SOUTH32 Illawarra Metallurgical Coal

BROAD HEADED SNAKE AND SOUTHERN BROWN BANDICOOT MANAGEMENT PLAN – APPIN MINE

Table of Contents

DOCUMENT REVISION LOG

Persons authorising this Plan

Name	Title	Date
Chris Schultz	Superintendent Environment	23/12/2020

Document Revisions

Revision	Description of Changes	Date
1.0	Replaces ICHMP0250 Southern Brown Bandicoot Management Plan (SBBMP) and ICHMP0256 Broad Headed Snake Management Plan (BHSMP). Previous Revision History provided in Appendix 4. Updated to new format. Incorporates regulatory agency comments.	16/12/2020
1.1	Inclusion of Broad-headed Snake and Southern Brown Bandicoot Offset Strategy Proposal Version 3 as Appendix 5.	23/12/2020

Persons involved in the review of this Plan

Name	Title	Company	Exp (yrs)	Date
Chris Schultz	Superintendent Environment	South32 IMC	24	23/12/2020
Dave Gregory	Specialist Environment	South32 IMC	12	28/10/2020

1. INTRODUCTION

Appin Mine incorporates the underground mining operations, which extract coal from the Bulli Seam, and associated surface activities, including the West Cliff Coal Preparation Plant (WCCPP) and Coal Wash Emplacement Area (CWEA). Appin Mine is located approximately 25 kilometres (km) north-west of Wollongong in New South Wales. Appin Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

ICHPL received Project Approval 08_0150 (the Project Approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure[1] on 22 December 2011[2] for current and proposed mining of the Bulli Seam Operations (BSO) for the next 30 years, and production of up to 10.5 million tonnes per annum of run of mine (ROM) coal. This approval incorporates underground mining, transport and coal wash emplacement activities undertaken 24 hours a day, seven days per week.

The Project Approval (Condition 17 d) of Schedule 4) requires the inclusion of management strategies for the protection and conservation of the Broad-headed Snake and Southern Brown Bandicoot to be included in the CWEA Management Plan.

EPBC Approval 2001/214 (the DEN EPBC Approval) was issued by the Australian Government on 20/12/2001 under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Condition 5 of the DEN EPBC Approval required the submission of a plan for the management of Broad-headed Snake at Stage 3 of the CWEA. This included the provision of compensatory habitat.

EPBC Approval 2010/5350 (the EPBC Approval) was issued by the Australian Government on 15 May 2012 under the *EPBC Act 1999*. Condition 7 of the EPBC Approval required the preparation of a Southern Brown Bandicoot and Broad-headed Snake Management Plan.

The Broad-headed Snake and Southern Brown Bandicoot Management Plan (SBMP)[3] has been prepared to detail the measures to avoid, mitigate and manage impacts on the Broad-headed Snake, Southern Brown Bandicoot and their habitats as a result of Appin Mine operations. The SBMP has been prepared to satisfy Condition 17 d) of Schedule 4 of the Project Approval, Condition 5 of the DEN EPBC Approval and Condition 7 of the EPBC Approval.

[1] Now Department of Planning, Industry and Environment (DPIE)
[2] As modified by MOD 1 (April 2015) and MOD 2 (October 2016)
[3] Replaces ICHMP0250 Southern Brown Bandicoot Management Plan (SBBMP) and ICHMP0256 Broad Headed Snake Management Plan (BHSMP)

1.1 Objectives

The objectives of the SBMP are to:

- detail measures to avoid, mitigate and manage impacts on the Broad-headed Snake, Southern Brown Bandicoot and their habitats;
- outline provisions for funding of research programs to inform or enhance the conservation of these species; and
- meet the requirements of approval conditions.

1.2 Scope

The SBMP applies to potential impacts on the Broad-headed Snake and Southern Brown Bandicoot from Stages 3 and 4 of the CWEA construction and operations.

1.3 Environmental Management System

IMC has a comprehensive Environmental Management System (EMS) in place to minimise the impact of its operations on the local environment and community. The SBMP is a component of the EMS which is certified to ISO 14001.

1.4 Consultation

As required, the components relating to the Broad-headed Snake and Southern Brown Bandicoot from the CWEA Management Plan (CWEAMP) were prepared in consultation with the then Department of the Environment (DoTE - now Department of Agriculture, Water and Environment (DAWE)) and the NSW Office of Environment and Heritage (OEH – now Biodiversity and Conservation Division (BCD) of DPIE).

DoTE and OEH were provided with drafts of the BHSMP and SBBMP for comment with responses addressed within Rev 3 of the BHSMP and Rev 2 of the SBBMP where appropriate.

Consultation has been undertaken as part of this review of the SBMP with BCD, DPIE and DAWE. The comments from the consultation process have been incorporated into the current version of the SBMP.

Appendix 8 outlines comments from the relevant government agencies following consultation and the IMC response.

Consultation with relevant agencies will only be undertaken where there is a material change to the CWEAMP or SBMP or if specifically requested by DPIE or DAWE. Administrative or descriptive changes do not constitute a material change.

2. ROLES AND RESPONSIBILITIES

Table 1 outlines the roles and responsibilities associated with the SBMP.

Table 1: Summary of roles and responsibilities

Role	Responsibilities
Superintendent Environment	Implement and periodically review the SBMP. Liaise with government regulators and IMC senior leadership team in relation to any non-compliances with the SBMP.
Specialist Environment	Advise, coach and mentor IMC operations with respect to meeting the standards and requirements of the SBMP. Monitor and review compliance against these requirements. Undertake monitoring as required.
Production Personnel	Provision of suitable resources to manage the CWEA in accordance with the SBMP. Day to day operation and maintenance of CWEA in accordance with the SBMP and CWEAMP.
Ecologist or wildlife specialist (with experience in relation to the Broad-headed Snake or Southern Brown Bandicoot)	Relocation (if required) of the Broad-headed Snake or Southern Brown Bandicoot.

3. LEGISLATION AND PLANNING

3.1 Project Approval

Potential impacts from the BSO Project are assessed in the BSO Project EA 2009 and BSO Project EIS 2011. The results were assessed under the *Environmental Planning and Assessment Act 1979* (*EP&A Act*) and *EPBC Act*. All activities carried out as part of the BSO Project will be generally in accordance with the Project Approval, the EPBC Approval and with the EA and EIS.

Appendix 1 outlines the Broad-headed Snake and Southern Brown Bandicoot management requirements of the Project Approval and cross references where the requirements have been addressed within the SBMP.

Appendix 2 outlines the Broad-headed Snake and Southern Brown Bandicoot management requirements of the EPBC Approval and cross references where the requirements have been addressed within the SBMP.

Appendix 3 outlines the Broad-headed Snake and Southern Brown Bandicoot management requirements of the DEN EPBC Approval and cross references where the requirements have been addressed within the SBMP.

3.2 Relevant Legislation

Key regulatory and SBMP obligations are managed via an obligations management database. The obligations are allocated to responsible personnel. This process is detailed in the Environmental Compliance/Conformance Assessment and Reporting Procedure.

Legislation applicable to the SBMP includes but is not limited to:

- *Biodiversity Conservation Act 2016*[4] *(BC Act)*;
- *Environment Protection and Biodiversity Conservation Act 1999;*
- *Environmental Planning and Assessment Act 1979*
- *National Parks and Wildlife Act, 1974*; and
- *Protection of the Environment Operations Act, 1997*.

4. BROAD HEADED SNAKE INFORMATION

The Broad-headed Snake *Hoplocephalus bungaroides* (see Plate 1) is a species of national conservation significance. It is listed as Vulnerable under provisions of the *EPBC Act* and as Endangered under New South Wales' *BC Act 2016*

Plate 1: Broad-headed Snake

Records of Broad-headed Snake are restricted to the Sydney Basin Bioregion of NSW (Cogger 2000). The species occurs in association with Triassic sandstones within the Sydney Basin, and is typically found among exposed sandstone outcrops within vegetation types ranging from woodland to heath. Within these habitats, they generally seek shelter in rock crevices and exfoliating rock with males and non-gravid females also using tree hollows during the warmest periods of summer (Webb and Shine 1998b). Research has found that the rock outcrops used by Broad-headed Snake have relatively specific characteristics, being generally western facing and with a relatively open canopy (Webb and Shine 1998a, b).

[4] Previously the *Threatened Species Conservation Act 1995 (TSC Act)*

Furthermore, the rock crevices within these outcrops are quite specific, with rocks having to be exposed to direct sunlight (no overgrowth; Pringle et al 2003), be a rock on rock substrate and have relatively specific crevice structures and rock thicknesses that provide specific microclimates (Croak et al 2008).

These highly specific rock characteristics lead to a paucity of suitable rocks being available in any given outcrop area and so there may be significant competition for suitable rocks between resident snakes and hence, the loss of suitable crevices may be a significant problem for local populations. Individual snakes have been found sheltering in hollows in tree species including *Eucalyptus gummifera*, *E. punctata*, *E. piperita* and *E. agglomerata* and prefer larger trees, trees with multiple hollows or dead trees. These hollows are typically located in positions where they are relatively unshaded by surrounding vegetation. Individual snakes use between one and nine trees and may spend long periods within a single hollow, up to 48 days (Webb & Shine 1997a).

The Broad-headed Snake is an ambush predator, spending up to four weeks in the same retreat site (Webb & Shine 1997a) and preying on small reptiles and mammals that enter the retreat (Webb & Shine 1997a; Wells 1981). Snakes feed very infrequently, with less than 20% of captured adults showing signs of having fed recently (Webb & Shine 1994). Juveniles feed more frequently than adults (Webb & Shine 1994; Webb & Shine 1998c). Juvenile snakes feed primarily on Velvet Geckos (*Oedura lesuerii*) (up to 70% of prey items) and occasionally on small skinks (Downes 1999; Webb & Shine 1998c). Adult snakes also consume Velvet Geckos, although they only comprise 27% of prey items (Webb & Shine 1998c). Other prey items include lizards, snakes and small mammals (Downes 1999; Shine 1983b; Webb & Shine 1998c). Broad-headed Snakes show a greater specialisation or specificity of prey than is typical of Australian snakes (Webb and Shone 1998c), which may be related to limited prey types occurring within their preferred habitats.

The Broad-headed Snake has been recorded to have a sedentary life cycle. Individuals in southern areas of its range have been found to occupy home ranges that are only 3.43 (±2.86 SD) ha (n = 18) with all snakes avoiding sharing space (Webb & Shine 1997b). Despite this low home range size and habitat specificity, recent research has indicated that there is a relatively high exchange of genes amongst populations, although this appears to occur only along lines of outcropping (Dubey et al 2011). The Broad-headed Snake also has a notably long reproductive cycle, with adults reaching maturity only at six years for female snakes and five years for males (Webb et al. 2003). Females are able to produce offspring only every second year (Webb et al 2002) and with litter sizes of 4-12 (Webb & Shine 1998c). This relatively low reproductive rate, relative to other Australian elapid snakes, appears to be related to low prey availability or low prey capture rates (Webb et al. 2003).

Stages 3 and 4 of the CWEA contain areas of suitable habitat for the species in the Sandstone Scribbly Gum Woodland, Sandstone Gully Apple Peppermint Forest and Sandstone Gully Peppermint Forest. These vegetation units contain areas of suitably exposed sandstone that also have adjacent forests containing large hollow bearing trees that can be used during summer.

Common prey species, such as the Velvet Gecko (*Oedura lesueurii*) and the Southern Leaf-tailed Gecko (*Phyllurus platurus*), have also been recorded within Stages 3 and 4 of the CWEA, indicating that prey species are available.

To date, the Broad-headed Snake has been definitively recorded only twice within the Stage 3 CWEA (Figure 2). Another record nearby the Stage 4 CWEA is still the subject of some conjecture. Several records of the species exist within 10 km of the Appin North/WCCPP operations (OEH Atlas of NSW Wildlife – See Figure 2). Most of these records occur to the north and east of the site, including within Dharawal National Park. Locally, the species has a patchy distribution, almost certainly reflecting its specific habitat requirements.

4.1 Significance of Broad-headed Snake Population within the Study Area

The local Broad-headed Snake population within the Appin North Surface Lease and surrounds is considered to be of national conservation significance and, as such, Stages 3 and 4 of the CWEA may be considered to support an 'important population' of the species, as defined by the *EPBC Act*.

An important population is one that is necessary for a species' long-term survival and recovery and may include populations that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

Under provisions of the *EPBC Act*, an action has, will have, or is likely to have a 'significant impact' on a 'Vulnerable Species' if it does, will, or is likely to:

- decrease the size of an important population of a species; or
- reduce the area of occupancy of an important population; or
- fragment an existing important population into two or more populations; or
- adversely affect critical habitat; or
- disrupt the breeding cycle of an important population; or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; or
- directly or indirectly result in invasive species that are harmful to a vulnerable species becoming established in the 'vulnerable species' habitat; or
- interferes substantially with the recovery of the species.

4.2 Habitats of the Broad-headed Snake within the Study Area

Known and potential habitat for the Broad-headed Snake occurs within Stages 3 and 4 of the CWEA and the remainder of the surface lease. This habitat includes:

- rocky outcrops, crevices, caves and overhangs;
- open forest and woodland with hollow-bearing trees (particularly dead trees); and
- fallen hollow timber and bark.

The individual recorded by Biosis Research (2001) was observed in March 2001 during a spotlighting survey and was crossing a dirt track between open woodland habitat on a ridge, within the site (refer to Figure 2). A second individual was recorded in April 2016 by IMC

personnel during a pre-clearing survey in the Stage 3 CWEA. The snake was captured and relocated in accordance with the BHSMP.

The snake was approximately 40 cm long and showed no signs of injury, parasites or other ill-health. Its colouration was bright suggesting it had recently sloughed and its body condition was good based on the rounded overall body shape. More importantly, the snake was clearly a female that was carrying at least two or possibly large full term young based on the bulges in her lower abdomen. This species produces live young between December and April (Cogger 2014), which fits in with the condition of this individual.

