Hunter Environment Lobby Inc.

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Submission of Objection
Mt Owen Continued Operations Project

Hunter Environment Lobby Inc. (HEL) is a regional community-based environmental organization that has been active for over 20 years on the issues of environmental degradation, species and habitat loss, and climate change.

HEL strongly opposed the development of the Mt Owen Mine and destruction of over half the Ravensworth State Forest in 1994 and the expansion through biodiversity offset areas in 2004.

HEL is submitting an objection to the Mt Owen Continued Operations Project (the proposal) because it will not meet the principles of Ecologically Sustainable Development.

The biodiversity assessment is very poor and has not identified the true nature of the impacts of the proposal. The biodiversity offset strategy will not mitigate the extent of the biodiversity impact.

HEL recommends on these grounds that the proposal cannot be approved.

This submission will outline the deficiencies in the flora and fauna survey effort, omissions in the 7 part test of significant impact, issues arising from the assessment of Commonwealth matters and the inadequacy of the biodiversity offset strategy.

Yours sincerely

Jan Davis
President

Submission of Objection

1. Proposed impacts

1.1 The proposal requires the disturbance of a large area of native species habitat. This includes:

- Native vegetation – 451 .5 ha
- Native grassland – 223.1 ha
- Mature Woodland/forest – 136.3 ha (131.9 Spotted Gum Ironbark; 4.4 ha Grey Box Ironbark)
- Riparian vegetation – 6 ha (5.8 Swamp Oak Forest, 0.2 River Oak Forest)
- Regrowth and planted vegetation – 81.4 ha (54 Bull Oak regeneration; 27.4 Planted Spotted Gum Ironbark)
- Kunzea shrubland – 4.7 ha
- Waterbodies –12 waterbodies will be directly impacted

1.2 Impacted endangered ecological communities (EECs) include:

- Central Hunter Grey Box Ironbark Grassy Woodland – 4.4 ha
- Central Hunter Ironbark Spotted Gum Forest – 159.3 ha (including planted vegetation)

1.3 Impacted threatened species:

29 threatened fauna species are known from the Mt Owen Mine Lease (Project Area). The Environmental Assessment (EA) conducted by Umwelt considers impact on the Spotted-tailed Quoll and Squirrel Glider to be significant. Another 12 species are considered to have a potentially significant impact; Masked Owl, Brown Treecreeper, Grey-crowned Babbler, Speckled Warbler, Diamond Firetail, Hooded Robin, Varied Sittella, Brush-tailed Phascogale, Yellow-bellied Sheathtail Bat, East-coast Freetail Bat, Greater Broad-nosed Bat, Southern Myotis.

Some fauna species are overlooked in the EA introductory overview that are subject to an assessment later in the document, namely, the Green and Golden Bell Frog (GGBF) which is known from the Project Area as recently as 2009; the Koala, Common Bentwing Bat, Little Bentwing Bat, Large-eared Pied Bat, Flame and Scarlet Robins, Black-chinned Honeyeater, Powerful Owl which have also been recorded from the Project Area.

In addition, one threatened flora species is known from Ravensworth State Forest *Ozothamnus tesselatus* and may be subject to a significant impact.

1.4 Connectivity:

All mature native vegetation will be removed to the west of the main corridor running south from Ravensworth Forest, including one section of a minor stream, except for a small patch of vegetation to the north-east of the Disturbance Area and south of the

state forest totalling about 50 ha. At one point, 2/3 of the width of the corridor will be removed, to the west and adjacent to the Southern Biodiversity Area Corridor which contains only scattered trees and some regrowth. In terms of effective corridor width (as defined under the BioBanking Assessment Methodology) this is an effective 100% removal of the corridor width in this location.

2. Poor survey effort

The effort undertaken to detect and describe the key threatened species is guided by the OEH threatened species guidelines, '*Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft)*, New South Wales Department of Environment and Conservation, Hurstville, NSW.' (DEC 2004) and '*Threatened species survey and assessment guidelines: field survey methods for fauna – Amphibians*' (DECC 2009).

In terms of overall fauna survey effort, it seems that Umwelt have carried these out at an intensity that matches the guidelines for a total 223 ha area (approximate area of woodland/forest to be disturbed), but have placed some of these sites outside the disturbance area. If the survey effort for a comprehensive survey of the whole Project Area were to be undertaken then it should have been done at a sampling effort to cover 1,300 ha of native woodland/forest vegetation. This has not been undertaken for the EA. It would have required a total effort of 12 general fauna sites across the Project Area.

The EA considers fauna survey effort undertaken in the Project Area between the years 2012-2014 at two general fauna survey sites, one located within the Disturbance Area and another outside the area of direct disturbance though within a patch of vegetation that will become isolated under the proposal due to the construction of infrastructure.

