

**Appendix F3
Best Practice Fauna
Management Review,
Happy Valley ERMP**

1. ABOUT THIS DOCUMENT

1.1 PURPOSE AND SCOPE

This Best Practice Fauna Management Review is based on a review of relevant guidelines and recent case studies. It is used as a checklist to demonstrate that the management of potential impacts to fauna associated with the Happy Valley proposal is consistent with Best Practice standards, with particular reference to the following conservation significant taxa:

- Western Ringtail Possum (WRP), *Pseudocheirus occidentalis* (Vulnerable)
- Carnaby's (or Short-billed) Black Cockatoo (CBC), *Calyptorhynchus latirostris* (Endangered)
- Baudin's (or Long-billed) Black Cockatoo (BBC), *Calyptorhynchus baudinii* (Vulnerable)
- Chuditch *Dasyurus geoffroii* (Vulnerable).

This document has been prepared as part of the Happy Valley Environmental Review and Management Program (ERMP).

1.2 REVIEW OF EXISTING INFORMATION AND PREVIOUS STUDIES

A desktop review of selected documents was conducted to identify management principles, strategies and actions applicable to fauna, particularly those of conservation significance. The following key documents were identified during the desktop review:

General fauna management for rehabilitation sites

- *Innovative Techniques For Promoting Fauna Return To Rehabilitated Sites Following Mining* (ACMER 2005)
- *Fauna Management Plan* for Ludlow Mineral Sands Mine (Cable Sands 2005)
- Species profile and threats (SPRAT) database (DEWHA 2009).

Western Ringtail Possum management

- EPBC Act Policy Statement 3.10 – *Significant Impact Guidelines For Western Ringtail Possums In The Southern Swan Coastal Plain* (DEWHA 2008a and 2008b)
- *WRP Mitigation Plan – Procedures To Minimise Risk To Western Ringtail Possum During Vegetation Clearing And Building Demolition* (DEC 2008)
- *Western Ringtail Possum Interim Recovery Plan 1997-1999* (CALM 1998)
- Recovery outline for WRP - *Action Plan for Australian Marsupials and Monotremes* (Wildlife Australia 1996).

Black-Cockatoo management

- *Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) Recovery Plan* (CALM 2003)
- Fiona Stanley Hospital Project *Carnaby's Black Cockatoo Management Plan* (Strategen 2008)

- The *Action Plan for Australian Birds* (EA 2000)
- Recovery Outlines and Taxon Summaries for Baudin's Black-Cockatoo and Canaby's Black-Cockatoo, (EA, 2000).

Chuditch management

- *Chuditch Recovery Plan 1992-2001* (CALM 1994)
- Recovery outline for the Chuditch - *Action Plan for Australian Marsupials and Monotremes* (Wildlife Australia 1996).

2. THREATS, THREAT ABATEMENT AND RECOVERY

Baseline fauna surveys at Happy Valley demonstrate that the project area may support low numbers of Chuditch, WRP and potential habitat for CBC and BBC (all species currently listed under the EPBC Act).

2.1 OVERVIEW OF CONSERVATION FAUNA RECOVERY PLANS

The State and Commonwealth Governments have developed recovery plans to set out research and management actions necessary to stop the decline of, and support the recovery of, listed threatened species. The aim of a recovery plan is to maximise the long term survival of a threatened species in the wild.

Recovery plans state what must be done to protect and restore important populations of threatened species and habitat, as well as how to manage and reduce threatening processes. Recovery plans achieve this aim by providing a planned and logical framework for key interest groups and responsible government agencies to coordinate their work to improve the plight of threatened species and/or ecological communities.

The DEC and DEWHA have established Recovery Plans for the WRP, CBC, BBC and Chuditch. A summary of the recovery plan objectives is provided below. Additional supporting guidelines and policies have been prepared or are in preparation for these species. Recovery management criteria are presented in Table 1 to Table 3.

WRP recovery plan

State and Commonwealth strategies for the recovery of the WRP include the following objectives:

- conservation of WRP populations that occur within public lands managed by the DEC
- improve the species conservation status so that it no longer meets criteria for Vulnerable status
- minimise the impact of land developments through *in situ* conservation and translocations as appropriate
- ensure that derelict animals (injured, orphaned or nuisance animals) are rehabilitated where possible and released into the wild in places where their chances of survival are maximised (CALM 1998, Wildlife Australia, 1996).