The Broad-headed Snake spends a significant amount of time inactive in retreat-sites and moves only short distances between winter sites (i.e. rocky outcrops). The species' movement is more frequent and extensive within woodland (summer) habitat, with males and non-gravid females moving up to 780 m from winter sites into woodland during summer (Webb and Shine 1997a). Potential habitat is shown in Plate 2.

Plate 2: Potential Broad-headed Snake habitat

4.3 Potential Impacts on Broad-headed Snake

Key Threatening Processes (KTP), as listed under Schedule 4 of the *BC Act*, are actions that have the ability to significantly impact threatened species and/or their habitats. KTPs relevant to the proposal that would impact on actual and potential habitat for the Broad-headed Snake include:

- bushrock removal - the emplacement operations involve the removal of bushrock, including large rock platforms and outcrops that provide potential habitat for the species;
- clearing of native vegetation; and
- loss of hollow-bearing trees.

The CWEA operations have the potential to negatively impact on the local population of Broad-headed Snake either directly through mortality and habitat removal, or indirectly by changes to habitat conditions, fragmentation of suitable habitats and loss of prey items.

A summary of potential impacts associated with the Project are outlined in Sections 4.3.1.1 and 4.3.1.2.

4.3.1.1 *Direct Impacts*

Direct impacts that may result from the active emplacement within Stages 3 and 4 of the CWEA include:

- death and/or injury of Broad-headed Snakes due to the disturbance and removal of known and potential habitat for this species;
- direct loss of habitat such as hollow-bearing trees, hollow logs and exposed sandstone rocky outcrops;
- increased predation due to loss of sheltering habitat;
- relocation of individuals during habitat translocation;
- direct road-kill mortality by construction vehicles (although unlikely due to the nocturnal nature of Broad-headed Snakes); and
- creation of artificial barriers to movement (e.g. isolation of rock outcrops from adjacent hollow-bearing trees to the extent that snakes can no longer move between these two critical resources).

4.3.1.2 Indirect Impacts

Potential indirect impacts that may result from the active emplacement within Stages 3 and 4 of the CWEA include:

- loss of prey habitat and hence prey availability leading to starvation and reduced recruitment;
- reduction in genetic diversity within the regional population due to a reduction or loss of the Appin North population, or to disrupted capacity for the species to move within and through Stages 3 and 4 of the CWEA; and
- reduction in quality of surrounding habitat due to noise and dust from Appin Mine operational activities.

5. SOUTHERN BROWN BANDICOOT INFORMATION

The Southern Brown Bandicoot, *Isoodon obesulus obesulus* (Shaw and Nodder 1797), is a medium-sized (400-1600 g) ground-dwelling marsupial (see Plate 3). Like other members of the bandicoot family (Peramelidae) the species has a long tapering snout with a naked nose, a compact body and short tail with a pointed end. The head has small rounded ears and small eyes. The coarsely furred dorsal surface of the body is usually dark grey with golden-brown flecks, and the softer underbelly is creamy-white. While the forelegs are short with curved claws on the digits, the hind limbs are much longer resembling those of macropods. The hind feet are characterised by the presence of syndactylus toes, formed by fusion of the second and third digits. These are used for grooming (DEC 2006).

The Southern Brown Bandicoot is a species of national conservation significance. It is listed as Endangered in Schedule 1, Part 2 of the *BC Act* and Endangered in the *EPBC Act*. In NSW, the species has a patchy distribution along the eastern coastline and adjacent lower foothills in the southern part of the state, from the Hawkesbury River to the Victorian border.

Records of the species are generally confined to heathlands or woodlands and forests with heath understorey, typically on friable sandy soil.

Bandicoots usually nest in a shallow depression in the ground covered by leaf litter, grass or other plant material (Rayment 1954; Ride 1970; Gordon 1974, in DEC 2006). The upper surface of this covering may be mixed with earth to waterproof the inside of the nest (Stodart 1983; Gordon 1983 in DEC 2006). Internally, the nest comprises a hollow chamber, often lined with grass and leaves with no distinct entrance or exit.

Plate 3: Southern Brown Bandicoot (DSEWPaC, 2011)

5.1 Significance of Southern Brown Bandicoot population within the Study Area

The Stage 3 Emplacement Species Impact Statement (SIS) prepared by Biosis (2007) found no records of Southern Brown Bandicoot during targeted surveys of the species in the CWEA. The SIS concluded that whilst habitat for the species existed within the CWEA, it was unlikely that the species would be affected by the proposed Stage 3 CWEA as the species had not been sighted since a recorded sighting in Dharawal National Park several decades prior. Previous records of Southern Brown Bandicoot in the study area are shown in Figure 1.

During the fauna survey for the Terrestrial Fauna Assessment prepared for the BSO Project EA, Biosphere Consultants (2009) trapped one adult male Southern Brown Bandicoot in the proposed Stage 4 CWEA. Further targeted trapping, use of hair tubes and use of infrared motion sensing cameras was conducted, however no further animals were captured, photographed or hair traces found.

However, numerous Southern Brown Bandicoot diggings were located outside of the Stage 4 CWEA (including within land to the north, in the Dharawal National Park to the east and in the Metropolitan Special Area to the south). In addition, some other bandicoot diggings were recorded; however, these could not be distinguished between the Long-nosed Bandicoot and the Southern Brown Bandicoot. A bandicoot skull was found within the Metropolitan Special Area and was subsequently identified as belonging to a Southern Brown Bandicoot by palaeontologist Henk Godthelp from the University of NSW (Biosphere 2009).

The Southern Brown Bandicoot is probably best described as present but rare. The proposed Stage 4 CWEA and surrounds provide habitat for the Southern Brown Bandicoot,

resulting in part from the 2001 bushfires creating habitat mosaics in early to mid-succession phase at the time of the BSO Project surveys. Conversely, the greater the time lapse since the last landscape-scale bushfire, the greater the possibility that some early successional habitats may become sub-optimal for the species. It is likely that well managed cool mosaic burnings between well-spaced landscape-wide bushfires may be required as part of a management mix to maintain optimal habitat outcomes for the Southern Brown Bandicoot. (Biosphere 2009).

5.2 Potential Impacts on Southern Brown Bandicoot

The Southern Brown Bandicoot Recovery Action Plan (DEC 2006) lists five KTPs from Schedule 4 of the *BC Act* that are of direct relevance to the Southern Brown Bandicoot:

- predation by the European Red Fox *Vulpes vulpes*;
- predation by the Feral Cat *Felis catus*;
- high frequency fire resulting in disruption of life cycle processes in plants and animals and loss of vegetation structure and composition;
- clearing of native vegetation; and
- infection of native plants by *Phytophthora cinnamomi*.

The KTP of most direct relevance to the proposal is clearing of vegetation which would impact on actual and potential habitat for the Southern Brown Bandicoot.

The CWEA operations have the potential to negatively impact on the local population of Southern Brown Bandicoot either directly through mortality, habitat removal and increased susceptibility to predation by introduced carnivores, or indirectly by changes to habitat conditions, fragmentation of suitable habitats and loss or degradation of food resources.

A summary of potential impacts associated with the proposal is outlined in Sections 5.2.1.1 and 5.2.1.2.

5.2.1.1 Direct impacts

Direct impacts that may result from the Stage 4 CWEA operations include:

- death and/or injury of Southern Brown Bandicoots due to the removal of known and potential habitat for this species;
- direct loss of habitat;
- increased susceptibility to predation by introduced carnivores due to loss or degradation of habitat;
- loss or injury to individuals during capture and translocation; and
- creation of artificial barriers to movement.

5.2.1.2 Indirect impacts

Potential indirect impacts that may result from the active emplacement within the Stage 4 CWEA include:

- loss of habitat for prey items and hence loss of food resources leading to starvation;

- reduction in genetic diversity within the regional population due to a reduction or loss of the Appin North population, or to disrupted capacity for the species to move within and through the Stage 4 CWEA; and
- reduction in quality of the existing surrounding habitat due to noise and dust from the proposal.

6. MANAGEMENT AND MITIGATION

This section addresses Condition 17(d) of the Project Approval and Condition 7(a) of the EPBC Approval in relation to the Broad-headed Snake and Southern Brown Bandicoot as follows:

> *17 (d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot;*
>
> *7 (a) measures to avoid, mitigate and manage impacts on the Southern Brown Bandicoot, Broad-headed Snake and their habitats occurring as result of the action.*

6.1 Management Strategies

Clearing practices will incorporate appropriate controls to minimise mortality and injury to Broad-headed Snakes and Southern Brown Bandicoots occupying the site. These are summarised in the following sections.

6.1.1 Pre-clearance surveys

Prior to the first stage of clearing, the area to be cleared will be marked using flagging and surveyed by an ecologist or suitably trained site environmental representative to locate, record and mark specific habitat features that are proposed for preservation and redistribution to the emplacement (e.g. rocks and boulders, stags and large hollows). The pre-clearing surveys (relating to Stage 3 CWEA operations) that have been undertaken to date are summarised in Table 2.

Table 2: Summary of pre-clearing surveys undertaken in Stage 3

Area in Ha	Purpose of Clearing[5]	Report Reference
6.5	Coal wash emplacement	Niche, 2011
0.4	Coal wash emplacement	Niche 2012
0.25	Slurry pond	Illawarra Coal, 2013
2	Coal wash emplacement	Illawarra Coal, 2015
2	Coal wash emplacement	Illawarra Coal, 2016
0.3	Coal wash emplacement	Illawarra Coal, 2018
2.4	Coal wash emplacement	Illawarra Coal, 2019

[5] Table includes areas cleared for Stage 3 under the BHSMP that was developed in 2007 for the DEN EPBC Approval Condition 5. Future clearing activities in Stage 3 and Stage 4 will be undertaken in accordance with the current version of the SBMP.

In April 2016, one individual Broad-headed Snake was found in the Stage 3 CWEA during a pre-clearing survey. The individual was captured and released to another location in accordance with the BHSMP (See Figure 2 and Figure 3).

6.1.2 Two-stage Clearing

The primary mitigating measure for protection of Broad-headed Snakes and Southern Brown Bandicoots within the CWEA is two-stage clearing.

Where possible, (i.e. where access to trees by the excavator is safe and practical), clearing of hollow bearing trees will be performed in a two stage process where surrounding vegetation is cleared separately, before the removal of habitat trees to allow fauna an opportunity to move.

The process is detailed in the approved CWEAMP.

6.1.3 Management of Captured Animals

6.1.3.1 Broad-headed Snake

If a Broad-headed Snake is found during the two-stage clearing process, the animal will be relocated to pre-determined suitable habitat within the Appin North surface mining lease area (Figure 3).

Pre-determined sites for relocation will take into account the species home ranges and be evenly spaced to avoid social conflict. Ideally, predetermined relocation sites should not be inhabited by another Broad-headed Snake at the time of relocation.

Pre-determined relocation sites will necessarily consist of the following:

- occur on Hawkesbury Sandstone within the current known range of the species and provide rocky outcrops with a westerly or north-westerly aspect, and horizontal crevices (Webb and Shine 1998c); and/or
- have large adjacent areas of woodland that support large stags or trees bearing numerous hollows (Webb and Shine 1997b). The adjacent woodland will ideally be larger than the area supporting rocky outcrops (Webb and Shine 1997a) and contain preferred species of 'habitat trees' (trees most often selected by Broad-headed Snakes) such as *Eucalyptus gummifera*, *E. punctata*, *E. agglomerata* and *E. pipperita* (Webb and Shine 1997b).

Information collected for relocated individuals will include:

a) Health/condition of the individual.

b) Size.

c) Sex.

d) Approximate age cohort.

e) Photos of the snake (including head shot).

f) Location detected (including GPS coordinates) and notes on habitat type (including rock availability and vegetation), photos etc.

g) Location of relocated site (including GPS coordinates) and notes on habitat.

Any other fauna located within the CWEA during the pre-clearing survey will also be relocated. In particular, any Velvet Geckos (and other lizards) encountered will be relocated to the same pre-determined sites for Broad-headed Snakes to provide prey for the relocated snakes.

Where possible, snakes will be translocated from the initial capture point to the nearest site considered suitable for the long-term habitation by the species, but not more than 1 km from that point (where possible) to reduce the possibility for unfavourable genetic mixing.

Snakes will be released at sites as soon as practicable after capture.

BCD will be notified within one month of any Broad-headed Snakes identified during pre-clearing surveys and relocated.

6.1.3.2 Southern Brown Bandicoot

In the event that an individual is found during the two-stage clearing process, the animal will be relocated to pre-determined suitable habitat within the Appin North surface mining lease area.

Sites for relocation will take into account the species home ranges and be evenly spaced to avoid social conflict. Where possible, captured bandicoots will be translocated from the initial capture point to the nearest site considered suitable for the long-term habitation by the species, but not more than 1 km from that point (where possible) to reduce the possibility for unfavorable genetic mixing.

Bandicoots will be released at sites as soon as practicable after capture.

6.1.4 Habitat Translocation – Broad-headed Snake

Rocky outcrops, crevices, caves and overhangs provide winter habitat for the Broad-headed Snake (Goldingay and Newell 2000). Suitable winter habitat occurring within the Stages 3 and 4 of the CWEA will be identified during the pre-clearing survey.