The survey guidelines state that effort for general fauna survey sites should be at an '*effort per stratification unit up to 50 hectares, plus an additional effort for every additional 100 hectares'* (DEC 2004, p. 5-88). Note the key word here is 'stratification unit' which is generally viewed to mean effort per vegetation formation, being reflective of different habitat types. There are three vegetation formations in the study area which should have been subject to survey effort:

- Dry sclerophyll forest (including planted vegetation) – 159.53 ha (two general fauna survey sites)
- Grassy Woodland (including Bull Oak regeneration and Grey Box Ironbark) – 58.4 ha (one general fauna site)
- Forested Wetlands - 6 ha (one general fauna survey site)

Therefore in order for Umwelt to undertake an adequate fauna survey effort, it had to target three formations. This means that four general fauna survey sites should have been undertaken within the Disturbance Area instead of two. It is apparent that areas of riparian vegetation were not surveyed.

The survey effort is unsatisfactory, does not meet Government guidelines and should be redone.

2.1 Analysis of the survey effort undertaken for key threatened fauna

2.1.1 Brush-tailed Phascogale and Squirrel Glider

These arboreal species are targeted using the same techniques, namely arboreal Elliott traps (size B), arboreal hair-tubes, camera traps and spotlight surveys. Two 'General Fauna' survey sites were set up for the EA, with only one set in the Disturbance Area. This means only a total of 48 arboreal Elliott trap nights were set to detect these species in the Disturbance Area, when 96 were required as a minimum.

250 arboreal hair-tube trap nights were set, which is consistent with the recommended overall effort, but should have been spread across four sites.

Umwelt's effort of four camera traps over the whole Disturbance Area is very poor.

2.1.2 Spotted-tailed Quoll

This species is generally targeted by using cage-traps, ground hair-tubes, spotlight surveys and camera traps. Cage traps were set at only two sites in the Disturbance Area for a total of 48 trap nights, when 96 was required under the guidelines.

Spot-light surveys were likewise deficient. 500 terrestrial hair tube nights were set up which is an adequate overall effort though should have spread across four sites.

For camera traps it is noted in the EA that camera traps were only used to detect arboreal species, so were most likely tree-mounted. Commonwealth survey guidelines for the Spotted-tailed Quoll recommend camera traps as the most effective (and least intrusive) method and most contemporary surveys for quolls use this method. This was not done in the EA, which is remarkable. Reliance in the EA was placed on the data gathered from two radio-tracked animals and the data this study provided, however, if camera traps had been used and if effort was undertaken to the minimum standard, the identification of additional individuals or new areas of quoll use could have occurred.

2.1.3 Koala

Only four SAT sites (scat survey) were assessed within the Disturbance Area, with some others outside. This is quite a low level of effort considering that potential for Koalas to be moving through this corridor (record of animal on the eastern edge of the Disturbance Area from 2012). Potential Koala habitat containing Forest Red Gum (Hunter Lowland Redgum Forest) is found just to the north of the Disturbance Area, though was not targeted for Koala surveys in the EA.

2.1.4 Microbats

Six sonar-recording sites were placed in or close to the Disturbance Area at an effort that was close to being within the guidelines. However two more sites were required.

2.1.5 Diurnal Birds

The effort for this group is stated to be three sites surveyed, though one more was required. As woodland birds are a key declining group of species, additional effort would have better informed the EA.

2.1.6 Swift Parrot/Regent Honeyeater.

Between 2011 and 2014, 42 targeted surveys were undertaken in the wider Project Area, including 25 within and near the Disturbance Area. Surveys were said to target flowering eucalypts, though do not co-incide with significant flowering events in the Disturbance Area, using the information provided in the EA.

2.1.7 Nocturnal birds.

Two call-playback was undertaken in or near the Disturbance Area, while this may be adequate in terms of the reach of the calls across this portion of the Disturbance Area, only two nights were surveyed. In terms of adherence to the guidelines, most owl species require longer periods of survey, for example the Masked Owl requires eight nights of play-back in order to adequately detect presence.

2.1.8 Green and Golden Bell Frog**.**

Umwelt have combined survey effort for the survey of this endangered species for the EA and monitoring effort undertaken over the last 10 years. Of note is that the sites (13 sites) subject to annual monitoring activities were not targeted during surveys for the EA.

Surveys for the EA included 11 locations (waterbodies) in the Disturbance Area, though the larger water body on the western edge of Ravensworth State Forest which is within the Disturbance Area was not surveyed. Effort undertaken for each seems to be consistent with the recommended methodology, except that surveys in 2014 were undertaken late in March under 'suitable weather conditions'. Surveys during March are allowable under the BioNet database, though needs to be undertaken after rainfall events to ensure that breeding events and calling may be captured.