The recovery program includes:

- studies on the effect of predatory control measures on WRP populations
- minimising impact of land development on the degradation/destruction of habitat, or impacts to populations
- liaison with wildlife carers to promote good management and ensure release of rehabilitated animals into areas where survival is maximised
- translocations of individuals to areas conducting fox control
- education, liaison and communication with people working/living in areas of WRP populations.

Carnaby's Black-Cockatoos recovery plan

The broad objectives of the State and Commonwealth strategies for the CBC recovery plans are to retain breeding populations and reverse decline in remaining breeding areas. Many of the control measures of the recovery plan program are only applicable to the wheat-belt areas of Western Australia, including:

- population monitoring
- habitat management in priority areas - protection of known existing nests and significant breeding areas (particularly stands of Salmon gum, and kwongan heaths)
- management of feeding habitat in non-breeding areas - reestablishment of feeding habitat (particularly within kwongan heath or Banksia woodland species)
- captive breeding programs
- establish a CBC recovery team
- establish community involvement (CALM 2003, EA 2000).

The DEWHA are currently developing a draft EPBC Act Policy Statement for significant impact guidelines for Black Cockatoo species (DEWHA 2009).

Baudin's Black-Cockatoos recovery plan

The broad objective of the Commonwealth strategies for the recovery of BBC is to mitigate threats to habitat and current population densities. Control measures of the recovery program include:

- develop a repeatable population monitoring technique
- initiate monitoring in different parts of range
- help orchardists develop a non-lethal damage mitigation techniques and enforce more vigorously legislative provisions that make shooting illegal (EA 2000).

Chuditch recovery plan

The objective of the State recovery plan is to achieve downlisting of Chuditch status from endangered to vulnerable by:

- ensuring that the species persists within its present range
- increasing population numbers by expansion into former range.

The recovery program includes:

- habitat management in the jarrah forest (prescribed burning, timber harvesting, habitat requirements following bauxite mining)
- implementation of broadscale fox baiting program
- population monitoring
- research to determine distribution and habitat requirements in wheatbelt and semi-arid areas
- captive breeding programs
- translocation programs and studies (CALM 1994).

A draft national recovery plan for the Chuditch is currently in preparation (DEWHA 2009).

2.2 KEY THREATS AND ABATEMENT

The Happy Valley Proposal has the potential to affect native fauna in the following ways:

- permanent or temporary habitat loss
- habitat fragmentation
- increased vehicle movement and potential for road kill
- indirect effects on adjacent habitats.

In addition, a number of key threats are universally recognised by the recovery plans for the conservation significant species listed in this document. Many of the measures to be implemented by Bemax to abate these threats are consistent with fauna management by mining companies across Australia (ACMER 2005).

A review of relevant threats and mitigation criteria, objectives for the conservation species, and Bemax management measures for the Happy Valley project are explained below and presented in Table 1 to Table 3.

Habitat loss and fragmentation

The clearing of remnant vegetation for agricultural and urban development has led to the decline in populations of WRP, Black-Cockatoo and the Chuditch. Clearing vegetation causes habitat degradation, fragmentation and reduction of foraging habitat.

The Happy Valley Proposal has developed a mine plan that minimises disturbance to native vegetation. The clearing of remnant vegetation will be managed effectively by the Bemax EMS clearing protocols.

The mining program includes retention of riparian habitat (i.e. ephemeral creeklines) that bisects the development footprint in several locations by maintaining a 30 to 50 m buffer along riparian habitat. The program also includes stockpiling of topsoil for use in the rehabilitation of disturbance areas, revegetating and infill planting of riparian buffers and disused quarries (as per the Integrated Mining and Rehabilitation Plan). Rehabilitation and infill planning will consist of local provenance species in densities comparable to control plots outside the disturbance area and will include many suitable foraging habitat species for Black-Cockatoos.

Nesting boxes and habitat logs will also be deployed in the rehabilitation of the disturbance areas to facilitate the rapid recolonisation of many hollow-dwelling animals including threatened species.

