The conservation and management of the Pilbara leaf-nosed bat *Rhinonicteris aurantius* (unnamed Pilbara form).

Project Plan 2012 - 2021

Photo: Mark Cowan, DEC

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OBJECTIVE

This document has several objectives:

- To document and guide the implementation of priority future actions for the conservation and management of the Pilbara leaf-nosed bat (PLNB) in the Pilbara Region of Western Australia.
- To justify funding allocations for the priority actions.
- To guide future controlling provisions and potential research offset decisions in Western Australia.

BACKGROUND

The orange leaf-nosed bat *Rhinonicteris aurantius* is listed as "Fauna that is rare or is likely to become extinct" under the WA *Wildlife Conservation Act* 1950. The Pilbara form, or the Pilbara leaf-nosed bat PLNB *Rhinonicteris aurantius* (unnamed Pilbara form) is listed as Vulnerable under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999.* The Pilbara and Kimberley / Top End populations are thought to have been separated for at least 30,000 years by the unsuitable habitat in the Great Sandy Desert. The PLNB has not been formally taxonomically differentiated because of limitations of small Pilbara sample sizes. There are some morphological and echolocation call differences between the Pilbara and northern forms.

The species is listed as a threatened species because, until recently, it was recorded in low numbers from only a few locations in the Pilbara. However recent surveys have identified several additional major and minor roosts, including a banded ironstone site in the south west Pilbara where > 100,000 individuals have been estimated. Its' preferred roosting habitat is warm, humid caves and disused mine shafts, often near waterholes in granite and remnant sedimentary landscapes in the Marble Bar / eastern Pilbara area, and in the dissected gorges of the west Pilbara. There appears to be limited gene flow between eastern and western Pilbara populations. Threats include human visitation, and collapse and flooding of disused mines, and the renewed interest in drilling and open cutting ore bodies below disused mines (Armstrong 2008). There are no recovery plans for this taxon.

The Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) have developed a Policy Statement which aims to develop significant impact guidelines for actions which are likely to have a significant impact on the PLNB. The Policy Statement was developed for the following reasons:

- There have been an increasing number of referrals under the EPBC Act relating to potential impacts on the abundance and distribution of the PLNB.
- Several assessment sections within SEWPaC were having difficulty in relation to determining significant impacts on the PLNB.
- There were inconsistent decisions being made in relation to the level of impacts on the PLNB.
- There are different threats affecting the PLNB across its range, and
- Mining pressures were intensifying in Western Australia.

PROJECTS

The Projects considered necessary to ensure the conservation of the PLNB in the Pilbara region are listed below. Projects 1 – 4 could most effectively be undertaken by university Honours and / or post graduate students, with supervision and support from appropriate DEC staff and other microbat experts. Project 5 is over a longer term and would need additional support. Funding shown is in 2012 $$.

Project 1 – PLNB distribution and status assessment

Scope	• To determine the distribution and abundance of the PLNB in the Pilbara using reviews of the "grey" and published literature, museum records, communication with pastoralists, consultants and mining companies, DEC and other microbat experts, and acoustic sampling techniques. • Develop a data spreadsheet collating location records, abundance estimates, survey effort and habitat (roosting). • Locate any genetic material that might be available. • Undertake a literature review of previous mining (and other) impacts. • Reassess conservation status using additional distribution and abundance information.
Outputs	• Spreadsheet capturing the distributional and abundance data. • Short two page project brief. • Bibliography on PLNB distribution, ecology and management in the Pilbara.
Benefit to DEC and SEWPaC	• Improved information for distribution modelling for the species. • Improvement to the significant impact guidelines currently being developed for PLNB • Improved and more efficient decision making ability. • Determine the appropriate conservation status.
Duration	• 6 months
Cost	• $15,000
Funding source	• Research offset from controlling provision.

Project 2 – Locate, characterise and protect PLNB roost sites.