While Umwelt have stated that these were done under the right weather conditions, details of weather events are not documented in the EA. No tadpole surveys appear to have been carried out, which a requirement under the amphibian survey guidelines (DECC 2009).

3. Assessment of Significant Impact

As noted above, assessments of the significance of impact upon the fauna species utilising the Disturbance Area have been hindered by a lack of appropriate survey effort that is required to inform a robust impact assessment. This is particularly true for the Spotted-tailed Quoll, Squirrel Glider, Brush-tailed Phascogale, Koala and woodland birds. The appropriateness of the effort for the Green and Golden Bell Frog is also questionable.

In undertaking the assessments of significance, using the assessment of significance criteria as contained within Section 5A, Part 1 of the *Environmental Planning and Assessment Act 1979*, the EA does not define some key terms such as 'local population', 'study area' and 'locality' though merely places the assessment within the context of the Disturbance Area and a 'wider Project Area'.

Definitions of these key terms as described within the *Threatened species assessment guidelines: The assessment of significance* (DEC2007) are used in the following assessments of significant impact.

The study area is taken to be the same area as contained with the Project Area.

3.1 The proposal will remove 17.2% of potential habitat in the Project Area and remove a significant corridor. This is likely to be a significant impact on the threatened species listed below in relation to Part 5A of the EP&A Act, 2(a) because it:

- Will lead to an area of habitat which is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- Will remove, modify, fragment or isolate to the long-term survival of the species, population or ecological community in the locality.
- The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality is high.

These significant impacts will affect the Brush-tailed Phascogale, Squirrel Glider, Spotted-tailed Quoll, Hollow-dependent Microbats (Yellow-bellied Sheathtail Bat, East-Coast Freetail Bat, Southern Myotis, Greater Broad-nosed Bat), Little Lorikeet, Masked Owl, Swift Parrot,Regent Honeyeater, Brown Treecreeper, Black-chinned Honeyeater, Varied Sittella, Hooded Robin, Scarlet and Flame Robins, Diamond Firetail.

3.2 The of removal of habitat as a result of the proposal will be approximately 5-10% of the total extent in the Project Area. This is likely to have a significant impact on the Grey-crowned Babbler**.**

3.3 The removal of 12 water bodies and the isolation of four others, most of which are 'potential' or known habitat, without any identified mitigating actions or offsets will have a significant impact on the Green and Golden Bell Frog.

3.4 Commonwealth criteria

Using the criteria in the Commonwealth Significant Impact Guidelines for an endangered species (DoE 2013), removal of 17.2% of potential habitat in the Project Area:

- May lead to long-term decrease in the size of a population;
- Will reduce the area of occupancy of the species;
- May adversely affect habitat critical to the survival of this species; and
- May modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this specie is likely to decline.

Therefore the Project is likely to have significant impact on the Spotted-tailed Quoll, Swift Parrot and Regent Honeyeater using the Commonwealth criteria.

3.5 Summary of significance of impact

As a general statement, the assessments of significance undertaken by Umwelt seem to be poorly done, with a poor interpretation of terms contained within the Commonwealth criteria, particularly the term "occupancy". The failure to use the criteria as defined by the NSW Assessment of Significance guidelines is also central to the failure to identify a significant impact for a large number of species.

Following an independent assessment of the data provided in the EA, the following Commonwealth-listed species are determined to be subject to a significant impact:

- Green and Golden Bell Frog
- Spotted-tailed Quoll
- Swift Parrot
- New Holland Mouse

The following State-listed species are determined to be subject to a significant impact:

- Green and Golden Bell Frog
- Spotted-tailed Quoll
- Squirrel Glider
- Brush-tailed Phascogale
- Yellow-bellied Sheathtail bat
- East-coast Freetail bat
- Southern Myotis
- Greater Broad-nosed Bat
- Swift Parrot
- Little Lorikeet
- Masked Owl
- Brown Treecreeper
- Grey-crowned Babbler
- Hooded Robin
- Varied Sittella
- Hooded Robin
- Diamond Firetail

HEL considers that the EA vastly under estimates the significant impact of the proposal on threatened species recorded in the area.

4. Biodiversity Offset Strategy

The EA states that the primary aim of the Mt Owen Biodiversity Offset Strategy is to increase the extent of future habitat by providing significant areas of rehabilitation (such as the New Forest Area to the northwest of Ravensworth Forest) and to increase levels of landscape connectivity, particularly in a north-south direction along the eastern side of Ravensworth Forest and in a north-western direction. The importance of this significant Hunter valley remnant area as primary habitat and a linkage for forest and hollow-dependent fauna; woodland birds and other highly mobile species is acknowledged in the EA.