Predation by foxes (*Vulpes vulpes*) and cats (*Felis catus*)

Predation by foxes and cats has contributed to a general decline of the WRP, Chuditch and many other native fauna species. The Happy Valley Proposal will implement fox control baiting in remnant vegetation surrounding the development footprint.

Cat control measures are not part of the Happy Valley Proposal as cat baiting programs are not known to be successful.

Road kills

Vehicle speed limits will be implemented to protect individuals from road kill.

Competition for tree hollows

There are many exotic and native species that now occur outside their natural range and compete for nesting hollows with locally indigenous animals (AMCER 2005). Of these, the European Honey Bee has been identified as the greatest threat in the region. Other threats include the rats, cats, cockatoos, corellas, galahs, lorikeets, kookaburra and common brushtail possums.

Bemax will commence a feral European honey bee control program for the remnant vegetation surrounding the disturbance area 6 months prior to ground-disturbing activities. Feral bee control will continue throughout the mining and early rehabilitation period.

Translocation

Translocations of conservation significant species have shown mixed results. Translocation of Chuditch at three Western Australian sites showed low to nil recovery during subsequent trapping for monitoring the success (CALM 2000). Another pilot study on translocations found that all of the WRP released with radio transmitters were found dead within six weeks due to predation (CALM 1998).

The DEWHA (2008a) considers that translocation does not reduce the impact of a proposal and is not considered to be a mitigation or offset measure as it is unlikely to result in a positive conservation outcome for the species.

Bemax will relocate any conservation significant fauna encountered during clearing into adjacent areas of remnant vegetation undergoing foxes and feral bee control.

Other fauna management measures

The Australian Centre for Minerals Extension and Research (ACMER) distributed a survey to mining companies throughout Australia for promoting fauna return to rehabilitated sites following mining (ACMER 2005). Thirty companies responded with a wide range of techniques to assist faunal recolonisation following mining, including:

- controlling introduced predators including the European Red Fox
- appropriate revegetation structure and composition

- leaving remnants of unmined habitat - which act as a source of potential colonists for areas rehabilitated following mining
- progressive clearing - reduce fauna deaths and allow fauna movement into nearby uncleared areas
- habitat trees left intact for a short time after remaining vegetation is cleared, allowing hollow inhabiting species a chance to escape.
- relocating fauna to nearby surrounding bushland
- transplanting mature slow growing understorey plants (e.g. *Xanthorrhoea* sp.) – provide microhabitat and shelter to small animals and invertebrates
- provision of habitat logs and rocks – assist in recolonisation and increase populations of many faunal species

Table 1 Review of relevant mitigation criteria and objectives for WRP recovery

WRP - relevant mitigation criterion	#	Is the criterion met	Reference	Comment
DEC WRP Mitigation Plan (DEC 2008)				
Identify trees to be retained	1.1	Yes	HV Fauna Management Plan	Mark trees, logs and rock pile habitat to be retained.
Avoid unnecessary clearing	1.2	Yes	HV Fauna Management Plan	The key objective during the development of mine plan was to minimise disturbance to native vegetation (eg. siting of infrastructure, stockpiles and roads)
Suitable fauna expertise on-site	1.3	Yes	HV Fauna Management Plan EMS Clearing procedure	During the clearing process, a suitably qualified fauna spotter will conduct daily pre-clearing surveillance for fauna (i.e a suitably qualified zoologist or carer that holds a current Regulation 17 Licence to Take Fauna for Scientific Purposes).
Provide advice and direction to contractors	1.4	Yes	HV Fauna Management Plan	Site induction including: <ul style="list-style-type: none"> ▪ advice to clearing contractors ▪ identification of trees to be retained and cleared ▪ likely presence of WRP
Injured animals	1.6	Yes	HV Fauna Management Plan EMS Clearing procedure	Contractors to notify the fauna spotter of Injured WRP – so that they are taken to a designated veterinary clinic or Department of Environment and Conservation (DEC) nominated wildlife carer
Understorey Vegetation Undertake check by foot prior to machines entering the area and clearing the understorey vegetation	1.7	Yes	As per criteria 1.3	
Tree removal <ul style="list-style-type: none"> ▪ tree inspection/bump tree prior to removal ▪ if WRP present, gently lower tree to ground - remove and relocation WRP to nearest suitable habitat 	1.5	Yes	HV Fauna Management Plan EMS Clearing procedure	An experienced 'fauna spotter' shall be employed to: <ul style="list-style-type: none"> • ensure that no WRPs are injured or killed • ensure trees are bumped or shaken prior to clearing • inspect all trees removed for WRP ▪ relocate any conservation significant fauna encountered during clearing into adjacent areas of remnant vegetation undergoing foxes and feral bee control.
Timber stockpile practices <ul style="list-style-type: none"> ▪ avoid stockpiling of wood to avoid displaced WRP sheltering stockpiles 	1.8	Yes	HV Fauna Management Plan	Remove wood daily during clearing process to prevent potential WRP nesting or, if stockpiled on site-then do so in cleared areas as far as possible from uncleared nearby remnant vegetation.
Post clearing report	1.9	Yes	HV Fauna Management Plan	Fauna encounters during clearing and generally will be recorded in EMS. Results will be reported as part of Annual Environmental Review.