Rehabilitation of the CWEA behind the line of clearing for the Broad-headed Snake, in terms of winter habitat, will include the following:

- Translocated rocky outcrops and boulders will ideally be positioned with a westerly or north-westerly aspect and crevices should remain horizontal (Webb and Shine 1998c; Goldingay and Newell 2017).
- The Velvet Gecko should also be translocated (Webb and Shine 2000). Suitable habitat for this prey species is the same as for the Broad-headed Snake's winter habitat and includes loose rock on rock substrate (Shine et al. 1998, Webb and Shine 1998c, Croak et al. 2013).
- The above shelter sites will ideally be evenly spaced and not clumped together to encourage a greater number of Broad-headed Snakes to the area (Webb and Shine 1997a). If shelter sites are too close together, they are likely to remain uninhabited due to home range overlap. Shelter sites will ideally be placed at least 300 m apart and close/adjacent to suitable summer habitat (translocated hollow-bearing trees or limbs within rehabilitating sections of the old CWEAs (Webb and Shine 1997a)).
- Artificial rocks/concrete pavers will be added to the CWEA behind the line of clearing to increase habitat opportunities for prey items and the Broad-headed Snake if

insufficient natural rock cannot be sourced from the CWEA for this purpose. Webb and Shine (2000) recommend the use of large pavers (30 – 45 cm wide and 5 – 10 cm thick), as well as a range of smaller pavers (e.g. 19 cm wide) and thicker pavers (e.g. > 30 cm thick) placed with a variety of crevice sizes (up to 10 mm). The artificial rocks will be placed in both shaded and exposed areas to provide a range of suitable micro-climates for the snake and its prey depending on the time of year (Croak et al. 2013, Croak et al. 2008, Croak, et al. 2010).

- Hollow logs and hollow-bearing stags will also be translocated to provide additional retreat-sites for the Broad-headed Snake and its prey (Webb and Shine 1997b).

6.1.5 Habitat Protection during Construction – Southern Brown Bandicoot

In addition to the actions provided in the above sections, the following practices will be adopted during construction:

- Sediment control measures will be adopted during clearing, as outlined in the CWEAMP.
- The CWEA will be clearly demarcated and regularly surveyed to prevent unnecessary clearing or access by construction vehicles and plant to surrounding potential habitat.
- Construction materials and spoil must not be stored, dumped or stockpiled within surrounding habitat.
- Induction of the CWEA Supervisory personnel will include information about the Southern Brown Bandicoot and its habitat within Stage 4 of the CWEA, along with protection measures that will be in place and enforced during the construction period.
- General information on threatened species (including key site contacts for threatened species) will be provided to all CWEA personnel.

6.2 Summary of Impact Minimisation Strategies

Measures to minimise impacts of the Project (Stage 3 and 4 CWEAs) on the local population of the Broad-headed Snake and Southern Brown Bandicoot are outlined in Table 3.

Table 3: Impact minimisation measures for the protection of the Broad-headed Snake and Southern Brown Bandicoot at Appin North

Performance Objective	Performance Target	Management/Mitigation Measures	Monitoring and Reporting Methods
Protection of Broad-headed Snake and Southern Brown Bandicoot outside the approved emplacement and development footprints	- No loss of Broad-headed Snake or Southern Brown Bandicoot individuals or its habitat outside the approved emplacement and development footprints	- Vegetation clearing to be within approved boundaries. - Future development requiring land clearing to consider Broad-headed Snake and Southern Brown Bandicoot individuals.	- Works as executed survey plans of any vegetation clearing .
Protection of Broad-headed Snake and Southern Brown Bandicoot within the approved emplacement and development footprints	- Minimise loss of Broad-headed Snake and Southern Brown Bandicoot individuals within the approved emplacement footprints due to construction and operations.	- Conduct pre-clearance surveys in the Stage 3 and 4 CWEAs and subsequent two-stage clearing, to give animals the opportunity to move away. - Individuals found will be relocated to pre-determined suitable habitat within the Appin North surface mining lease area.	- Document by preparation of pre-clearing survey reports for every emplacement phase cleared including use of GIS coordinates for survey results. - Document numbers of individuals trapped and released. - Observation of animal condition. - Record release location.
Re-establishment of suitable habitat on completed and rehabilitating CWEAs	- Establishment of suitable rocky and woodland habitat components to support Broad-headed Snake individuals within five years of commencement of rehabilitation. - Establishment of suitable vegetation cover, habitat components and soil profiles to support Southern Brown Bandicoot individuals within five years of commencement of rehabilitation.	- Placement of hollow logs and rock outcrop elements of habitat for the Broad-headed Snake in rehabilitated areas. - Installation of artificial habitat for Broad-headed Snakes (e.g. concrete paving slabs) if necessary as per Webb and Shine (2000). - Placement of topsoil, hollow logs and other structural elements of habitat for the Southern Brown Bandicoot in rehabilitated areas.	- Annual Emplacement Rehabilitation Inspection program undertaken. - Reports from the annual rehabilitation monitoring program to be attached to the Appin Mine Annual Review.

Performance Objective	Performance Target	Management/Mitigation Measures	Monitoring and Reporting Methods
Reduce dust impacts on Broad-headed Snake and Southern Brown Bandicoot habitat from operations.	- Dust controls as per CWEAMP and Air Quality and Greenhouse Gas Management Plan	- Dust impacts from emplacement operations will be mitigated by the coal wash material being wet from coal washing processes and being compacted once emplaced. - Active emplacement areas will be capped and vegetated as soon as practicable.	- Annual environmental reporting of air quality results and performance of mitigation measures in the Appin Mine Annual Review.
Predator control to enhance population viability of the Southern Brown Bandicoot	- Maintain or increase the population size of Southern Brown Bandicoots in overall project area.	- Participation in regional vertebrate pest programs with National Parks & Wildlife Service and Sydney Catchment Authority. *Note: The regional research program established under the EPBC Approval (Condition 7b) will focus on population monitoring. A regional pest program will be designed once a population of Southern Brown Bandicoots has been confirmed and defined.*	- Research reporting as required.
Monitoring and reporting undertaken and submitted as scheduled	- Annual monitoring report submitted and management plan review as required.	- Reporting of project to DAWE and other stakeholders - Adjustments made to systems and methods as required	- Monitoring including pre-clearing surveys, capture and transfer of animals, implementation of two-stage clearing, success of translocation efforts, progress in rehabilitation of emplacement sites, success of captive breeding programs if applicable. - Annual compliance report to DAWE.

7. PROVISION OF REGIONAL FUNDING

7.1 Provision of Funding

This section addresses Condition 7(b) of the EPBC Approval as follows:

> *(b) provisions for the contribution of no less than $250,000 (GST exclusive) in funding towards regional Southern Brown Bandicoot and Broad-headed Snake programs. This funding must not be expended on the measures referred to in condition 7a;*

Illawarra Coal (IC)[6] has funded $250,000 towards the regional management of the Southern Brown Bandicoot and Broad-headed Snake programs as outlined in this Plan and as detailed in the Offset Strategy (Appendix 5).

The project took place over three years commencing July 2014 and finishing June 2017 with payments issued as follows:

- Year 1 $85,000 July 2014.
- Year 2 $85,000 July 2015.
- Year 3 $80,000 July 2016.

7.2 Actions to be Funded

IC consulted with OEH (local and threatened species unit) regarding EPBC Approval Conditions 7(b) to (e). Condition 7 (c) requires:

> *(c) a description of actions to be funded and undertaken to inform and/or enhance the conservation of these species, including through survey or research, threat abatement with specific reference to predator controls and habitat restoration or rehabilitation, including public reporting or publication of information gained by these actions;*

OEH developed a Project Proposal to be funded by IC, which addressed points (c) to (f) of the EPBC Approval Condition 7.

The Project Proposal, OEH Letter of endorsement and BHPBilliton letter of endorsement are provided in Appendix 5, Appendix 6 and Appendix 7 respectively.

7.3 Impacts on other EPBC Act Listed Species

This section addresses Condition 7(d) of the EPBC Approval for works conducted by OEH as follows:

> *(d) a demonstration that management actions to be undertaken will not adversely impact EPBC Act listed species;*

The OEH Proposal addressed the above requirement (see section titled Consideration of Impacts of the Project).

[6] Now Illawarra Metallurgical Coal (IMC)

7.4 Funding Arrangements

This section addresses Condition 7(e) of the EPBC Approval as follows:

> *(e) a description of funding arrangements or agreements including work programs and responsible entities.*

OEH provided a Project Proposal for the Broad-headed Snake and Southern Brown Bandicoot recovery actions (see Appendix 5).

IC provided the funding through a Non-order Invoice (NOI). OEH issued three separate invoices, prior to the start of each financial year i.e. Year 1, Year 2 and Year 3.

7.5 Documentary Evidence of Funding

This section addresses Condition 7(f) of the EPBC Approval as follows:

> *(f) measures for the provision of documentary evidence within 30 days of the funding having been expended and/or that funding commitments have been met.*

IC provided documentary evidence to the DoTE&E in September 2016 to satisfy this condition.

The relevant results were included in the FY17 BSO Annual Review.

8. REPORTING AND REVIEW

8.1 Reporting

Operational and environmental performance of Appin Mine is reported through the:

- Compliance Report; and
- Annual Review.

Reports are available on the South32 website. The Annual Review and Compliance Report will be provided to DAWE.

8.1.1 Compliance Report

Annual reporting is undertaken as per Condition 14 of the EPBC Approval.

The Compliance Report is required to be submitted to DAWE by 15 August of each year via EPBCMonitoring@environment.gov.au and is attached as an appendix in the Annual Review.

8.1.2 Annual Review

IMC will report on the performance of the SBMP in the Annual Review.

The Annual Review is prepared in accordance with Condition 4 of Schedule 6 of the Project Approval and is submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the South32 website.

8.2 Review of SBMP

In accordance with Condition 5 of Schedule 6 of the Project Approval, the SBMP will be reviewed, and if necessary revised, within three months, of:

- the submission of an annual review;
- the submission of an incident report;
- the submission of an Independent Environmental Audit report; or
- any modification to the conditions of the Project Approval (unless the conditions require otherwise).

Outcomes from each review will be documented in the Management Plan Review Log. The SBMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the SBMP. Administrative or descriptive changes do not constitute a material change.

Where a review triggers a revision of the SBMP, the SBMP will be revised and submitted to the Secretary and/or Minister for approval.

8.3 Publication of Documents

Condition 13 of the EPBC Approval requires the proponent to publish all management plans, reports, strategies or agreements required by these conditions of approval on their website.

Approved versions of the SBMP will be displayed on the South32 regulatory page at:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents

8.4 Audits

8.4.1 Independent Environmental Audit

In accordance with Condition 9 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval, an Independent Environmental Audit (IEA) shall be commissioned every three years, that will include a review of the SBMP. The report is required to be submitted to the Secretary within six weeks of completion of the audit, in accordance with Condition 10 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval.

IEAs have been conducted in 2013, 2016/17 and 2019, with the next IEA to be conducted in 2022. Recommendations from the IEA will be incorporated into the SBMP where appropriate.

8.4.2 ISO 14001

As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard.

External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.

Internal Governance Reviews of the SBMP are nominally undertaken on a two yearly basis.

9. ACRONYMS

Term	Definition
BHSMP	Broad-headed Snake Management Plan
BSO	Bulli Seam Operations
CWEA	Coal Wash Emplacement Area
CWEAMP	Coal Wash Emplacement Area Management Plan
DAWE	Department of Agriculture, Water and Environment
DEC	Department of Environment and Conservation
DEN	Dendrobium
DoPI	Department of Planning and Infrastructure (now DPIE)
DoTE(E)	Department of the Environment (and Energy)
DPIE	Department of Planning, Industry and Environment
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EA	Environmental Assessment
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act*
EPBC Act	*Environment Protection and Biodiversity Conservation Act*
G360	IMC event reporting system
IC	Illawarra Coal (now IMC)
ICHPL	Illawarra Coal Holdings Pty Ltd
IEA	Independent Environmental Audit
IMC	Illawarra Metallurgical Coal
KTP	Key Threatening Process
NOI	Non Order Invoice

OEH	Office of Environment and Heritage (now Biodiversity and Conservation Division of DPIE)
SBMP	Broad-headed Snake and Southern Brown Bandicoot Management Plan
SBBMP	Southern Brown Bandicoot Management Plan
TSC Act	*Threatened Species Conservation Act*
WCCPP	West Cliff Coal Preparation Plant

10. REFERENCES

Allen, G. R., Midgley, S. H. and Allen, M. (2002). Field Guide to the Freshwater Fishes of Australia. Western Australian Museum. Perth, WA.

Anstis, M. (2002). Tadpoles of South eastern Australia: a guide with keys. Reed New Holland, Sydney.

Bevitt, B., Erskine, W., Gillespie, G., Harris, J., Lake, P.S., Miners, B. and Varley, I. (1998). Expert Panel environmental flow assessment of various rivers affected by the Snowy Mountains Scheme. Snowy River Recovery: Snowy Flow Response Monitoring. Department of Water and Energy, Sydney. http://www.water.nsw.gov.au/Water-Management/Monitoring/Snowy-River/default.aspx. 30 November 2009

BHPBIC (2012). Application to vary EPL 2504 Supporting Material

Bio-Analysis Pty Ltd (2009). Illawarra Coal - Bulli Seam Operations Aquatic Ecology Assessment prepared for Illawarra Coal Holdings Pty Ltd August 2009.

Biosis Research (2001). Dendrobium Coal Project Species Impact Statement.

Biosphere Environmental Consultants (2009). Bulli Seam Operations Terrestrial Fauna Assessment prepared for Illawarra Coal Holdings Pty Ltd July 2009.

Brennan, K.E.C., Nichols, O.G. & Majer, J.D. (2005). Innovative techniques for promoting fauna return to rehabilitated sites following mining, Australian Centre for Minerals Extension and Research (ACMER) and Minerals and Energy Research Institute of Western Australia (MERIWA), Brisbane (ACMER) & Perth (MERIWA).

Cerbo, A.R.D. and Biancardi, C.M. (2013). Monitoring small and aboreal mammals by camera traps: effectiveness and applications. Acta Theriologica 58 (3), 279-283.

Cogger, H.G. (2000). Reptiles and Amphibians of Australia - 6th edition. Sydney, NSW: Reed New Holland.

Croak, B.M., Pike, D.A., Webb, J.K., and Shine, R. (2008). Three-dimensional crevice structure beneath rocks influences retreat site selection by nocturnal reptiles. Animal Behaviour 76:1875-1884.