The EA does not clearly identifiy the past impacts on Ravensorth State Forest ie the removal of 257 ha since 1994. There is emphasis on the principle of avoidance in the proposal by avoiding further impact on the Ravensorth State Forest itself.

The proposal will remove, in fact, a strip of the former Ravensworth State Forest which lies outside the current boundary, including a large waterbody for infrastructure

associated with the project. It will also remove most vegetation constituting part of this remnant to the south-east of the state forest and west of Main Creek.

The proposal will reduce the ecological function of this north-south corridor, particularly for woodland birds and hollow-dependent species such as the Brush-tailed Phascogale and the Squirrel Glider by the removal of this mature vegetation containing old-growth elements.

The chief mitigating action of the Strategy is the provision of large areas of rehabilitated forest, which may be viable habitat for a range of forest fauna into the future (over 100 years are usually required before the development of old-growth elements such as hollows commences) though during the life of the mine offers only marginal habitat for most species.

The offset package proposed was completed prior to implementation of the new NSW Offset Policy for Major Projects took effect, but purports to be consistent with the six 'principles' including Principle 6 'Supplementary Measures' where appropriate. At the time of the submission of the EA, the offset package should have been assessed against the '*NSW OEH Interim Policy on assessing and offsetting biodiversity impacts of Part 3A, State Significant development (SSD) and State significant infrastructure (SSI) projects*' (2011) with the addition of Principle 6. This will be used to assess the adequacy of the package in this submission.

There are three Tiers of adequacy under the Interim Offset Policy:

- Tier 1 – Improve or maintain with offsets calculated using the BBAM calculator (red flags protected and clearing can only occur within the variation rules as set out in the BBAM).
- Tier 2 – No Net Loss with offsets calculated using the BBAM calculator (some/all red flags not protected and clearing can only occur within the variation rules as set out in the BBAM).
- Tier 3 – Mitigated Net Loss with offsets calculated using the BBAM calculator, but then amended by offset variation criteria to a minimum offset land-based ratio of 2:1 (as above but using the variation criteria as species in Attachment B of the Interim Policy).

Consistent with previous offset assessments provided by Umwelt during 2013 and 2014, however, the offset package has not used the BioBanking Assessment Methodology (BBAM) to identify biodiversity credit liabilities and adequacy of offsets as the Interim Policy requires.

Instead, Umwelt have stated that their objective was a Tier 3 outcome due to the lack of suitable 'like for like' offsets on the market or available in the Hunter Valley. While the decrease in the availability of central Hunter ecosystems is a fact due mainly to ongoing mine expansion, there is in excess of approximately 30,000 ha of central Hunter box/ironbark/spotted gum vegetation on private land.

There are three offset areas (total area of 767 ha) identified in the package to offset the impact of the development. All are located within the Sydney Basin IBRA region.

4.1 Proposed Offset Areas

4.1.1 Cross Creek Offset (367 ha)

A highly modified parcel of land to the north of the New Forest Area developed for agriculture. While the mapping in the EA shows over 50 ha of mapped vegetation polygon for the Spotted Gum Ironbark type, most of this are groups of isolated trees. There is a strong case that these have been generously mapped to include areas of non-forest.

Derived native grasslands make up 315.3 ha of the area.

4.1.2 Stringybark Creek Corridor (97 ha)

The Spotted Gum Ironbark type and all the vegetation communities in this offset area is highly disturbed and shows floristic components consistent with the Barrington Footslopes type.

4.1.3 Esparanga (303 ha)

The Esparanga offset contains the best quality vegetation of the three offset areas, though being on the edge of the Sydney Basin IBRA region, the vegetation communities bear little resemblance to those in the Project Area, in terms of 'like for like' or even at the Keith Class level.

4.2 Inadequacy of offset package for ecosystems

The EA does not provide a Biometric analysis of the vegetation communities to be impacted by the proposal.

According to Attachment B of the Interim Policy on variation rules, when no matching ecosystem credits are available, under Variation (a), ecosystem credits from one vegetation type can be converted to any vegetation type within the same Keith Formation which are located within the same IBRA Region and have to be at least 2:1 in areal extent in order to meet the minimum Tier 3 outcome of mitigated net loss.

For the vegetation community with the biggest impact, Spotted Gum Ironbark Forest (159.3 ha), the offset package only provides for 51.7 ha of 'like for like' offset, and 151.9 ha at the same formation level. This is less than 1:1 and does not meet the Tier 3 requirement.

For the Forested Wetland types (Swamp Oak and River Oak), 0.5 ha of 'like for like' is provided and 1.5 ha provide at the same formation level. This is less than 1:1 and does not meet the Tier 3 requirement.

