Conservation Advice

Vulnerable Pilbara Leaf-nosed Bat *Rhinonicterus aurantia*

Background

The Pilbara Leaf-nosed Bat (PLNB) is a small insectivorous bat which occurs throughout the Pilbara region and adjacent Gascoyne region. The PLNB is reliant on temperature stable, high humidity roosts found in deep caves and disused underground mines which are limited and threatened by mining and collapse of disused mine adits (Armstrong 2001). Recent assessments predict that if mining is to proceed without significant constraints there will be a > 30 % population size decline over the next 15 years and, without intervention and management, most roost sites will be destroyed over the next 30-50 years (Woinarski et al 2014).

Eligibility as vulnerable (see TSSC 2001) i.e. grounds on which the species is eligible to be included in the category in which it is listed: The species was listed as vulnerable because: (1) it has undergone, is suspected to have undergone or is likely to undergo in the immediate future a substantial reduction in numbers; (2) its geographic distribution is precarious for its survival (being limited to the Pilbara) and (3) the estimated total number of mature individuals is limited and the number is likely to continue to decline.

Main factors causing this eligibility: The loss of roost sites through mine collapses and flooding (Duncan et al 1999).

Primary national conservation objectives

- Identify, protect and monitor all known PLNB roost sites to halt predicted population decline.
- Conduct research to better understand and minimise future impacts from mining on the PLNB population and recover the national population.

Priority conservation actions

The following actions are considered necessary to stop the decline of and, or support the recovery of the PLNB:

- Dedication of adequate buffers and restrictions around all known diurnal, nocturnal and maternity roost sites.
- Monitoring of all known colonies, including best estimations of colony size and maternity use.
- Retention and preservation of preferred and productive foraging habitat in the vicinity of roosts.

Site specific and regional conservation actions

The following additional action supports the national conservation objectives minimising potential impacts to the PLNB:

- Suitably control public access to all known roost sites on both private and public lands.

Research and information requirements

The following information requirements inform the national conservation objectives and identification of priority conservation actions. They may be useful for directing research and other information providers when establishing research programs. Priority information requirements include:

- Review and collate unpublished information collected by mining companies.
- Clarify the number and distribution of day roosts.
- Characterise natural roosts.
- Characterise and map foraging habitat.
- Understand the role of landscape connectivity and resource availability for the movement between roosts.
- Understand population and colony size and social behaviour.
- Increase knowledge of appropriate buffer size for mining activities.
- Develop protocols for artificial roost construction.
- Develop a regional management plan that prevents extensive destruction of or significant disturbance to roost sites.

These priority research and information requirements were developed from a workshop held specifically to identify priority research actions for the PLNB (Cramer et al 2014).

Actions likely to have a significant impact on PLNB

Important populations

There are currently 26 known roosts of the PLNB. Given its distribution is precarious for its survival and the predictions by Woinarski et al (2014), all known and yet to be discovered roosts of the PLNB are considered to comprise one nationally important population.

Habitat critical to the survival of the PLNB

There are three types of PLNB roosts; nocturnal, diurnal and maternity roosts. The latter tend to be located in deep, humid caves associated with hard iron rich rock strata and are highly likely to be habitat critical to the survival of the PLNB. Nocturnal and diurnal roosts are likely to represent habitat critical to the survival if they are occupied by >100 PLNB or are a naturally occurring cave roost that is unlikely to collapse and provides optimal roosting conditions i.e. depth, > 30 degrees and >90 % humidity. Roosts can be natural structures or disused mine shafts and can be complex and involve off shoots from the main chamber. Disused mine shafts occupied by ≤100 PLNB that are unstable, have or are likely to be subject to collapses and are not currently subject to restoration and management works, are unlikely to be habitat critical to the survival of the PLNB. Roosts that contribute to a new understanding of distribution or are previously unknown habitat types are likely to be habitat critical to the survival of the PLNB. For example an artificially constructed roost found to be occupied by PLNB could contribute significantly to a better understanding of roosting preferences and creation of artificial roost sites that could help recover the species.

An action is <u>highly likely</u> to have a significant impact on the PLNB if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of the PLNB population

The size of the PLNB population is unknown however roosts range in size from few individuals, to some containing 1000-2000 individuals, to several very large roosts containing >10, 000 PLNB. The loss of or unmitigated disturbance to roosts constituting habitat critical to the survival of the PLNB is highly likely to lead to a long-term decrease in the size of the PLNB population.

Reduce the area of occupancy of the PLNB population

Armstrong (unpublished data) estimated the total potential area of occupancy to be 6594 km^2 but the total combined area of occupied PLNB roosts to be only <10km^2 . Any destruction of PLNB roosts or removal of foraging habitat is highly likely to reduce the area of occupancy of the PLNB population.