Croak, B.M., Pike, D.A., Webb, J.K., and Shine, R. (2010). Using artificial rocks to restore non renewable shelter sites in human-degraded systems: colonization by fauna. Restoration Ecology 18:428-438.

Croak, B.M., Pike, D.A., Webb, J.K., Shine, R. (2012). Habitat selection in a rocky landscape: experimentally decoupling the influence of retreat-site attributes from that of landscape features. PLoS One 7:e37982

Croak, B.M., Webb, J.K., Shine, R. (2013). The benefits of habitat restoration for rock-dwelling velvet geckos *Oedura lesueurii*. Journal of Applied Ecology 50:432–439

Cronin, L. (2001). Australian Reptiles and Amphibians Key Guide. Envirobook.

Daly, G. (1996). Observations on the Eastern Owl Frog *Heleioporus australiacus* (Anura: Myobatrachidae) in Southern New South Wales. Herpetofauna 26(1): 33-42. In National Parks and Wildlife Service (2001b) Threatened Species Information – Giant Burrowing Frog (*Heleioporus australiacus*).

Department of Planning (2011). Project Approval – Bulli Seam Operations Project.

Department of Sustainability, Environment, Water, Population and Communities (2012a). *Litoria aurea* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:21:37 +1000.

Department of Sustainability, Environment, Water, Population and Communities (2012b). *Heleioporus australiacus* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:19:32 +1000

Department of Sustainability, Environment, Water, Population and Communities (2012c). *Litoria littlejohni* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:15:29 +1000

Department of Sustainability, Environment, Water, Population and Communities (2012d). *Macquaria australasica* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:23:21 +1000.

Department of Sustainability, Environment, Water, Population and Communities (2012e). *Pultenaea aristata* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 15:22:13 +1000.

Department of Sustainability, Environment, Water, Population and Communities (2012f). *Leucopogon exolasius* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:40:12 +1000.

Department of Sustainability, Environment, Water, Population and Communities (2012g). *Pomaderris brunnea* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:56:00 +1000

Downes, S. (1999). Prey odour influences retreat-site selection by naive Broad-headed Snakes (*Hoplocephalus bungaroides*). Journal of Herpetology. 33:156-159.

Dubey, S., Sumner, J., Pike, D. A., Keogh, J. S., Webb, J. K. and Shine, R. (2011), Genetic Connectivity among Populations of an Endangered Snake Species from Southeastern Australia (*Hoplocephalus bungaroides*, Elapidae). Ecology and Evolution, 1: 218–227.

Environment Protection and Biodiversity Conservation Act 1999 draft referral guidelines for the endangered southern brown bandicoot (eastern), *Isoodon obesulus obesulus*. Accessed Mon, 15 May 2013 20:08

Department of Environment and Conservation (2005). Green and Golden Bell Frog *Litoia aurea* (Lesson 1829) Recovery Plan. Draft for Public Comment.

Department of Environment and Climate Change (2007). Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region: Volume 1 – Background Report; Volume 2 - Fauna of Conservation Concern including Priority Pest Species; Volume 4 – The Fauna of the Metropolitan, O'Hares Creek and Woronora Special Areas – Summary of Findings and Recommendations. A joint project between the Sydney Catchment Authority and the Department of Environment and Climate Change.

Department of Primary Industries (2005). Threatened Species in NSW, Macquarie Perch, *Macquaria australasica*. Primefact 9, NSW Department of Primary Industries.

Department of Primary Industries (2008). Fish Distribution and Abundance within the Dharawal State Conservation Area.

EcoEngineers (2012). West Cliff Mine Assessment of Potential Ecotoxicants, Brennans Creek Dam Discharge, September 2012.

Fairley, A. and Moore, P. (2000). Native Plants of the Sydney District. Revised Edition, Kangaroo In: Department of Sustainability, Environment, Water, Population and Communities (2012g). *Pomaderris brunnea* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 25 Sep 2012 14:56:00 +1000

FloraSearch (2009). Illawarra Coal Bulli Seam Operations Project Terrestrial Flora Assessment prepared for Illawarra Coal Holdings Pty Ltd July 2009.

Gehrke, P. G. and Harris, J. H. (1996). Effects of river flow diversion on fish communities in the Hawkesbury-Nepean River system, Australia. In: Fish and fisheries of the Hawkesbury-Nepean River system. Final report to Sydney Water Corporation.

Goldingay, R.L. & D.A. Newell (2000). Experimental rock outcrops reveal continuing habitat disturbance for an endangered Australian snake. Conservation Biology. 14 (6):1908-1912.

Goldingay, R. L. and Newell, D. A. (2005). Population estimation of the Green and golden bell Frog *Litoria aurea* at Port Kembla. Australian Zoologist 33(2): 210-216.

Goldingay, R.L. & Newell, D.A. (2017). Small-scale field experiments provide important insights to restore the rock habitat of Australia's most endangered snake. Restor. Ecol. 25, 243–252.

Green, M., Thompson. M. B. and Lemckert, F. L. (2004). The effects of suspended sediments on the tadpoles of two stream-breeding and forest dwelling frogs, *Mixophyes balbus* and *Heleioporus australiacus*. Lunney, D., ed. Conservation of Australia's Forest Fauna (second edition). Pages 713-720.

Knight, J. and Bruce, A. (2008). Fish Distribution and Abundance in the Dharawal State Conservation Area. Report prepared for NSW Department of Environment and Climate Change.

Illawarra Coal (2013). Pre-clearing Ecological Surveys Stage 3 Slurry Pond Constructions. Internal Report prepared by Illawarra Coal.

ICHPL (2014a). Appin Area 9 Longwalls 901 to 904 Extraction Plan – Annex C - Water Management Plan.

ICHPL (2014b). Appin Area 9 Longwalls 901 to 904 Extraction Plan – Annex D - Biodiversity Management Plan.

IMC (2020a). Air Quality and Greenhouse Gas Management Plan (APNMP0112).

IMC (2020b). Coal Wash Emplacement Area Management Plan.

IMC (2020c). Environmental Compliance/Conformance Assessment and Reporting (IMCP0186). October 2020.

IMC (2020d). Environmental Management Strategy. September 2020

IMC (2020e). Reporting and Investigation Standard (IMCSTD0069). May 2020.

Lemckert, F. (2004) The biology and conservation status of the heath frog *Litoria littlejohni*. Herpetofauna 34: 99-104.

Lemckert, F. (2008). Observations of above ground calling by the giant burrowing frog (*Heleioporus australiacus*). Herpetofauna 38: 123.

Lemckert, F. (2010) Habitat relationships and presence of the threatened heath frog *Litoria littlejohni* (Anura: Hylidae) in central New South Wales, Australia. Endangered Species Research 11: 271-278

Lemckert, F. and Mahony M. (2008), Core calling periods of the frogs of temperate New South Wales, Australia', Herpetological Conservation and Biology 3: 71–76. NPWS Atlas of NSW Wildlife – Accessed July 2012.

National Parks and Wildlife Service (1999a). Threatened Species Information – Green and Golden Bell Frog (*Litoria aurea*).

National Parks and Wildlife Service (2001). Threatened Species Information – Giant Burrowing Frog (*Heleioporus australiacus*).

Niche (2011). Pre-clearance Surveys - Stage 3 Coal Wash Emplacement Area. Report prepared for Illawarra Coal.

Niche (2012). Pre-clearance Surveys - Stage 3 Coal Wash Emplacement Area. Report prepared for Illawarra Coal.

NSW Scientific Committee (2000). Final Determination for the Littlejohn's Tree Frog.

Office of Environment and Heritage (2013). Southern Brown Bandicoot and southern brown bandicoot Offset Strategy Draft Project Summary. Proposal prepared BHP Billiton Illawarra Coal.

Penman, T., Lemckert, F. and Mahony, M. (2004). Two hundred and ten years of looking for giant burrowing frog. Australian Zoologist. 32(4): 597-604.

Penman, T., Lemckert, F., Slade, C. and Mahony, M. (2006). Non-breeding habitat requirements of the giant burrowing frog (*Heleioporus australiacus*) in south-eastern Australia. Australian Zoologist 33: 251-257.

Powell, J.M. (2010). '*Leucopogon exolasius*'. [Online]. New South Wales Flora Online. Available from: http://plantnet.rbgsyd.nsw.gov.au/cgibin/NSWfl.pl?page=nswfl&lvl=sp&name=Leucopogon~exolasius.Press, Sydney.

Pringle, R.M., J.K. Webb & R. Shine (2003). Canopy structure, microclimate, and habitat selection by a nocturnal snake, *Hoplocephalus bungaroides*. Ecology. 84(10):2668-2679.

Resource Strategies (2011) Bulli Seam Operations- Environmental Assessment. Report prepared for BHPBIC.

Robinson, M. (1993). A field guide to frogs of Australia from Port Augusta to Fraser Island including Tasmania, Reed New Holland, Sydney.

Scroggie, M. P. (2008). An evaluation of occupancy methods for monitoring of southern brown bandicoots in Gippsland, Victoria. Unpublished report to the Department of

Sustainability and Environment. Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg, Victoria.

Shine, R., J.K. Webb, M. Fitzgerald & J. Sumner (1998). The impact of bush-rock removal on an endangered snake species, *Hoplocephalus bungaroides* (Serpentes: Elapidae). Wildlife Research. 25:285-295.

Smith, J.K. and Coulson, G. (2012). A comparison of vertical and horizontal camera trap orientations for detection of potoroos and bandicoots. The Journal of the Australian Mammal Society. 34 (2). 196-201

Webb, J., D. Pike & R. Shine (2008). Population ecology of the velvet gecko, *Oedura lesueurii* in south eastern Australia: Implications for the persistence of an endangered snake. Austral Ecology. 33 (7):839-847.

Webb, J.K. & R. Shine (1994). Habitat use by the broad-headed snake, *Hoplocephalus bungaroides*. Page(s) 7-24. NSW NPWS. NSW NPWS, Sydney.

Webb, J.K. & R. Shine (1997a). Out on a limb: conservation implications of tree-hollow use by a threatened snake species (*Hoplocephalus bungaroides*: Serpentes, Elapidae). Biological Conservation. 81:21-33.

Webb, J.K. & R. Shine (1997b). A field study of spatial ecology and movements of a threatened snake species, *Hoplocephalus bungaroides*. Biological Conservation. 82:203-217.

Webb, J.K. & R. Shine (1998a). Thermoregulation by a nocturnal elapid snake (*Hoplocephalus bungaroides*) in southeastern Australia. Physiological Zoology. 71 (6):680-692.

Webb, J.K. & R. Shine (1998b). Using thermal ecology to predict retreat-site selection by an endangered snake species. Biological Conservation. 86:233-242.

Webb, J.K. & R. Shine (1998c). Ecological characteristics of a threatened snake species, *Hoplocephalus bungaroides* (Serpentes, Elapidae). Animal Conservation. 1:185-193.

Webb, J.K. & R. Shine (2000). Paving the way for habitat restoration: can artificial rocks restore degraded habitats of endangered reptiles?. Biological Conservation. 92:93-99.

Webb, J.K., B.W. Brook & R. Shine (2002). What makes a species vulnerable to extinction? Comparative life-history traits of two sympatric snakes. Ecological Research. 17:59-67.

Webb, Jonathan K., Barry W. Brook & Richard Shine (2003). Does foraging mode influence life history traits? A comparative study of growth, maturation and survival of two species of sympatric snakes from south-eastern Australia. Austral Ecology. 28(6):601-610.

Wells, R. (1981). Remarks on the prey preferences of *Hoplocephalus bungaroides*. Herpetofauna. 12 (2):25-29