Scope	• Using distributional information gathered in Project 1, identify roost locations. • PLNB is cave-dependent in the Pilbara, so it is important to locate, characterise and protect its 'day roosts' and 'colony roosts' as well as its 'breeding roosts'. We also need to assess the significance of differences between males and females (if any) in roost-use. All three roost-types will underpin the species' regional population/s, the first two types by allowing it access to suitable foraging areas, thence the extent of suitable foraging area available to it in the region. • PLNB survey work should also assess dependence of each roost-type on (1) caves in banded ironstone outcrops, (2) old underground mines (for gold/copper etc) in other parts of the Pilbara, and (3) other strata that may serve as temporary roosts thereby allowing this high-energy species to access additional areas suitable for foraging purposes. • Determine extent of movements between roosts. • Identify potential monitoring sites that span the different land tenures e.g. conservation estate, mining leases and pastoral leases. • Collect information on the use of roosts by other bats, in particular the ghost bat *Macroderma gigas*. • Develop guidelines for the protection of roost sites. • Model potential distribution of PLNB based on known characteristics of roost sites.
Outputs	• Identification and characterisation of key roost sites, dissemination to consultants and mining companies. • Better understanding of Pilbara distribution. • Thesis chapter. • Refereed publication.
Benefits to DEC and SEWPaC	• Improved knowledge for conservation and management of PLNB. • Improvement to the significant impact guidelines currently being developed for PLNB. • Improved and more efficient decision making ability.
Duration	• 24 months, could be undertaken concurrently with Project 3.
Cost	• $90,000
Funding source	• Research offset from controlling provision.

Project 3 – Use of foraging habitats by PLNB.

Scope	• Given the PLNB's high-energy flight requirements and seasonal breeding, survey work also needs to investigate temporal dynamics in its habitat-use: its dependence (if any) on continuously productive habitat mosaics, such as riparian zones, as well as on mosaics that are ephemerally productive (e.g. after rain) or seasonal productivity. • Identify important foraging habitat attributes. • Develop effective tagging techniques to determine PLNB movements between roosts. • Identify possible other threatening processes during the foraging phase.
Outputs	• Better understanding of PLNB movements and habitat requirements. • Thesis chapter. • Refereed paper.
Benefits to DEC and SEWPaC	• Improved knowledge for conservation and management. • Improved information for distribution and habitat modelling. • Improvement to the significant impact guidelines currently being developed for PLNB. • Improved and more efficient decision making ability.
Duration	• 24 months, could be undertaken concurrently with Project 2.
Cost	• $85,000
Funding source	• Research offset from controlling provision.

Project 4 – Taxonomy and genetic structure of PLNB.

Scope	• Collate existing DNA samples, and determine gaps in collections. • Undertake collection of blood or hair samples as necessary. • Assess the validity of the current taxonomic status of the PLNB as a distinct taxon, Pilbara vs northern populations. • Assess the genetic structure of the PLNB, eastern vs western populations.
Output	• Technical report. • Honours thesis • Refereed papers.
Benefits to DEC and SEWPaC	• Improved information for assessing conservation status of PLNB. • Improved knowledge of movements within the Pilbara. • Meeting the objectives of the EPBC Act. • Consistent with the significant impact guidelines.
Duration	• 12 months, could be undertaken in conjunction with Project 3 where PLNBs would be captured and handled.
Cost	• $50,000.
Funding source	• Research offset from controlling provision.

Project 5 – Monitoring of PLNB populations.

Scope	• Consult with DEC Regional staff, species' experts and a biometrician to ensure robust and appropriate design of the monitoring program. • Establish monitoring sites at representative PLNB roost and foraging locations (derived from either survey and / or habitat modelling) across the Pilbara, using information from Projects 2 and 3. Select monitoring sites that provide for a comparison of PLNB populations on / near impact (e.g mining disturbance) and undisturbed (control) sites. • Develop a monitoring timetable and implement seasonal monitoring.
Outputs	• Annual reports • At least one published journal paper after 5 years data collection.
Benefits to DEC and SEWPaC	• Meeting the objectives of the EPBC Act. • Improved understanding of the PLNB population trends. • Improved knowledge for management of PLNB. • Potential application to other bat species in the Pilbara e.g ghost bat.
Duration	• 10 years
Cost	• $120, 000 per year, including salary.
Funding source	• Research offset from controlling provision.

PERFORMANCE TRACKING

PROJECT	DEADLINE	COMPLETED
1. PLNB distribution assessment.	August 2013	
2. Locate, characterise and protect PLNB roost sites.	February 2015	
3. Usage of foraging habitats by PLNB.	August 2015	
4. Taxonomy and genetic structure of PLNB.	December 2013	
5. Monitoring of PLNB populations.	2021	

REFERENCES

Armstrong, K.N (2008). Pilbara Leaf-nosed Bat *Rhinonicteris aurantia* (unnamed Pilbara form) pp 470-471 In: The Mammals of Australia (3rd edition), edited by Van Dyck, S and Strahan, R. New Holland Publishers.