WRP - relevant mitigation criterion	#	Is the criterion met	Reference	Comment
EPBC Act Policy Statement 3.10				
Retain and improve habitat corridors	2.1	Yes	HV Fauna Habitat Management Plan HV Integrated Mining and Rehabilitation Plan	Maintaining a 30 to 50 m buffer along riparian habitat (i.e. ephemeral creeklines) Retention of habitat logs and reuse during rehabilitation of disturbance areas.
Peppermint trees Retain peppermint trees with a breast height diameter of >10 cm Plant and nurture new peppermint trees to fill in gaps or enhance existing habitat	2.2	No	Not applicable	Not applicable No peppermint trees are found within the proposal footprint. Peppermints trees are not included in the rehabilitation program.
Recreate habitat areas and corridors	2.3	Yes	HV Fauna Habitat Management Plan HV Integrated Mining and Rehabilitation Plan	In-fill replanting in open areas along the riparian habitat 30 to 50m buffer.
Western Ringtail Possum Interim Recovery Plan 1997-1999 (CALM 1998)				
Ensure that rehabilitated WRP are released in areas where their survival is maximised Improve the species conservation status, through habitat management (including fox control) and translocations so that it no longer meets criteria for Vulnerable (IUCN 1994).	3.1	Yes	HV Fauna Habitat Management Plan EMS Clearing procedure	Bemax will relocate any conservation significant fauna encountered during clearing into adjacent areas of remnant vegetation undergoing foxes and feral bee control.

Table 2 Review of relevant mitigation criteria for Black Cockatoo recovery

Black-Cockatoo – relevant mitigation criteria	Species	#	Is the relevant criteria met	Reference	Comment
Recovery outline for Black-Cockatoos - Wildlife Australia 1996, Action Plan for Australian Marsupials and Monotremes					
Population Monitoring in different parts of range	CBC BBC	4.1	Not applicable	Not applicable	The Happy Valley development footprint is not recognised as critical habitat for the survival of Black-Cockatoos. The development footprint of vegetated areas is 155 ha and surrounding vegetated area is >10,000 ha Preliminary fauna studies provide baseline data at five separate sites within Happy Valley including nearby reserve areas (offset areas). Additional fauna surveys will be conducted every two years until completion criteria are met (estimated to be six years in total).

Black-Cockatoo – relevant mitigation criteria	Species	#	Is the relevant criteria met	Reference	Comment
Help orchardists develop a non-lethal damage mitigation technique and enforce more vigorously legislative provisions that make shooting illegal	BBC	4.2	Not applicable	Not applicable	Illegal shooting is unlikely as no orchardists are located in the surrounding that are likely to be affected by Black-Cockatoo feeding.
Identify and protect significant breeding areas	CBC	4.3	Not applicable	Not applicable	The Happy Valley development footprint is not recognised as critical habitat for the survival of CBC. The development footprint is outside the CBC breeding area. Notwithstanding, clearing will be conducted outside the likely breeding/nesting periods of conservation significant fauna.
Management of foraging habitat in non-breeding areas	CBC	4.4	Yes	HV Integrated Mining and Rehabilitation Plan	Rehabilitation of disturbance areas, revegetating and infill planting of riparian buffers and disused quarries. Suitable foraging habitat species include: Hakea, Banksia (including Dryandra), Snotty gobbler, Jarrah and Marri. In densities comparable to control plots outside the disturbance area Maintain health of foraging habitat through Fire and Dieback management.
Re-establishment of foraging habitat	CBC	4.5	Yes	As per criteria 4.4	