11. FIGURES

Figure 1: Previous Records of Southern Brown Bandicoot

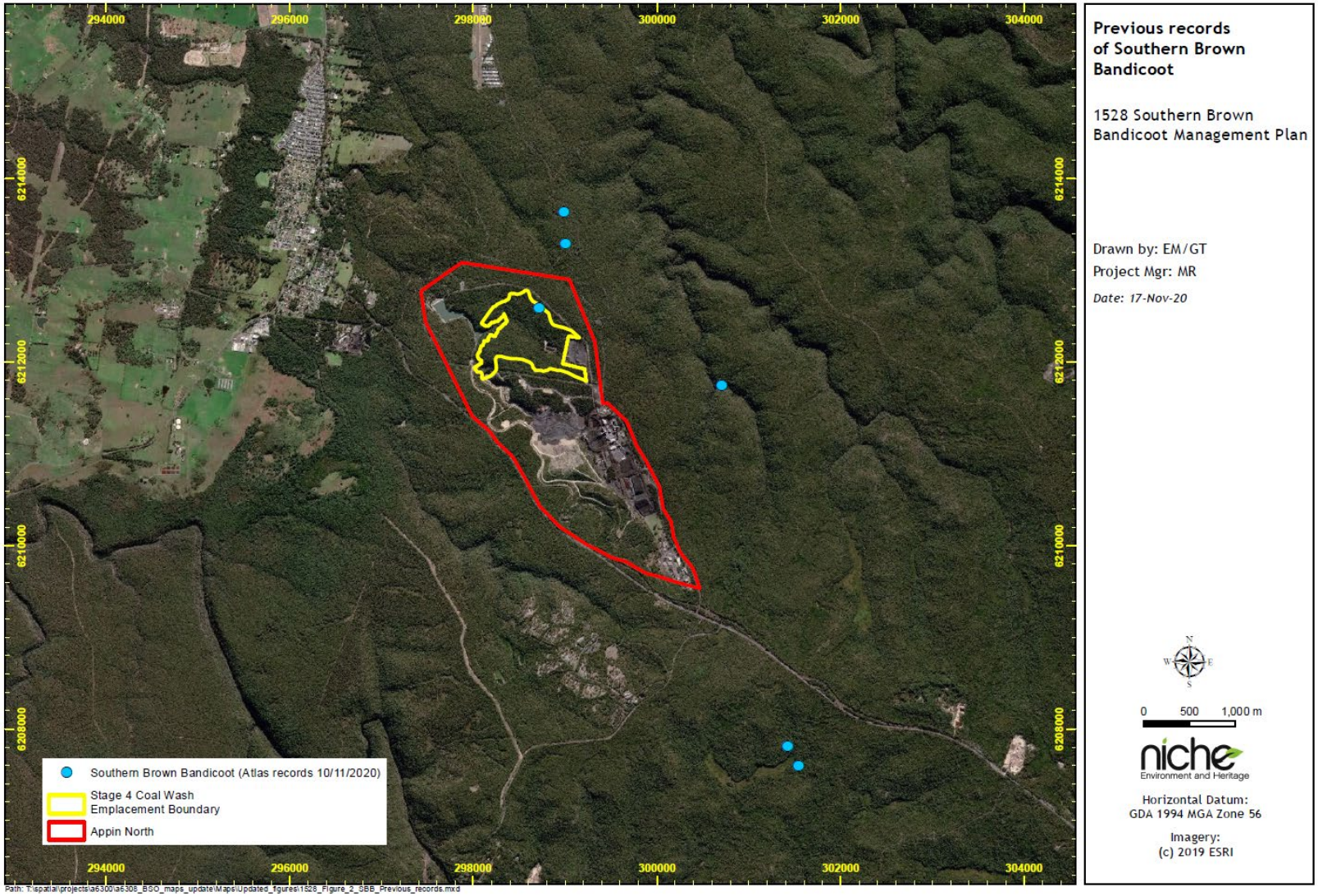


Figure 2: Previous Records of Broad-headed Snake

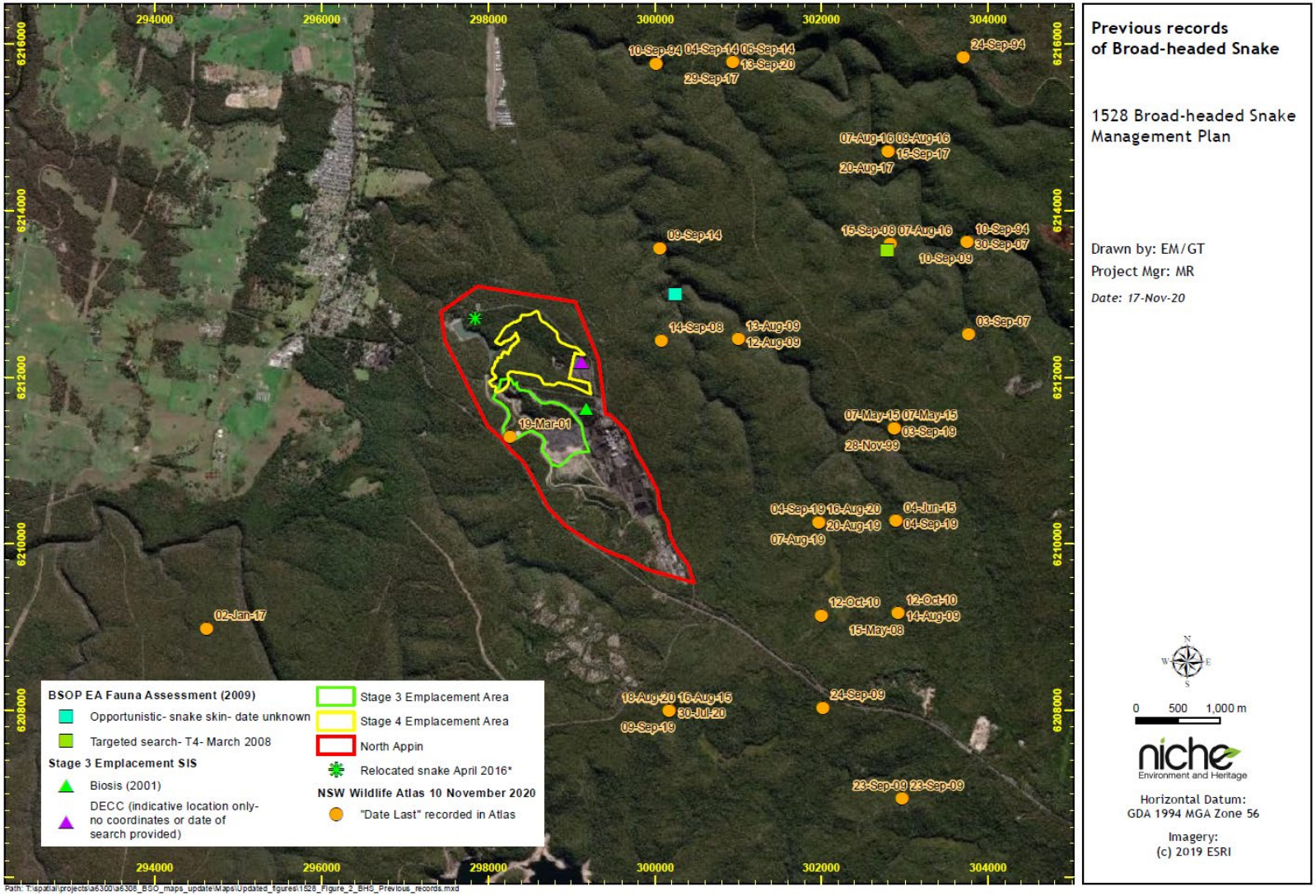
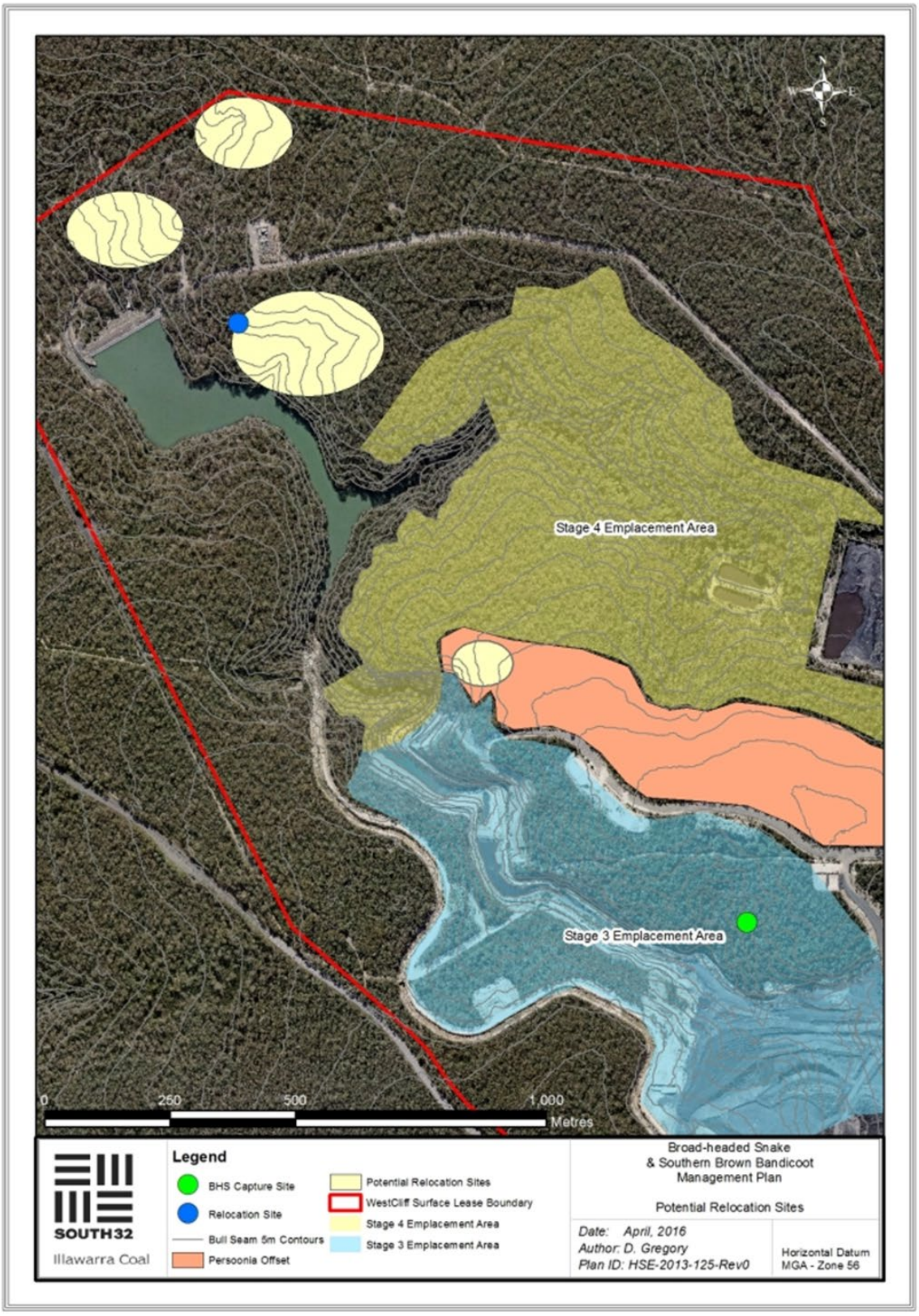


Figure 3: Broad-headed Snake Potential Relocation Sites



12. APPENDICES

Appendix 1: Project Approval Conditions: SBMP

CONDITION	REQUIREMENT	SECTION
Condition 17 of Schedule 4	The Proponent shall prepare and implement a West Cliff Emplacement Area Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with OEH and be submitted to the Secretary for approval by the end of June 2013. This plan must include: (d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot.	See Coal Wash Emplacement Area Management Plan

Appendix 2: EPBC Approval 2010/5350 Conditions: SBMP

Condition	Requirement	Section
Condition 7	Within 1 year of the date of this approval the person taking the action must provide for the Minister's approval a Southern Brown Bandicoot and Broad-headed Snake management plan or plans. The plan or plans must include:	This document and previous versions
	(a) measures to avoid, mitigate and manage impacts on the Southern Brown Bandicoot, Broad-headed Snake and their habitats occurring as result of the action;	Section 6
	(b) provisions for the contribution of no less than $250,000 (GST exclusive) in funding towards regional Southern Brown Bandicoot and Broad-headed Snake programs. This funding must not be expended on the measures referred to in condition 6a;	Section 7.1
	(c) a description of actions to be funded and undertaken to inform and/or enhance the conservation of these species, including through survey or research, threat abatement with specific reference to predator controls and habitat restoration or rehabilitation, including public reporting or publication of information gained by these actions;	Section 7.2
	(d) a demonstration that management actions to be undertaken will not adversely impact EPBC Act listed species;	Section 7.3
	(e) a description of funding arrangements or agreements including work programs and responsible entities; and	Section 7.4
	(f) measures for the provision of documentary evidence within 30 days of the funding having been expended and/or that funding commitments have been met.	Section 7.5
Condition 13	Unless otherwise agreed to or instructed in writing by the Minister, the person taking the action must publish all management plans, reports, strategies or agreements required by these conditions of approval on their website. Each management plan, report strategy or agreement must be published on the website within 30 days of being approved.	Section 8.3
Condition 14	Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be	Section 8.1

	provided to the department at the same time as the compliance report is published.	
Condition 18	By the end of 31 December 2013 and every three years thereafter, unless the Minister directs otherwise, the person taking the action must commission and pay the full cost of an independent environmental audit of project. This audit must: a. be conducted by a suitably qualified and independent team of experts whose appointment has been endorsed by the Minister; b. include consultation with relevant state agencies; c. assess the environmental performance of the project and assess whether it is complying with the requirements in this approval (including any assessment, plan or program (however described) required under this approval); d. review the adequacy of strategies, plans or programs required under the abovementioned approvals; and e. recommend appropriate measures or actions to improve the environmental performance of the action, and/or any assessment, plan or program required under the above mentioned approvals; and f. audit criteria must be agreed to be the Minister; g. within 6 weeks of the completion of this audit, or as otherwise agreed by the Minister, the person taking the action must submit a copy of the audit report to the Minister. The audit report must address the criteria to the satisfaction of the Minister. Note: The audit team must be led by a suitably qualified auditor and include experts in any field specified by the Minister.	Section 8.4.1

Appendix 3: EPBC Approval (2001/214) Conditions: SBMP

Condition	Requirement	Section
Condition 5	S32 Illawarra Coal must submit for the Minister's approval a plan for managing the impacts of the action on the Broad-headed Snake *Hoplocephalus bungaroides*. The plan must be implemented. No vegetation may be cleared as part of West Cliff Coal Emplacement Stage 3 until the plan has been approved by the Minister.	Previously submitted BHSMP

Appendix 4: Version History – SBBMP and BHSMP

SBBMP

Version	Description of changes	Date
1.0	New plan developed for EPBC Act and EP&A Act approvals (developed by Niche Environment and Heritage)	2013
2.0	Incorporate comments from OEH and DSEWPaC (developed by David Gregory (IMC) and Niche Environment and Heritage)	2014
3.0	Updated to reflect South32 name and branding. Updates to management & mitigation measures to remove duplication with the Coal Wash Emplacement Area Management Plan. Updated section on Management of Captured bandicoots to preference being relocation. Updated section on Provision of Regional Funding - funding has been expended. (Developed by David Gregory (IMC))	2017

BHSMP

Version	Description of changes	Date
1.0	Original Plan for Dendrobium EPBC Approval (2001/214), Condition 5 (developed by Biosis Pty Ltd)	2007
2.0 and 3.0	Plan updated to reflect Bulli Seam Operations EPBC 2010/5350 requirements (developed by David Gregory (IMC) and Niche Environment & Heritage)	2013 and 2014
4.0	Updated to reflect South32 name and branding. Updates to management & mitigation measures to remove duplication with the Coal Wash Emplacement Area Management Plan. Updated section on Management of Captured Broad-headed Snakes to preference being relocation. Updated section on Provision of Regional Funding - funding has been expended. (Developed by David Gregory (IMC))	2017

