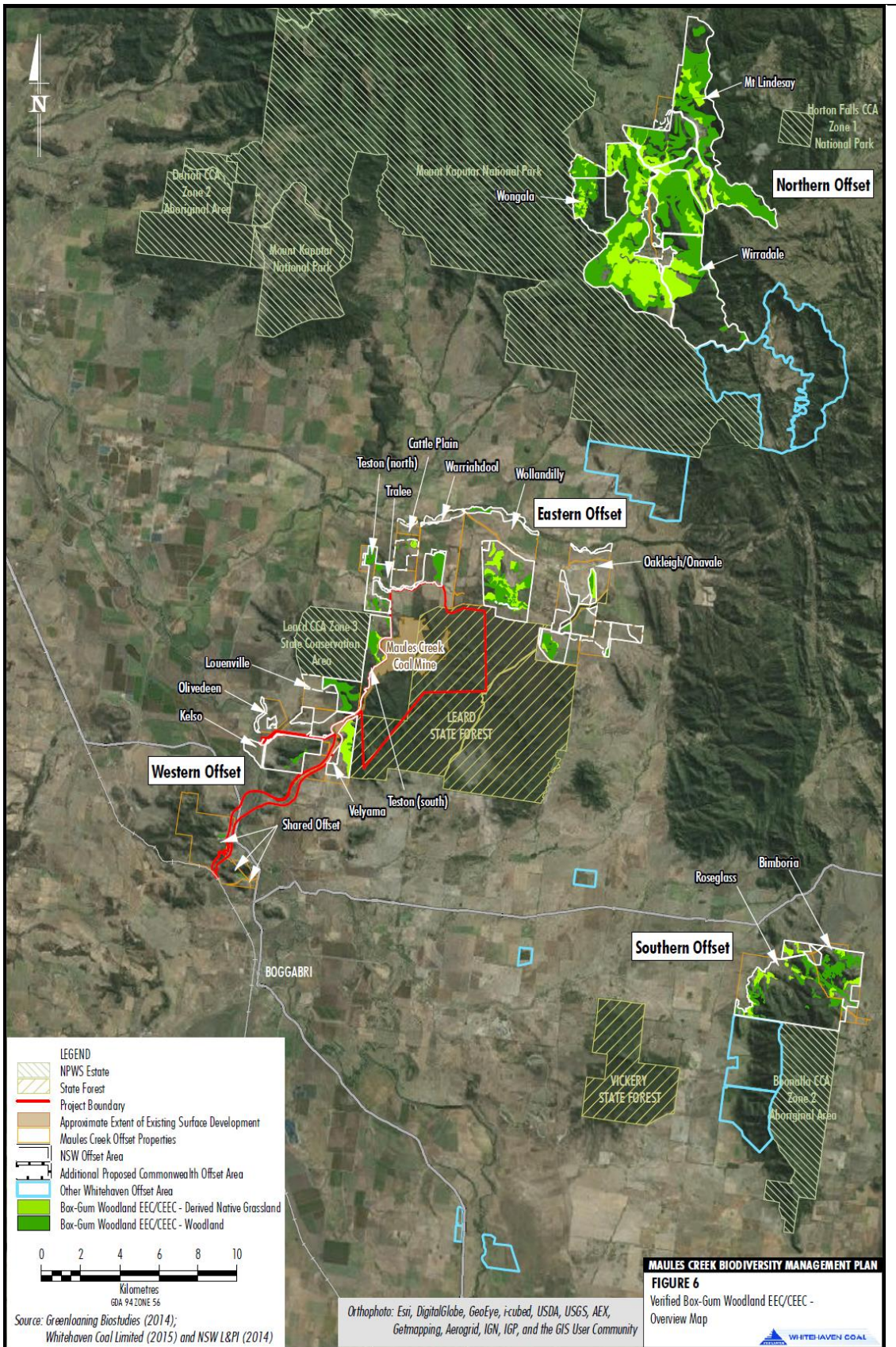


Figure A.6 Maules Creek Offset Site Box-Gum Woodland EEC/CEEC

Sourced from Maules Creek Biodiversity Management Plan (April 2017)



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