Table 3 Review of relevant mitigation criteria for Chuditch recovery

Chuditch – relevant mitigation criteria	#	Is the relevant criteria met	Reference	Comment
Chuditch Recovery Plan 1992-2001 (CALM 1994)				
Translocation to areas of vacant, suitable habitat.	5.1	Yes	HV Fauna Habitat Management Plan EMS Clearing procedure	Retention of suitable habitat logs for rehabilitation in disturbed areas (diameter of at least 30 cm but usually greater than 50 cm; hollow diameter of 7–20 cm and generally 1 m long (CALM 1994)) Bemax will relocate any conservation significant fauna encountered during clearing into adjacent areas of remnant vegetation undergoing foxes and feral bee control.
	5.2	Yes	HV Integrated Mining and Rehabilitation Plan	Retention of riparian habitat. The mining programs includes retention of riparian habitat that bisects the development footprint in several locations. The Maintaining a 30 to 50m buffer along riparian habitat (i.e. ephemeral creeklines). The program also includes rehabilitation of disturbance areas, revegetating and infill planting of riparian buffers and disused quarries. Riparian vegetation has shown to support higher densities of Chuditch, possibly because the food supply is better, or more reliable, or better cover is offered by dense undergrowth thereby reducing vulnerability to predators (CALM 1994).

3. CASE STUDY

3.1 LUDLOW

The proponent has recently completed active mining within the Ludlow State Forest (EPA Assessment Bulletin No. 1098, Ministerial Statement 639). Due to the presence of or potential impacts to listed species, including the Western Ringtail Possum, Carnaby's Black Cockatoo, Masked Owl and Barking Owl, a Fauna Management Plan was also prepared for the project. The Ludlow FMP was made available to the public for a period of 10 weeks, following the incorporation of comments and advice from lead agencies, including DEC and EPA. One hundred and eleven public submissions were received, with the amended FMP being approved for implementation on 25 November 2003.

3.1.1 Ludlow fauna management measures

The management actions presented in the Ludlow FMP included:

- installation of artificial possum shelters surrounding the mining lease to provide replacement brushtail and ringtail possum habitat
- having a fauna carer during clearing operations to monitor for injured fauna and direct clearing events to minimise impact
- monitoring in adjacent state forest and National Park throughout operations to determine impact of mining operation on local population
- implementing speed limits and using established tracks
- incorporation of fauna habitat requirements into rehabilitation planning, including reinstatement of habitat logs and debris stockpiles and pest animal control
- retaining a proportion of trees identified as having significant habitat potential.

Prior to clearing, artificial possum shelters were established in the area surrounding the mining lease at sites selected by a fauna specialist, who also supervised the construction of the shelters and selection of habitat logs for reinstatement in the rehabilitation programme. Post-mining, habitat logs and debris stockpiles are being reinstated into the rehabilitation under the direction of the rehabilitation advisor at a minimum density of 1 habitat per hectare. The fauna specialist also monitored clearing operations. In areas of high habitat potential, a 'possum spotter' worked with the operational crews as the trees were pushed. Where possible, habitat trees were nudged several times prior to pushing to flush mobile fauna.

The proponent initiated a pest animal control programme prior to commencement of clearing and will continue throughout the rehabilitation phase to minimise the impacts of pest species on both native fauna and the rehabilitation. To ensure workforce awareness of the FMP, information signs were erected on site and relevant aspects of the FMP were covered in the site induction which all personnel undertook before working on site.

3.1.2 Happy Valley fauna management measures

These above actions are very similar to those proposed for Happy Valley project, with the exception of the retention of habitat trees. In the case of Happy Valley, the proponent has committed to retaining instead the riparian habitats that cut through the proposal, as these were identified as being a priority.

Post-mining, habitat logs and debris stockpiles are being reinstated into the rehabilitation under the direction of the rehabilitation advisor at a minimum density of 4 habitat logs per hectare (consistent with current best practice fauna management for Chuditch recovery programs implemented by Alcoa).