Appendix 5: Broad-headed Snake and Southern Brown Bandicoot Offset Strategy

Broad-headed snake and southern brown bandicoot Offset Strategy
Office of Environment and Heritage
Project Summary
Version 3 – April 2014

Project Initiation and Planning	
Project Name	Bulli Seam Operations broad-headed snake and southern brown bandicoot Offset Strategy, Woronora Plateau.
Project Context	BHP Billiton Illawarra Coal (BHPB) was granted approval for their Bulli Seam Operations Project by the Federal Government (EPBC 2010/5350) on 15 May 2012. The EPBC Approval, in accordance with condition 7, requires that Illawarra Coal provide a Southern Brown Bandicoot & Broad Headed Snake Management Plan for approval by the Federal Minister for the Environment. The Office of Environment and Heritage (OEH) has been approached by BHPB to develop and implement a project proposal to be funded by BHPB, that addresses points (c) to (f) of this condition as outlined below. This project proposal aims to address this request. *7. Within 1 year of the date of this approval the person taking the action must provide for the Minister's approval a Southern Brown Bandicoot and Broad Headed Snake conservation management plan or plans. The plan or plans must include:* *a) measures to avoid, mitigate and manage impacts on the Southern Brown Bandicoot, Broad Headed Snake and their habitats occurring as a result of the action* *b) provisions for the contribution of no less than $250 000 (GST exclusive) in funding towards regional Southern Brown Bandicoot and Broad Headed Snake programs. This funding must not be expended on the measures referred to in Condition 7a* *c) a description of actions to be funded and undertaken to inform and/or enhance the conservation of these species, including through survey or research, threat abatement with specific reference to predator controls and habitat restoration or rehabilitation, including public reporting or publication of information gained by these actions* *d) a demonstration that management actions to be undertaken will not adversely impact EPBC ACT listed species* *e) a description of funding arrangements or agreements including work programs and responsible entities, and* *f) measures for the provision of documentary evidence within 30 days of the funding having been expended and/or that funding commitments have been met.* *The approved plan or plans must be implemented within 2 years of the date of this approval. The clearing of native vegetation for the stage 4 coal wash emplacement cannot occur until the approved plan or plans have been implemented.*
Project Manager	Meagan Hinds, Senior Threatened Species Officer Ecosystems and Threatened Species, Greater Sydney Office of Environment and Heritage P: (02) 9585 6842 E: meagan.hinds@environment.nsw.gov.au
Project Sponsor	Lou Ewins, Manager Ecosystems and Threatened Species, Greater Sydney Office of Environment and Heritage P: (02) 9585 6802 E: lou.ewins@environment.nsw.gov.au

7/04/2014 1

Stakeholders	**BHP Billiton Illawarra Coal (BHPB)** Joanna Page, Manager Environment P: (02) 4286 3322 E: joanne.page@bhpbilliton.com David Gregory, Specialist Land and Biodiversity P: (02) 4286 3323 E: David.Gregory@bhpbilliton.com **Commonwealth Department of Environment (DoE)** Manel Samarakoon, Approvals Monitoring, Compliance and Enforcement Branch P: (02) 6274-1080 E: manel.samarakoon@environment.gov.au
Project Team	**Ecosystems and Threatened Species, Metro** Meagan Hinds, Senior Threatened Species Officer Debbie Andrew, Natural Heritage Officer **Ecosystems Management Science** Ben Hope, Project Officer, Conservation Implementation
Project partners / Expert input	**OEH** James Dawson/Kylie Madden/Lachlan Wilmott/Elizabeth Magarey, Ecosystems & Threatened Species, Illawarra **Parks and Wildlife Division** Tony Horwood, Area Manager, Illawarra Phil Craven, Project Officer, South Coast Region Andrew Claridge, Research Scientist, Planning & Assessment (SBB expert) **Sydney Catchment Authority** Kelvin Lambkin, Senior Catchment Officer **BHS habitat restoration experts** Ben Croak, University of Sydney Ross Goldingay, Southern Cross University **Contractors** To be determined via formal contractor tender selection process.
Project Objectives	1. Improve our understanding of the distribution and habitat usage of the southern brown bandicoot across the Woronora Plateau via the implementation of a systematic survey program. 2. Asses the risk of fox predation on any identified southern brown bandicoot population. 3. Improve our understanding of the distribution and threats acting on the broad-headed snake across the Woronora Plateau to address existing knowledge gaps via the implementation of a targeted survey and threat assessment program. 4. Reduce the impact of threats operating on the broad-headed snake and its habitat at priority locations across the Woronora Plateau via the implementation of site protection and habitat restoration program. Note it is beyond the scope of this project to incorporate threat management actions, particularly predator control, for the southern brown bandicoot. See project scope for further explanation.
Project Tasks	1. Undertake a formal tender selection process to select contractor(s) to undertake identified tasks requiring expert skills and knowledge (eg. BHS survey & habitat assessment, image review, camera deployment) 2. Develop and implement a systematic survey program for the SBB across the Woronora plateau using IR remote cameras and predator scat collection while also incorporating an assessment of habitat and fox predation across the study area. 3. If SBB population is confirmed, develop recommendations for priority site management and threat abatement actions including

7/04/2014 2

	population monitoring and predator control. 4. Develop and implement a targeted BHS survey program across the Woronora Plateau addressing distribution knowledge gaps. 5. Conduct an assessment of threats operating at known BHS sites and identify priority locations for site protection and habitat restoration. 6. Develop and implement a targeted BHS threat management program that addresses habitat protection, management and restoration actions at identified priority locations. 7. Prepare and distribute annual and final project implementation reports to project stakeholders. A brief description of the methods to undertake these tasks is outlined in Attachment 1.
Cost/budget	As outlined in the context above this project will be implemented using external funds provided by BHP Billiton as part of condition 7 of the EPBC Act Approval for no less than $250,000. It is anticipated that funds will be split across the three tasks as outlined in the **indicative** budget below. **Southern Brown Bandicoot (survey)** Contract expertise $ 90,000 Cameras $ 18,000 Field consumables/running costs $ 12,000 **Sub Total $120,000** **Broad-headed Snake (survey & monitoring)** Contract expertise $ 60,000 Consumables/running costs $ 5,000 **Sub total $ 65,000** **Broad-headed Snake (site protection & restoration)** Materials $ 44,000 Contract labour/expertise $ 21,000 **Sub total $ 65,000** **Grand total $250,000** The project will also include considerable in-kind contributions from the OEH project team and partners who are responsible for the project development and implementation.
	It is proposed that the project be scheduled over three years commencing July 2014 and finishing June 2017 with payments scheduled as follows: Year 1 $85,000 July 2014 Year 2 $85,000 July 2015 Year 3 $80,000 July 2016 All figures above are exclusive of GST.
Scope	The study area is generally referred to as the Woronora Plateau, which covers approximately 134,000ha and comprises the following areas: • Dharawal National Park, (6674ha) • Upper Nepean State Conservation Area, (25,086ha) • Woronora Plateau Special Area, (2768ha) • Metropolitan Special Area, (87, 087ha) and • O'Hares Special Area (7400ha) See Figure 1 in Attachment 1 The project has been developed to address approval condition 7 (as noted above). It is consistent with priority actions identified by the OEH Saving our Species Program as it improves our understanding and management of two state and commonwealth listed threatened species the southern brown bandicoot and the broad-headed snake across the

	Woronora Plateau. The project does not include predator control actions for the BHS as this is not an identified threat to this species. The project does not include predator control actions for the SBB as until a population for this species can be identified within the study area it is not appropriate to commit to the implementation of such actions. However, should a population be found, recommendations will be developed in accordance with the OEH SBB recovery program and the Fox Threat Abatement Plan. It is anticipated that the entire funds committed to the SBB will be required to address the primary objective for this species (Objective 1). The project is not intended to fund the implementation of priority actions for these species outside of the study area. However, it is possible that options for BHS site protection and habitat restoration within the study area may be exhausted prior to expenditure of funds allocated to this task. If this occurs OEH will consult with the Commonwealth Department of Environment and BHPB to reallocate this money to other BHS priority sites identified within Morton and/or Royal National Parks.
Outcomes	
Project inputs	1. Existing knowledge and data on species distribution, habitat requirements, survey and habitat restoration techniques. 2. Existing project priorities for survey, threat assessment, site protection and habitat restoration in accordance with established BHS and SBB recovery programs. 3. Expertise from project team, partners, experts and contractors as required.
Project outputs/reporting	1. Annual works schedule outlining proposed works for the year ahead prepared on: project commencement July 2014; year 2 commencement July 2015 and year 3 commencement July 2016. 2. Expert Contractor(s) selected via formal contractor selection process. 3. Annual 2014/15 and 2015/16 progress reports outlining project progress and implementation, delivered by July 2015 and July 2016. 4. Updated distribution map of the SBB and BHS across the study area. 5. Improved understanding of habitat requirements and threats acting across the study area on the BHS and SBB. 6. Identification of priority areas across the study area for threat management action for the BHS. 7. Description and map of BHS site protection and habitat restoration works implemented at priority areas across the study area. 8. Final report outlining project objectives, methods, outcomes and recommendations for future work.
Project risks	1. Feasibility of project implementation given extensive study and limited funding for project implementation Response: Additional consultation has been undertaken with project team and experts to discuss project scope and feasibility in January and February 2014 and methods have been revised as per Attachment 1 and the study area has remain unchanged. 2. Delays due to weather & fire which can limit access to study area, especially water catchment lands Response: The project has been scheduled over three years to allow flexibility in scheduling fieldwork and incorporate allowances for delays. In addition a detailed yearly works schedule will be developed and updated regularly to ensure timeframes, performance measures and

7/04/2014 4

	outputs are met. 3. Scope creep, and expectations of BHP, Commonwealth & other interested parties Response: This risk will be managed by the development of a project plan and yearly works schedule that has clear identification objectives and scope to be agreed by all interested parties including the Federal Government and BHPB. The project will also incorporate regular communication and reporting strategy to ensure interested parties are kept up-to-date. 4. Ability of systematic survey methods to detect SBB across the large study area. Response: The draft survey method was developed in consultation with species experts in NSW and the review of similar studies conducted elsewhere in Australia and will continue to be refined during the implementation of the project. It is important to note that the lack of detection of the target species (or a nil result) is not necessarily a reflection of an inadequate survey. Outcomes from the review of the draft have been incorporated into the project methodology. 5. Long-term security of BHS site protection and restoration measures (eg vandalism) and illegal collection of BHS Response: An assessment will be made to maximise the distance of habitat restoration areas from access routes while also still allowing easy access to bring in artificial bushrock. Natural rocks will be used where possible and restoration sites will not be made public. The study area was chosen given its already restricted access arrangements, particularly to the catchment lands which covers over 75% of the study area. The project will also investigate opportunities to incorporate targeted education awareness campaign within the community stakeholders with the aim of reducing impacts from habitat disturbance and illegal collection.
Timeframe	The project will be implemented over three years commencing July 2014 and completed by June 2017.
Roles and Responsibilities	Office of Environment and Heritage: • Development of draft and final project proposal to BHPB with cc copy to DoE for endorsement • Project development, co-ordination and implementation including formal contractor selection process, yearly works schedule and progress reporting to project team • Provision of project reports, including progress reports for 2015 and 2016 and final report in 2017, to BHPB with cc copies to DoE. BHP Billiton, Illawarra Coal: • Funding of project for at least $250,000 with payment schedule outlined above, including provision of contract of agreement for funds • Provide comment and endorsement of draft and final project proposal to OEH • Submission of final project plan to DoE • Reporting to Commonwealth for this project (against condition of consent 7 ii-vi) including progress and final reporting. Commonwealth Department of Environment: • Approval authority for condition 7 ii-vi implementation • Provide comment and endorsement of draft and final project proposal to BHPB and OEH.

Project Performance Measures/Timeline	1. Draft project proposal to BHPB & DoE 2. Final project proposal submitted for endorsement 3. Final project proposal endorsed 4. Formal contractor selection process 5. Project commences & 2014/15 works schedule 6. 2014/15 progress report & 15/16 works schedule 7. 2015/16 progress report & 16/17 works schedule 8. Final project report outlining outcomes a. Revised distribution description and maps for BHS & SBB b. If population located, a description of habitat preferences for SBB c. Description of threats and management recommendations for BHS and SBB d. Priority areas for BHS across study area e. Description and map of site protection works f. Recommendations for future management and research for the BHS and SBB across the study area	1. 11/12/13 2. 4/04/14 3. 30/04/14 4. 30/7/14 5. July 14 6. 30/07/15 7. 30/7/16 8. 30/8/17

Attachment 1

BHS and SBB Offset Project

Methods

Introduction

Both the broad-headed snake and the southern brown bandicoot are threatened species with extremely limited distributions. Records of both these species on the West Cliff emplacement site are a significant finding.

In December 2011 consideration by OEH experts was given to the long-term recovery objective for these species in NSW which for each species is:

> *"to secure the species in the wild for 100 years and to maintain its conservation status under the TSC Act"*

In order to meet these objectives a set of actions for each species was developed, which are outlined separately below.

Broad-headed snake

The broad-headed snake (BHS) is endemic to NSW and its current distribution extends from Wollemi NP in the North; the edge of the Clyde River catchment in the ranges SW of Nowra in the south; to the upper Blue Mountains at Blackheath and Newnes in the west and to near Little Marley within Royal NP in the east. Within this area it occupies very distinctive seasonally specific micro-habitats (exfoliating sandstone bushrock on outcrops, crevices and tree hollows) along sandstone cliffs, ridges and outcrops.

In the 2011 OEH prioritisation process it was determined that in addition to current active management of the two priority populations (Morton NP and surrounds, Royal & Heathcote NPs), a third priority site was required to secure the species. As part of this process the most recent records of the species were assessed, in conjunction with likely large areas of secure habitat. This assessment identified the record at West Cliff Colliery and the surrounding catchment lands and National Park estate as the highest priority for further targeted priority action implementation for the species in the State. Therefore this site has been identified as critical for the long-term conservation of this species and a suite of priority threat mitigation and habitat management actions have been developed for implementation.