For the Derived Grassland type, there are 374.1 ha provided on a 'like for like' basis and a total of 475.5 ha provide at a formation level. This is less than 2:1 and does not meet the Tier 3 requirement.

There are other variation rules which may allow Glencore to retire or waive credit requirements, in particular Variation (c) where an offset requirement can be removed if the clearing for any vegetation community can be waived if it is less than 4 ha and the

vegetation community is not a highly cleared type or a Commonwealth or state–listed TEC. Of all the types affected, only the River Oak Forest is of such a small extent, and this would only in effect waive 0.2 ha.

Another variation that the proponent could use to make better credit value for the shrubby Dry Sclerophyll Forest types in the Esparanga offset by use of Variation (f) whereby ecosystem credits are converted to hectares using the OEH 'credit converter'. However as Umwelt have not used the BBAM to calculate any credits for this offset package, this variation cannot be used, nor estimated here.

Additionally Umwelt have used the proposed extent of rehabilitation on the offset areas to up their offset ratios (Table 7.13 of the EA)[1], particularly the extent of proposed planting of Spotted Gum Ironbark amounting to over 300 ha of additional offset. Adding rehabilitation into this equation would increase the offset ratio to over 3:1.

The BBAM allows the proponent to include ecosystem credits that would be generated through rehabilitation actions, (these credits are calculated allow increases in site value though fall short of allowing increases to benchmark levels for any given vegetation type). However, as Umwelt have not utilised the BBAM to identify biodiversity credit liability or expected gains, it is not appropriate to list expected rehabilitation outcomes in order to raise offset ratios as has been done in the EA. In fact, it is misleading to do so because if the BBAM were used, the ecosystem credits generated would not be equivalent on an area basis to the whole proposed rehabilitation area that is proposed. The proposed rehabilitation measures proposed in other Keith formations in the offset sites would do little to change the current deficit in future areal extent of these vegetation communities.

Umwelt have also provided a future scenario of the extent of different vegetation communities including mine rehabilitation outcomes in Table 7.15 of the EA[2]. It is not appropriate to submit this analysis using the Interim Offset Policy because the calculation of ecosystem credits for mine rehabilitation under the BBAM is not possible as there are no measurable baseline site values.

HEL considers that the biodiversity offset package is entirely inadequate and will not mitigate the scale of biodiversity impact of the proposal.

5. Asssessment of Matters of National Environmental Significance (MNES)

In October 2013 the Commonwealth determined that there would be a significant impact on the Spotted-tailed Quoll, Regent Honeyeater, Swift Parrot and perhaps several other entities. As a result it was called in by the Commonwealth as a controlled action for determination by the Minister.

The proposal was given to the state to assess as an "Accredited Assessment" under the EP&A Act. However, in the MNES assessment (Supplementary DGR Report) given to the state government in October 2014 Umwelt maintained there would be no significant impact on MNES using the Commonwealth guidelines.

[1] Umwelt, October 2014, *Ecological Assessment,* Appendix 11, p 7.56
[2] Ibid p 7.59

HEL considers this conclusion is in error.

The proposal disturbance footprint will be about 485 ha and include derived native grassland (223.1 ha), forest (217.7 ha) riparian (6 ha), shrubland (4.7 ha) and an unknown number of wetland habitats. The proposed offset areas include Cross Creek Offset Area, Stringybark Creek Habitat Corridor and Esparanga Offset Site (located to the north of Sandy Hollow). The development will result in the removalof 17% of one of the few last significant areas of remnant vegetation on the central Hunter Valley.

The proposal will reduce the corridor width of remnant vegetation connecting Ravensworth SF to Main Creek by about two thirds. The edge of the pit will be located approximately 450 m from Main Creek at its closest point. There will be removal of a minor (2^{nd} Order stream) and the loss of riparian vegetation. While Ravensworth SF will not be further affected directly by the proposal, there will be removal of some contiguous vegetation associated with the western perimeter (including a dam) due to infrastructure development.

5.1 Threatened Species listes as MNES impacted by the proposal:

5.1.1 SPOTTED-TAILED QUOLL – Endangered

This species is targeted in regular annual monitoring and was targeted in the Project Area for the EA. This species has been recorded annually in the Project Area since 1994 except for the years 1998, 1999 and 2005, principally from within Ravensworth State Forest where most monitoring and survey effort has been focused.

It has also been recorded by the proponent and from NSW Wildlife Atlas records from other locations in the Project area and adjoining areas such as The Hillcrest Offset Area, the Mountain Offset Area, the New Forest Area, Bowmans Creek, Main Creek and the Disturbance Area where den sites and a breeding site have been recorded, strongly indicative of a resident local population. It has also been recorded using areas of rehabilitation.