Adversely affect habitat critical to the survival of the PLNB

Mining related activities such as excavation, vegetation clearing, blasting, drilling, rail or haul road vehicle activity within 100m of the lateral extent of the limits of habitat critical to the survival of the PLNB is highly likely to adversely affect habitat critical to the survival of the PLNB.

Interfere substantially with the recovery of the PLNB

Any proposed clearing of habitat critical to the survival of the PLNB is highly likely to interfere substantially with the recovery of the PLNB. Any mining proposals within 20 km of particularly large roosts such as the Cane River and Barley Range roost sites (>10, 000), which host ecologically significant proportions of the national population, are considered highly likely to interfere substantially with the recovery of the PLNB irrespective of a 100m buffer.

An action <u>may</u> have a significant impact on the PLNB if there is a real chance or possibility that it will:

Disrupt the breeding cycle of an important population

Blasting activities within 500 m of occupied habitat critical to the survival of the PLNB during parturition and lactation (between the birth of young in December to their weaning in February) may disrupt the breeding cycle of the PLNB population. Where buffers of 100 m or greater are implemented around this habitat, disrupting the breeding cycle is unlikely outside of parturition and lactation as long as ongoing monitoring is undertaken that incorporates stop work triggers to avoid roost abandonment or decline. Buffers should start from the lateral limits of caves or mines based on an understanding or best estimation of the lateral extent of habitat critical to the survival of the PLNB. Any mining related activities between 100 – 500m from habitat critical to the survival of the PLNB such as excavation or drilling is unlikely to disrupt the breeding cycle if it is staged and monitored. The breeding cycle is unlikely to be affected at non maternity roosts.

Modify, destroy, remove or isolate or decrease the availability or quality of PLNB habitat to the extent that the PLNB is likely to decline

Any modification, destruction, removal or isolation of high use foraging habitat within 20 km of habitat critical to the survival of the PLNB such as riparian zones with deep and permanent pools along gorges and within gullies, may result in decline of the species. Retention and management of this habitat (in conjunction with habitat critical to the survival of the PLNB) is important to avoid decline in the PLNB. These foraging habitats are particularly important during lactation between the birth of young in December to their weaning in February. Decline may also occur if there is loss of ≥10% of any foraging habitat with a 20 km radius of habitat critical to the survival of the PLNB.

An action is <u>unlikely</u> to have a significant impact on the PLNB if there is a real chance or possibility that it will:

Fragment the important population into two or more populations

The mobility and population structure of the PLNB suggests it is unlikely the population could be fragmented as a result of impacts from mining activities in the Pilbara.

Result in invasive species that are harmful to the PLNB becoming established in its habitat

The Pilbara is already inhabited by invasive species that are harmful to the PLNB. This is primarily through degradation and modification of habitat resulting from feral ungulates, domestic herbivores and invasive weed establishment i.e. buffel grass. Carwardine et al (2014) estimated a 50-75 % persistence probability for the PLNB both without and with strategies to abate these threats.

Introduce disease that may cause the PLNB to decline

There are no known diseases threatening the PLNB.

Avoiding or dealing with likely significant impacts

Habitat critical to the survival of the PLNB should not be destroyed as it would be inconsistent with the national conservation objectives. Currently, little is known about the specific roosting requirements to enable confidence in artificial roost construction. Until this is well understood and use of such roosts is demonstrated, artificial roost construction is considered unlikely to be an adequate mitigation of significant impacts.

Any offsets for the loss of foraging habitat should be consistent with the relevant conservation actions and research and information requirements described above.

Adherence to the following standards will avoid significant impacts on the PLNB and ensure consistency with the national conservation objectives for the species:

- Avoid mining within 20 km of habitats critical to the survival of the PLNB at Cane River and Barley Range which host ecologically significant proportions of the national population (>10, 000 individuals).
- Protect a 100 m buffer around other habitats critical to the survival of the PLNB in perpetuity.
- Stage construction works between 100-500 m of habitat critical to the survival of the PLNB to minimise disturbance to the animals
- Monitor PLNB occupation of habitat critical to the survival of the PLNB and apply stop work triggers to development works
- Avoid work within 500 m of maternity roosts during parturition and lactation
- Retain and preserve productive foraging habitats around habitat critical to the survival of the PLNB
- Retain 90% of foraging habitat within 20 km radius of habitat critical to the survival of the PLNB

Further information

Further information on the PLNB including ecology an biology, existing plans, information on mitigating impacts or conducting surveys is provided in the species profile in the Departments Species Profile and Threats Database.

References

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