Furthermore, options for offsetting this species outside the existing conservation reserve system are limited as there are no confirmed locations other than those noted above. Instead, targeted survey, site protection and habitat restoration is required and is the focus of this project proposal.

Southern Brown Bandicoot

In NSW the southern brown bandicoot is only known from two confirmed and disjunct populations, one in northern Sydney and the other in the far south-eastern corner of the State. Both populations are primarily on public land, in either National Park estate or a combination of National Park estate and State Forest.

In order to meet the above objective it was determined that in addition to active management of the two identified populations, further work was required to identify a third population to secure the species. As part of this process the most recent records of the species were assessed, in conjunction with likely large areas of secure potential habitat. This assessment identified the record at West Cliff Colliery and the surrounding catchment lands and National Parks estate as the highest priority for further targeted survey for the species in the State. Therefore, this site has been identified as potentially critical for the long-term conservation of this species and a

suite of priority threat mitigation and habitat management actions have been developed for implementation.

Furthermore, options for offsetting this species outside the existing conservation reserve system are limited as there are no confirmed locations other than those noted above. Instead, targeted survey and active management of the major threat to this species (predation by foxes) is required and is the focus of this project proposal. Fox control is beyond the scope of the current work, however, the results will be used to assess the need for fox control in the area and develop a plan for a predator control program if required.

Methods

Study Area

The study area for both species comprises of approximately 134,000 ha across the following areas:

- Dharawal National Park, (6674ha)
- Upper Nepean State Conservation Area, (25,086ha)
- Woronora Plateau Special Area, (2768ha)
- Metropolitan Special Area, (87, 087ha) and
- O'Hares Special Area (7400ha)

Figure 1 shows the proposed study area and current records for the southern brown bandicoot and broad-headed snake. As the habitat requirements of both species differ, work will be targeted to appropriate habitat for each species. A limited amount of survey effort has occurred in these areas and the current project will aim to address these knowledge gaps rather than duplicate existing knowledge.

Survey

As the biology of the southern brown bandicoot and the broad-headed snake differ each program employs separate methods within the same general area. A survey design for each species is outlined below.

Southern Brown Bandicoot

Survey design

Recent research and management programs for the species are now recommending the use of infra-red (IR) cameras over more traditional survey methods using cage traps and/or hair tubes as cameras are proving more efficient and effective at detecting this species and other small to medium sized mammals. Cage trapping is labour intensive, costly and time consuming, while hair tubes are less effective for detection.

While the upfront cost of cameras may be more costly, ongoing relative costs are lower as they can be installed for long periods in the field with much higher detection rates than cage trapping and hair tubes. Existing survey and monitoring programs for the species in NSW are based heavily on infrared cameras deployments. Furthermore elsewhere in Australia the use of IR cameras for survey small-medium sized mammals is general practice and is the preferred method outlined in the Commonwealth survey and assessment guidelines for this species.

As indicated in figure 1, little is currently known about the species distribution and habitat preference across the study area. Therefore the study area will be systematically surveyed to representatively sample the range of habitat types and burn histories. Camera deployment will occur year round over the life of the project as detection is not affected by seasonality. Sites will consist of a single IR camera deployed with a baited lure (eg. peanut butter, honey and oats) and retrieved after at least three weeks (or at least 21 trap nights). Sites will be independent with spacing at least 1-2kms from other sites and will be generally located adjacent (20-50m) to

Attachment 1

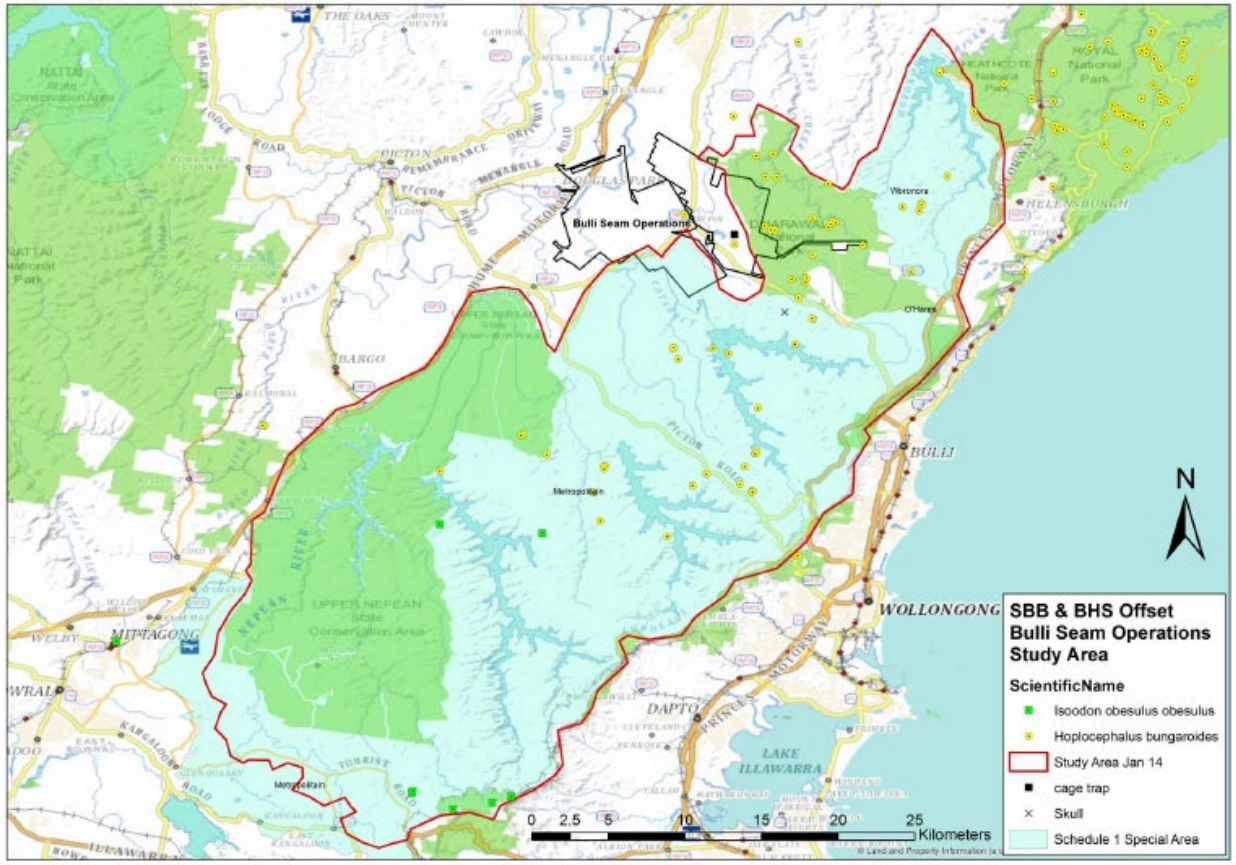


Figure 1: Survey area and southern brown bandicoot and broad-headed snake records.

7/04/2014 1

Attachment 1

trails and tracks which provide relatively good access across the study area. Basic site data will be collected using a site characteristic data sheet similar to that used by WildCount. Where possible, sites will be located where there is evidence of bandicoot diggings and this information will be collected and used in the analysis. All images of individuals captured, including targets (southern brown bandicoots) and non-targets (foxes and other animals) will be tagged and processed in accordance with WildCount image processing methods.

Should the target species be confirmed early on in the survey period (ie. within the first 1-2 years), this information will be used to inform and refine the survey strategy. This could lead to more targeted survey where effort could concentrate on specific habitat types or locations and possibly increase the density of sites in identified area(s) of interest therefore enable the delimitation of discrete populations of the species and/or the extent of suitable habitat. The annual implementation project reports will outline in detail the specific bandicoot survey methods employed to date, highlighting any necessary refinements to the above strategy.

It is anticipated that project planning including survey design and reporting will be generally supported by the project co-ordinator, team and partners providing expert advice. Fieldwork, image processing and scat analysis will be undertaken by contractors with specific survey and analysis expertise. It is estimated that with at least 30 cameras, between 250 and 350 sites will be surveyed across the study area which equates to approximately 12 weeks/60 days of fieldwork spread over the three year project period.

It is recognised that this proposed survey strategy differs from the standard guidelines established by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (2011) "Draft Referral Guidelines for the endangered southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*)" in camera trap density (1 camera / 5ha for affected areas over 30ha) repetition and duration (minimum of two surveys, each of 14 days duration). However, given the extremely large scale and non-development related purpose of the survey it is considered that the proposed survey strategy balances limited resources (ie cameras, staff/contractor time) against study area coverage while trying to maximise detection of the target species. As such this unique situation requires an individually tailored approach rather than the standard approach as outlined in the guidelines.

To supplement this program, incidental collection of predator scats, primarily foxes, will also be collected and analysed on an opportunistic basis. This will add to our knowledge of foxes across the study area and their common prey/diet which may include the southern brown bandicoot. All site, image and scat data collected will be entered into the NSW Wildlife Atlas survey database.

Threat assessment

Should the survey program confirm the presence of the southern brown bandicoot within the study area, a more detailed threat assessment and management program will need to be developed. Incidental records of predators collected via scat and images will provide an indicative assessment of this threat although it will need to be supplemented by a systematic assessment of fox activity which can then be used to determine the suitability of a fox control program at this location. If fox control is likely to benefit this species and funding for such a program can secured, a site plan consistent with the NSW Fox Threat Abatement Program will be developed for implementation in the future.

Broad-headed snake

Survey design

In contrast to the southern brown bandicoot, the specific habitat requirements and existing knowledge of the species across the study area means that a more targeted survey strategy can be used for the broad-headed snake. Surveys can be timed to occur during the cooler months of the year when the species is known to reside under exfoliating sandstone bushrock on sandstone outcrops between a westerly and northerly aspect. Digital aerial photography and topographical maps will be used to identify sites on the basis of abundant surface rock, close

Attachment 1

proximity of cliff edges, with northern and western aspects, and the proximity of woodland with tree hollows to rocky cliff edges. These sites will then be prioritised with regards to access with preference given to sites within easy access from tracks across the study area (up to 1-2 km walk). Surveys will not be limited to accessible sites and will aim to survey all identified potential habitat. If necessary, remote potential habitat will be surveyed by foot and potentially assisted by helicopter transport.

Survey methods are based on standard guidelines for saxicolous reptiles whereby a 1-person hour (or 2 person 30 mins) survey over a minimum area of 0.5 ha is undertaken in a linear manner with a dimension of 250 m x 20 m (0.5 ha) searching exposed rock in preference to heath or woodland habitats. Where possible 25 % of the search time (15 mins) will be devoted to habitats that are vegetated (not exposed rock). Observations shall be recorded for all reptiles and rock invertebrates identified as well as a count of all rocks or crevices inspected. Environmental variables measured include cloud cover, wind speed, wind direction, rain, ambient temperature and relative humidity. Search effort will be recorded for each broad habitat of the site (ie. exposed rock, woodland, heath, forest). A field survey data sheet used in the Morton wilderness surveys will be customised for data collection.

Additional information on habitat suitability and disturbance will be recorded to enable an assessment of threats across the study area. This information will guide threat management and habitat restoration objectives and will include the collection of the following:

- number and area of suitable rocks as well as lack of suitable rocks
- evidence of past & present disturbance (rock scars, caching, damage etc)
- access issues
- time since fire and evidence of overshadowing

It is anticipated that project planning including survey design and reporting will be generally supported by the OEH project team and partners with additional partners and experts providing advice. The estimated survey and threat assessment effort is likely to cover approximately 100 new sites and 20 existing sites (4 sites /day) within initial part of the program followed by the establishment of monitoring program for a subset of identified sites (approximately 20-40). This will equate to approximately 60 days of fieldwork during the prime winter survey period (approximately June-September) over the project timeframe and will be undertaken by contract expertise and supported by staff and/or volunteers where desired and available.

Threat assessment

This component will incorporate information collected during surveys and the compilation of knowledge from previous survey efforts and land managers. The aim is to identify priority habitat across the study area and the need for threat mitigation (access, disturbance) and habitat restoration. It will also identify opportunities for habitat restoration and protection.

BHS Habitat protection and restoration

Based on information collected during the site survey and assessment noted above the project will implement site protection and restoration actions at identified priority sites. This will utilise techniques established by researchers at Southern Cross University and the University of Sydney and focus habitat restoration using:

- natural bushrock replacement where bushrock is available and can easily be replaced and
- artificial bushrock in areas that are denuded of natural bushrock and are within areas that access can be restricted and easily accessed by management trails.

Methods for these techniques are outlined in the following references:

Croak, B.M., D.A. Pike, J.K. Webb, and R. Shine. (2010). Using artificial rocks to restore non-renewable shelter sites in human-degraded systems: colonization by fauna. *Restoration ecology* 18(4): 428-438.

Goldingay, R. (1998) Between a rock and a hard place: conserving the Broad-headed Snake in Australia's oldest National Park. *Proceedings Linnaean Society N.S.W.* 120: 1-10.

Attachment 1

Goldingay, R. and Newell, D. (2000) Experimental rock outcrops reveal continuing habitat disturbance for an endangered Australian Snake. *Conservation Biology* 14(6): 1908-1912

In addition, site protection measures also to be considered will include:

- rationalisation of access (gating, fencing, closure of tracks, limiting foot/vehicle access)
- signage
- surveillance

It is anticipated that the habitat restoration and site restoration implementation will be generally co-ordinated and supported by the project co-ordinator, team and partners providing expert advice. The habitat restoration and protection budget has provided for indicative costings for the following measures:

- gating & fencing at 8 sites
- installation of 10 signs
- 500 artificial bushrocks
- 2 weeks of natural bushrock replacement
- 2 weeks of monitoring of works.