The EA states that radio-tracking of two individuals has occurred showing two different usage patterns, one male being more restricted to the Ravensworth State Forest, while the other male showing use of the state forest and the Disturbance Area as well as adjoining creeklines. While the EA plays down the importance of the vegetation in the Disturbance Area, which is contiguous with the state forest, this is a position which is not supported by their own radio-tracking data and brought into question by a lack of survey effort in the Disturbance Area for the EA.

The proponent estimates that the Project Area only supports two adult animals and is part of the greater Barrington population. However there is evidence that there has been at least two breeding events within a diameter of ten km over the last ten years, one from Bowmans Creek where a breeding site was located a few years ago and another record of two road-killed juvenile animals on Hebden Road within the Project Area some time earlier. Juveniles are not dispersive, neither are adult female animals who can maintain quite small home ranges, as little as 30-50 ha (C. McLean, University of Wollongong, pers. comm., D. Ashworth, OEH, pers. comm.).

The presence of adult females in the Project Area and in nearby areas suggest a currently viable local population and although males may come in from the north, current data suggest a population which is distinct from the Barrington animals inhabits the Project Area and adjacent remnants. Even though male animals move in from the north, it is believed that the loss of resident females from particular areas may not see these areas re-colonised by females for long periods of time (P. Cropp, NPWS pers. comm.).

HEL considers that there is a local (sub-) population known to inhabit the area of Ravensworth State Forest and along Bowmans Creek into the Mountain Offset Area above Liddell Mine. This includes latrine sites, a breeding site on Bowman's Creek and other evidence of residency in the area (60 locations in the Mt Owen Complex where it is recorded regularly during monitoring and two juvenile animals were killed on a road near the Former Stage 3 water Storage). The distribution of records of this species in the NSW Atlas show records are continuous with Mt Royal and Barrington Tops. Both Atlas records and survey results show it within the Project Area – ie. is "occupied habitat"

The vegetation of the Ravensworth area is distinct from Mt Royal/Barrington, suggesting different types of habitat use. The Mt Royal/Barrington area is in the NSW North Coast bioregion. The Ravensworth area is in the Sydney Basin bioregion. This criteria places the quoll population in the Hunter valley as distinct from the more secure one from the north.

No estimates of population size or abundance is provided in the referral, MNES report or the EA.

The proposal is likely to have a significant impact because if the Spotted-tailed Quoll population in the Hunter is regarded as a distinct population then:

- the impact may result in the long term decline and decrease in the size of the population
- a reduction of 17.2% of habitat in the Project Area is a considerable reduction in the area of occupancy
- the reduction of the corridor width could cause fragmentation of the population
- habitat critical to the survival of the species may be be adversely affected. This has not been clearly assessed in the EA eg indirect impacts on known latrine sites and use of Ravensworth State Forest
- the breeding cycle of the population may be disrupted. There needs to be further work on female territories and location of breeding sites
- the increased stress may cause the animals to be more prone to disease
- the proposal may adversely affect an endangered population and interfere with the recovery of the species.

Given the extent of the local impact, if the precautionary principle is applied, then there may be a significant impact on this population.

Using the information provided in the EA, the proposed Project will remove 17.2% of suitable forest and woodland potential breeding/denning and foraging habitat available for this species in the Project Area. Quolls also use more open grassland areas to forage and disperse, the project will remove 15.6% of this habitat within the Project Area.

Using the criteria in the Commonwealth Significant Impact Guidelines for an endangered species (DoE 2013), removal of 17.2% of potential denning habitat in the Project Area:

- May lead to long-term decrease in the size of a population;
- Will reduce the area of occupancy of the species;
- May adversely affect habitat critical to the survival of this species; and
- May modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this specie is likely to decline.

Therefore the Project is likely to have significant impact on this species using the Commonwealth criteria.

5.1.2 SWIFT PARROT – Endangered

This species has been recorded using Ravensworth State Forest and the Project area in 2005, 2007 and 2014, suggesting somewhat regular use of the spotted gum ironbark forest at the Mt Owen Complex when in flowering events. While not a breeder in NSW, continued and incremental loss of foraging habitat in the Upper Hunter is an important issue for this species.

The Hunter usage by this species is consistent with what may be termed a population, though may not be specific to the central/upper Hunter.

The central/upper Hunter is as well used as an over-winter destination as the lower Hunter. The level of autumn/winter usage is indicative of a particular 'population'.

Swift Parrots have been recorded in the Project Area during annual monitoring surveys, at times largely correlated with the significant flowering events in 2005 (20 individuals) and in 2007 (five individuals). An individual was also recorded in 2014, though was not correlated with any significant flowering event. This data indicates that Swift Parrots routinely use the Project Area, particularly when eucalypts are in significant flower. Though not recorded in the Disturbance Area, there were no monitoring sites for this species or the Regent Honeyeater in the Disturbance Area and there were no flowering events in the Project Area during surveys undertaken 2011, 2012 or 2014.