3.1.3 Ludlow - performance to date

Monitoring of the artificial shelters over the past three and a half years has found 6 possums utilising the shelters, averaging only 1 – 2 possums per year. In the initial 2004 clearing stage, 4 possums were sighted, all uninjured. During the two clearing events in 2005, two brushtails were sighted, one running through the clearing area, and the other encountered in a tree hollow. The stand of trees containing the hollow were retained overnight on the advice of the fauna carer, the next morning the possum had moved on. Two clearing events were undertaken in 2006, with no sign of possums during clearing of these high risk areas.

Scat counts and night surveys conducted by a fauna consultant over the course of the operation showed a reduction of about half in ringtail possum activity in the sampled habitat from 2002 – 2006. However, the decline may have been part of a longer-term trend (clearing for mining commenced in 2004). The 2007 scores were the highest recorded since 2002, indicating that the ringtail activity level (in the sampled habitat) had risen to about 30% of its 1993 level when monitoring first commenced.

No injury to fauna has been reported on the minesite during operations. However, the site Environmental Incident register records that two kangaroos were killed through impact with employee / contractor vehicles on Tuart Drive.

The Ludlow operations, including the FMP, were audited by the DEC on three occasions, as well as by independent external auditors on a regular (bi-annual) basis. No non-compliances were identified by any of these audits.

4. REFERENCES

- Bemax 2009, *Draft Integrated Mining and Rehabilitation Plan, Happy Valley Mineral Sands Project*, Controlled Document CD915, January 2009.
- Cable Sands WA Pty Ltd (Cable Sands) 2005, *Fauna Management Plan, Ludlow*, Revision 7, September 2005.
- Conservation and Land Management (CALM), 1994, *Chuditch Recovery Plan 1992-2001*, prepared by Peter Orell and Keith Moris for the Chuditch Recovery Team, Government of Western Australia.
- Conservation and Land Management (CALM), 1998, *Western Ringtail Possum (Pseudocheirus occidentalis) Interim Recovery Plan 1997-1999*, prepared by Andrew A Burbidge and Paul de Tores for the Western Rintail Possum Recovery Team, February 1998.
- Conservation and Land Management (CALM), 2000 *Chuditch Recovery Team, Annual Report*, by Brent Johnson and Keith Morris for the Chuditch Recovery Team.
- Conservation and Land Management (CALM), 2003, *Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) Recovery Plan 2002-2012*, prepared by Belinda Cale for the Carnaby's Black – Cockatoo Recovery Team.
- Department of Environment and Conservation (DEC) 2008, *WRP Mitigation Plan*, unpublished report.
- Department of Environment, Water, Heritage and the Arts (DEWHA) 2008a, *Significant impact guidelines for the vulnerable western ringtail possum (Pseudocheirus occidentalis) in the southern Swan Coastal Plain, Western Australia*, EPBC Act Policy Statement 3.10 for public comment, Australian Government, December 2008, <http://www.environment.gov.au/epbc/publications/western-ringtail-possum.html>, accessed 16 February 2009.
- Department of Environment, Water, Heritage and the Arts (DEWHA) 2008b, *Background Paper to EPBC Act Policy Statement 3.10 – Nationally Threatened Species and Ecological Communities*, for public comment, Australian Government, December 2008.
- Department of Environment, Water, Heritage and the Arts (DEWHA) 2009, *Species profile and treats database*, <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>, accessed 16 February 2009.
- Environment Australia (EA), 2000, *The Action Plan for Australian Birds*, prepared by Stephen T. Garnett and Gabriel M. Crowley, <http://www.environment.gov.au/biodiversity/threatened/publications/action/birds2000/recovery.html>, accessed 16 February 2009.
- Strategen, 2008, *Fiona Stanley Hospital Project, Carnaby's Black-Cockatoo Management Plan – For EPBC Act referral*, prepared by Strategen for the Department of Health.

Wildlife Australia, December 1996, *Action Plan for Australian Marsupials and Monotremes, Recovery Outline Chuditch*,
<http://www.environment.gov.au/biodiversity/threatened/publications/action/marsupials/19.html>,
accessed 16 February 2009.

Wildlife Australia, December 1996, *Action Plan for Australian Marsupials and Monotremes, Recovery Outline Western Ringtail*,
<http://www.environment.gov.au/biodiversity/threatened/publications/action/marsupials/23.html>,
accessed 16 February 2009.