This will be re-assessed once the outcomes of the initial survey and assessment have been undertaken. As the majority of the study area is within Sydney's drinking water catchments and is generally restricted to the public, the actual need for such restoration and site protection works maybe over estimated. Should this be the case, opportunities for funding for similar site protection and habitat restoration works at Morton and/or Royal NP priority sites will be investigated and implemented, in consultation with the project stakeholders.

Consideration of impacts of project

Condition 7d of the consent conditions requires the demonstration that the proposed management actions to be undertaken will not adversely impact EPBC Act species. This project has been developed with the conservation of both the BHS and SBB in mind and as such all actions are designed to either improve our understanding of the species or to manage threats acting on the species. As such these actions are intended to have a positive impact on the target species. Where actions have potential to have a negative impact, measures have been put in place to ensure that this risk and impact is minimised.

Broad-headed snake

Specifically, when surveying for the broad-headed snake during the cooler months of the year it is necessary to lift the exfoliating sandstone bushrocks to inspect the cavity underneath. This action can cause damage to this habitat via changing the crevice dimensions or by breaking or damaging the rock which may reduce or destroy this habitat. Therefore it is standard practice that surveys are only conducted by suitably qualified experts who are aware of these risks and take the necessary care when undertaking these surveys to minimise the disturbance to this habitat. Similarly, these surveys have the potential to harm individuals or their prey when lifting bushrock. Once again this risk is minimised by the use of only qualified experts to undertake these tasks. Bushrock habitat is also fragile and when moving around sites either during survey, threat assessment or habitat restoration actions, care will also be taken to ensure minimal damage to bushrock habitat is achieved. All staff, contractors and/or volunteers working in this habitat will be briefed to ensure that the necessary care is taken. Should damage to habitat occur during these works, this damage will be recorded and every effort will be made to rectify the damage where possible by either of the habitat restoration techniques outlined above.

Southern brown bandicoot

This project aims to use the least invasive technique for survey and detection of the target species, ie infra-red remote cameras. As noted above the move to their use has been because of both the greatly reduced impact on the target species compared to other survey techniques particularly cage trapping or hair tubes and their comparative success rate and cost of

Attachment 1

implementation. Cameras do not involve the physical entrapment or direct interaction with any individuals and only requires the temporary removal of a very minor area of likely habitat to obtain a clear image of the individual at the lure. This habitat will quickly grow back and is a minimal temporary loss.

It is also noted that these practices are recognised as standard within the industry and the project will require a scientific license and animal ethics approval prior to commencement which will discuss these risks and proposed mitigation measures in detail. Once these approvals have been received they will be provided to both BHPB and DoE.

Appendix 6: OEH Broad-headed Snake and Southern Brown Bandicoot Proposal Endorsement

NSW GOVERNMENT | Office of Environment & Heritage

Our reference: DOC14/46528, SF14/2223
Contact Meagan Hinds 02 9585 6825

Joanne Page
Manager Environment
BHP Billiton Illawarra Coal
PO Box 514
Unanderra NSW 2526

Dear Ms Page

I am writing with regards to BHP Billiton Illawarra Coal (BHPBIC) request that the Office of Environment and Heritage (OEH) develop and implement a project proposal to fulfil the requirements of Condition 7 of the Federal Government Bulli Seam Operations Project Approval EPBC 2010/5350. This condition requires BHPBIC to contribute no less than $250,000 to regional Broad-headed Snake and Southern Brown Bandicoot recovery programs in order to offset predicted impacts of the proposal.

I am pleased to advise you that this project proposal has now been finalised and a copy is attached for your endorsement. This project proposal has been prepared in consultation with the Commonwealth Department of Environment, species experts, relevant land managers and BHPBIC. It is proposed that the project be scheduled over three years, commencing 1 July 2014 and finishing 30 June 2017 with payments scheduled as follows:

Year 1 $85,000 - July 2014
Year 2 $85,000 - July 2015
Year 3 $80,000 - July 2016

OEH now seeks your written endorsement of the project proposal to ensure that the necessary arrangements within OEH and BHPBIC are completed in time to allow for the commencement of the project and the first project payment in July 2014.

A copy of the final project proposal has also been provided to the Commonwealth Department of Environment. Should you require further information regarding this matter please contact Meagan Hinds, Senior Threatened Species Officer on 0295856825 or meagan.hinds@environment.nsw.gov.au.

Yours sincerely

David Trewin
Regional Manager
Greater Sydney Region

17/4/14

PO Box 1967 Hurstville NSW 1481
43 Bridge Street, Hurstville NSW
Tel: (02) 9995 5000 Fax: (02) 9585 6555
ABN 30 841 387 271
www.environment.nsw.gov.au

Appendix 7: BHPBilliton Broad-headed Snake and Southern Brown Bandicoot Proposal Endorsement

Illawarra Coal

bhpbilliton
resourcing the future

Illawarra Coal Holdings Pty Ltd
BHP Billiton Illawarra Coal Regional Operations Centre
Level 3, Enterprise 1, Innovation Campus, Squires Way
North Wollongong NSW 2500 Australia
PO Box 514
Unanderra NSW 2526 Australia
Tel +61 2 4286 3000 Fax +61 2 4286 3600
bhpbilliton.com

28 April 2014

David Trewin
Regional Manager
Greater Sydney Region
Office of Environment and Heritage
PO Box 1967
Hurstville, NSW, 1481

Attention: Meagan Hinds

Re: Endorsement of the Southern Brown Bandicoot and Broad-headed Snake Project Proposal

I am writing in response to your letter dated 17 April 2014 (your ref DOC14/46528, SF14/2223) requesting our written endorsement of the Broad-headed Snake (BHS) and Southern Brown Bandicoot (SBB) Project Proposal, Version 3.

Illawarra Coal endorses Version 3 of the Project Proposal and is committed to providing OEH with total funding of $250,000 paid over 3 years to contribute toward the regional BHS and SBB recovery programs as outlined in the Proposal.

We request that OEH provide Illawarra Coal with an invoice for the first payment of $85,000 by 15 June 2014 to allow payment to be processed during July.

Should you have any questions, please contact David Gregory, Specialist Land and Biodiversity on (02) 42863323 or via david.gregory@bhpbilliton.com.

Yours Faithfully

Joanne Page

Joanne Page
Head of Health, Safety and Environment
Phone: (02) 42863322
Email: joanne.page@bhpbilliton.com

Appendix 8: Agency Consultation

Agency Comments	IMC Response
DAWE	
Response received 23 December 2020 Could you please append the OEH Project Proposal to this plan and resend? Appendix 5 appears to only contain the OEH letter seeking endorsement of the proposal, not the proposal itself. The Project Proposal is heavily referenced within the plan and the majority of relevant condition items are deferred to this document, with Appendix 5 being the in-text reference. Please ensure it is Appended and complete.	Document has been included as Appendix 5. The letter of endorsement is now Appendix 6. The BHPBilliton letter of endorsement has been included as Appendix 7.
DPIE	
Response received 12 December 2020 • Update Section 8.2 to clarify that the management plan will only be revised then submitted and approved by the secretary in accordance with the conditions of approval. • Please include consultation of other regulatory agencies on previous versions. This will allow the reader to see the proponent has consulted with the other agencies such as Department of Agriculture, Water and the Environment.	Section 8.2 has been updated as requested. Consultation with DAWE has not yet been undertaken. The SBMP will be submitted to DAWE following approval of the Coal Wash Emplacement Area Management Plan by DPIE (of which the SBMP meets Condition 17d of Schedule 4). Any comments from DAWE will be incorporated into the final document. A final version of the SBMP will be provided to DPIE for DPIE's records.
Biodiversity and Conservation Division	
Response received 23 November 2020 My team has reviewed the BHS & SSB Management Plan and has made comments on the plan attached for consideration. The comments regarding the monitoring of relocated snakes reflects comments made on the 2016 version of the BHS management plan in email dated 5th October 2017 with David Gregory. It also includes some notes on additional BHS	Noted

habitat restoration and reconstruction methods for consideration.	
Section 4.2 - What details were collected on this snake and has there been any follow-up monitoring post relocation.	Details of the snake captured were provided to OEH on 11 October 2017 in a report. Details of the snake have now been included in the SBMP. There was no post relocation monitoring of the snake. Radio telemetry is very intrusive for a species of this size.
Section 6.1.3.1 - What details are collected? And what post relocation monitoring is undertaken? As per previous advice include: • Collection of data on any located individuals, (location, habitat found in, approximate age cohort, microchip or headshot for re-identification purposes) • Collection of data on relocation site (GPS location, habitat characteristics inc. rock availability, vegetation) • Post relocation monitoring of any relocated individuals, preferably during winter on two occasions for the life of the plan • Reporting to DPIE - BCD on the location of any BHS during pre-clearing surveys (within 1 month) and annual reporting of outcomes from monitoring of relocated individuals	These details were covered in an email to OEH on 11 October 2017. Additional detail on data capture has been provided in Section 6.1.3.1. It was identified that monitoring of individuals post relocation using radio telemetry is very intrusive given the small size of the snakes. It was also noted that the snakes are venomous. Non-intrusive monitoring will be considered if a suitable methodology is identified.
Section 6.1.4 - dot point 1 - New article on natural rock replacement as a habitat restoration technique from Ross Goldingay. • Goldingay, R.L. & Newell, D.A. (2017). Small-scale field experiments provide important insights to restore the rock habitat of Australia's most endangered snake. Restor. Ecol. 25, 243–252.	This reference has been included.
Section 6.1.4 - dot point 2 - Another reference: • Croak BM, Webb JK, Shine R (2013b) The benefits of habitat restoration for rock-dwelling velvet geckos *Oedura lesueurii*. Journal of Applied Ecology 50:432–439	This reference has been included.
Section 6.1.4 - dot point 2 - a couple more recent references re habitat restoration using artificial bushrock • Croak BM, Pike DA, Webb JK, Shine R (2012) Habitat selection in a rocky landscape: experimentally decoupling the influence of retreat-site attributes from that of landscape features. PLoS One 7:e37982	These references has been included.

• Croak, B. M., D. A. Pike, J. K. Webb, and R. Shine. 2008. Three dimensional crevice structure affects retreat site selection by reptiles. Animal Behaviour (in press). DOI: 10.1016/j.anbehav2008.08.011. • Croak, B.M., Pike, D.A., Webb, J.K. and Shine, R. (2010). Using artificial rocks to restore nonrenewable shelter sites in human-degraded systems: colonization by fauna. *Restoration Ecology* **18**, 428-438.	
Table 3 - Include post relocation BHS monitoring at relocation site and surrounds	It was identified that monitoring of individuals post relocation using radio telemetry is very intrusive given the small size of the snakes. It was also noted that the snakes are venomous. Non-intrusive monitoring will be considered if a suitable methodology is identified.
Table 3 - must include: • Collection of data on any located individuals, (location, habitat found in, approximate age cohort, microchip or headshot for re-identification purposes) • Collection of data on relocation site (GPS location, habitat characteristics inc. rock availability, vegetation) • documentation of post relocation monitoring events and outcomes	Additional detail on data capture has been provided in Section 6.1.3.1.

Appendix 9: Management Plan Approval - DPIE

Planning, Industry & Environment

Mr Chris Schultz
Lead Environment – South32
PO Box 514
Unanderra
New South Wales 2526

18/12/2020

Dear Mr Schultz

Bulli Seam Operations (08_0150)
West Cliff Coal Wash Emplacement Area Management Plan

I refer to the West Cliff Coal Wash Emplacement Area Management Plan and management strategy for Broad-headed Snake and the Southern Brown Bandicoot which was submitted in accordance with Condition 17 of Schedule 4 of the consent for the project name (08_0150).

The Department has carefully reviewed the documents and is satisfied that it meets the requirements of the conditions of approval.

Accordingly, the Planning Secretary has approved the West Cliff Coal Wash Emplacement Area Management Plan (Version 5, 16 December 2020) and the Broad Headed Snake and Southern Brown Bandicoot Management Plan (Version 1, 16 December 2020). Please ensure that the approved plans are placed on the project website at the earliest convenience. Please note that the management plans must now be implemented.

Please note that if either of the above approved management plans are altered after consultation and approval with Department of Agriculture, Environment and Water the documents will be required to be resubmitted for the Department to review and approve.

If you wish to discuss the matter further, please contact Daniel Martin at daniel.martin@dpie.nsw.gov.au

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta 2150 | dpie.nsw.gov.au | 1

Appendix 10: Management Plan Approval - DAWE

Australian Government

Department of Agriculture, Water and the Environment

Mr Chris Shultz
Superintendent Environment
Illawarra Metallurgical Coal
Enterprise 1 Building, level 3 Squires Way
North Wollongong, NSW 2500

Bulli Seam Operations Expansion, Bulli, NSW (EPBC 2010/5350) – Revised Management Plans

Dear Mr Shultz,

Thank you for submitting revised management plans for approval in accordance with Condition 16 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval for EPBC 2010/5350.

Officers of the Department have advised me on the revised plans, including amendments to the approved plans, and on the requirements of the EPBC Act conditions of approval for the above project. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve:

- The *Coal Wash Emplacement Area Management Plan*, version 5.0, dated 16 December 2020;
- The *Broad-headed Snake and Southern Brown Bandicoot Management Plan*, version 1.1, dated 23 December 2020; and
- The *Adaptive Management Plan – Water Sensitive EPBC Act Listed Species*, version 6.0, dated January 2021.

The approved plans must now be implemented.

The Department has an active compliance monitoring program which includes monitoring inspections, desk top document reviews and audits. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval including the implementation and revision of management plans, so that they may be made available to the Department on request.

Should you require any further information please contact Thomas Smith directly or postapproval@awe.gov.au.

Yours sincerely

Dwaine McMaugh, Director, Post Approvals,
Assessments (Vic, Tas) and Post Approvals Branch,
Environment Approvals Division

28 January 2021

GPO Box 858 Canberra ACT 2601 • Telephone 02 6274 1111 • Facsimile 02 6274 1666 • www.awe.gov.au