This species is known to select box/ironbark/spotted gum forest/woodland while spending time forging during autumn and winter in NSW. This is verified by the use of flowering eucalypts within Ravensworth State Forest dominated by Spotted Gum/Ironbark Forest. The proposed extent of removal of forest/woodland as a result of the proposal will be 17.2% of the total extent in the Project Area.

For the Swift Parrot, using the criteria in the Commonwealth Significant Impact Guidelines for an endangered species (DoE 2013), removal of 17.2% of potential foraging habitat in the Project Area:

- May lead to long-term decrease in the size of a population;
- Will reduce the area of occupancy of the species;
- May adversely affect habitat critical to the survival of this species; and

- May modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this specie is likely to decline.

Therefore the Project is likely to have significant impact on this species using the Commonwealth criteria.

Of note is Umwelt's assessment of significance of impact using the Commonwealth criteria state that because it only breeds in Tasmania that no significant impact was likely. This is another remarkable statement and if applied more widely, there could never be a significant impact on this species anywhere in NSW. As the meta-population of this species is thought to number about 3 000 individuals, any area of regularly used foraging resource in NSW should be considered as habitat critical to the survival of this species.

The reduction of up to 200 ha of critical habitat is locally and regionally significant. Spotted-Gum Ironbark is important habitat for this migratory species. The cumulative impact of the proposed habitat removal in the Upper Hunter is significant. The proposal will interfere with the recovery of the species.

5.1.3 GREEN AND GOLDEN BELL FROG – Vulnerable (GGBF)

It is recognised that the population of the GGBF in the central Hunter is an 'important population' of the species. It is a key source population for breeding and dispersal, is necessary for maintaining genetic diversity and is near the limit of the species range.

This species is targeted by annual monitoring at 21 sites within the Mt Owen Complex. Two of these sites lie within the Project area. Additional targeted surveys were undertaken at 15 potentially suitable sites in the Project area. It is noteworthy that one water body on the edge of Ravensworth SF that is within the footprint was not targeted by surveys.

The area of last known sightings of this species will be retained, but will be situated almost entirely within two pit areas, with little chance of dispersal, should this species be detected again. The last time this species was detected in the Mt Owen Complex was in 2009 in an existing offset area, though has not been detected since, despite regular monitoring.

For the proposal, this species was supposedly targeted, however, although it is stated that surveys were undertaken under appropriate weather conditions, there is no weather data provided and no real indication that surveys were conducted in a way that would maximise the detection of this species or according to Commonwealth guidelines (after significant summer rains).

Importantly, several areas of wetland habitat will be removed in the Project area. There is no assessment provided on the habitat conditions of these areas and their suitability for the GGBF, particularly in relation to water quality.

The local extinction of this species has not yet been verified. The proposed new pit will isolate known sites for this species making any possible future dispersal more difficult

for this species. The isolation of known habitat locations will detract from the ongoing viability of this species.

5.1.4 NEW HOLLAND MOUSE – Vulnerable

This species is targeted during annual monitoring, mostly in the rehabilitation zone on the north-western side of Ravensworth SF. This species was recorded between 2003 and 2007. There is, however, another record on the eastern side of the forest, that is associated with natural regeneration. There is another general fauna monitoring site within the project area.

This was species was NOT specifically targeted in the Project Area for the EA, though was accommodated in general fauna surveys which used Elliott Traps (400 trap nights) and hair-tubes (1000 trap nights) during surveys conducted in 2012. However half of this Elliott Trap effort used large "Type B" Elliott traps, which hare not appropriate for the New Holland Mouse. So effective effort for this species in the Project Area was only 200 trap nights. As well half the terrestrial hair-tubes were baited with meat, which would not target this species.

The Elliott trapping effort is well short of that required under the Commonwealth guidelines (… this survey effort represents a minimum of 160 trap nights per 5 hectare subject site [80 trap-nights per hectare survey site], DEWSAP 2011), making detection of this species in the Project Area very unlikely even if it was present.

The contention is made that habitat for this species is no longer suitable because of its older age and successional stage. However a recent assessment of habitats used by this species indicate that 50% of records are from young growth and 50% are from mature habitats and that the key factor is habitat structure and diversity and not time since disturbance per se (Action Plan for Australian Mammals, revised version 2014).

The New Holland Mouse population in the area is an 'important population'. It is a key source population for breeding and dispersal, it is necessary for maintaining genetic diversity, it appears to be isolated and a population vulnerable to ongoing habitat removal.

The loss of 17% of potential habitat in the Project Area may result in the local decline of this species. Question marks over the effort and significance of potential habitat leaves issues regarding this species in the Project Area unresolved.

Too many question marks remain as to the status and habitat selection of this species in the Project area which requires clarification/re-assessment. Based on known information of the habitat requirements of this species, there may be a significant impact on this species. The description of the habitat preferences of this species in the assessment of significance for this species does not appear to be consistent with the way this species was dealt with using the EPBC Offset Calculator (see below).

The effort used to detect this species and the misrepresentation of its known habitat requirements make a robust analysis of significance of impact difficult.

5.2 Adequacy of Offset according to Commonwealth Offset Policy

The Commonwealth's Offset Policy (2012) makes it a requirement that any offset package should be consistent with a number of objectives.

The Policy state that 'land-based outcomes' must constitute 90% of the offset outcomes, with the other 10% being provide in 'in-kind' measures which will benefit the conservation of any particular species through research or other recovery actions. No additional measures are being put forward in the Biodiversity Offset Strategy.

HEL is concerned that under this policy of lot of weight is given in the assessment to rehabilitation outcomes which can constitute part of the land-based outcome.

This has influenced the outcome of the use of the offset calculator in the assessment. The aim of the calculator is to demonstrate that an 'improve or maintain' standard has been met for an offset package and uses a number of biological and ecological criteria.

HEL is concerned that the EA meets these objectives through the assumption that rehabilitation occurring in these areas will provide great improvements in habitat quality over a 20 year period.

It is noted with concern that the calculator was not applied to the Green and Golden Bell Frog because, "*…the Project is not expected to impact on (it) in any way".*

All species subject to this assessment were found to have great improvements in total value eg improvements of 107% (Spotted-tailed Quoll) to over 1,000% (New Holland Mouse). It seems that large assumptions were being made in relation to the utility of habitat provided through rehabilitation.

The Spotted-tailed Quoll and the Swift Parrot have 'residual impacts,' being reliant on old-growth habitat elements such as tree and log hollows and mature flowering trees. It is difficult to understand how such habitat augmentations as proposed by the proponent, could lead to such improvements in site value as indicated in the calculator over the life of the mine. Such components could take in excess of 100 years to develop naturally.

The massive improvements in habitat value for the New Holland Mouse over the life of the mine is assumed based on the proposition that it prefers early successional stages of vegetation. There is strong evidence that the Mouse will use such areas but to assign to all the vegetation areas such a high site value improvement assumes a number of things:

- All vegetation communities proposed for rehabilitation are selected by this species;
- The rehabilitation being provided will be suitable over the longer term and not used for a briefer time period;
- That there are existing local populations in the vicinity of the offset areas that can colonise these areas. This species occupy small home ranges and are not

known to be particularly dispersive, avoiding areas where there is a lack of suitable groundcover.

CONCLUSION

The EA is a document required to assess biodiversity impacts, particularly presence/absence, significance of impact and offset adequacy for threatened species impacted by the proposal.

HEL considers the document on public exibition is deficient in a number of critical ways which draws into question the adequacy of this document and its supporting documents. These are:

1. Adequacy of survey effort is deficient in order to clarify the presence or absence of key threatened species in the Disturbance Area. In particular, riparian vegetation was not assessed in any substantive way and the effort for dry sclerophyll forest was half of what it should have been. There are other deficiencies in the adequacy and assessment of particular species.

2. Assessments of significance of impact on threatened species are poorly dealt with, for Commonwealth-listed species, a misinterpretation of term 'occupancy' has been applied, which should be taken to mean the known current usage of any particular area by any given species. For State-listed species, failure to use the definitions of key spatial terms as defined in the *Threatened species assessment guidelines: The assessment of significance* (DEC2007) meant that a significant impact on a number of resident and sedentary species was not identified. Use of these criteria demonstrates that 17 species are likely to endure a significant impact as opposed to the two identified by Umwelt.

3. The offset package is deficient in terms of its ability to meet a Tier 3 outcome under the Interim Offset Policy with a shortfall for all vegetation formations such there is a deficit for most, while derived grasslands are less than the minimum 2:1 areal ratio required. The use of variation criteria as allowed under a Tier 3 outcome has been compromised by the fact that the proponent's consultants (Umwelt) have not used the BBAM for a defendable outcome.

HEL considers that the proposal will have significant, unmitigated impacts on a large number of threatened species and Matters of National Environmental Significance.

The proposal does not meet the principles of Ecologically Sustainable Development and should not be approved.

References:
Ethical Ecology 2015 *Review of ecological assessment and significance of impact reports for Mt Owen Continuation Project*
Umwelt 2014 *Ecological Assessment Mount Owen Continued Operations Project*