13  South-eastern long-eared bat

13.1 EPBC Act legal status

Vulnerable - listed 4 April 2001

13.2 Biology and ecology

13.2.1 Characteristics

The head and body length of the South-eastern long-eared bat (*Nyctophilus corbeni*) is approximately 50 to 75 mm in length and its tail length is approximately 35 to 50 mm. The weight varies between genders with females (14 to 21 g) being heavier than males (11 to 15 g).

The South-eastern long-eared bat is distinguishable from other long-eared bats by its larger size as well as a broader skull and jaw. It is also geographically separated from other long-eared bats (van Dyck & Strahan 2008).

It should be noted that most of the data on this species is from studies undertaken outside of Queensland (Curtis *et al* 2012).
13.2.2 Known distribution

The South-eastern long-eared bat has a limited distribution restricted to the Murray-Darling Basin in south-eastern Australia (DSEWPaC 2012h). In Queensland, the majority of records for this species are from the Brigalow Belt South Bioregion, with the most easterly record from the Bunya Mountains National Park. The most northerly records are from the Expedition Range and Dawson River areas with the most westerly records from west of Bollon in the Mulga lands Bioregion (DSEWPaC 2012h, Schulz & Lumdsen 2010). The nearest records to the GTP footprint are from the Rundle Range, north of Gladstone and Expedition National Park on Melancholy Creek (DERM 2012 and Atlas of Living Australia 2012).

Figure 13.1 South-eastern long-eared bat distribution range for the species (Source: DSEWPaC 2012h)

13.2.3 Known species populations and their relationship with the GTP footprint

There is no data on the population size for this species. The species is considered rare throughout most of its distribution range, including Queensland where there are relatively few records (less than 30 localities) despite the large distribution area (Curtis et al 2012, DSEWPaC 2012h).

No individuals have been positively identified from the GTP footprint during the pre-clearing surveys. However it should be noted that *Nyctophilus* calls were identified from a number of locations during the pre-clearing surveys. However these could not be reliably identified to the species level (Ecologica Consulting 2012). There are no known roosting and/or breeding places within and directly adjacent the GTP ROW (Ecologica Consulting 2012). This species is unlikely to occur in the GTP ROW due the highly attenuated nature of the area. However this species may turn up in better woodland remnants (eg riparian areas) that are attached to the extensive remnants on the eastern and western sides of Arcadia Valley. This includes Clematis Creek and Ironbark Creek which have been mapped as ‘general habitat’.

This species was not identified during the pre-clearance survey within KP312 to KP408.81 (FEC 2012b, Santos GLNG 2013). However, *Nyctophilus* species calls were identified at Bell Creek (1.14 km east of KP334.5) and Harper Creek (KP360.3). *Nyctophilus* species produce distinctive near-vertical linear pulses, which are indistinguishable from each other. Four *Nyctophilus* species occur within the range of the study area; *Nyctophilus bifax*, *Nyctophilus corbeni*, *Nyctophilus geoffroyi* and *Nyctophilus gouldi*. *Nyctophilus corbeni* (South-eastern long-eared bat) is listed as ‘vulnerable’ under the EPBC Act, while the others are not listed as threatened species under the EPBC Act. A total of ten calls attributable to *Nyctophilus* species were recorded across both sites in this survey. Suitable habitat for *Nyctophilus corbeni* exists within Harper Creek, so this species can not be excluded from KP312 to
KP408.81. Bell Creek within the GTP ROW has been cleared of riparian vegetation so suitable habitat is not present at this site.

Potential habitat has also been identified within and adjacent to KP408.81 to KP409.04.

13.2.4 Biology and reproduction

There is little information currently available on this species reproductive biology, although it is thought that mating takes place during autumn and winter. Females are thought to store sperm until spring, when fertilisation and gestation occurs. Up to two young are born during late spring/early summer with young not fully weaned until mid-summer (DEC 2005c and Curtis et al 2012).

13.3 Habitat

Although commonly recorded in some areas such as the Brigalow Belt South and Nandewar Bioregions in north-eastern NSW, this species occurs in a range of inland woodland vegetation types, including Box, Ironbark, Cypress pine, Mallee, Bull-oak, Brigalow and Belah woodlands/forests and will roost in tree hollows, crevices and under loose bark within these communities (DEC 2005c, DSEWPaC 2012h). The South-eastern long-eared bat forages within the understorey of the abovementioned communities, including the ground (DSEWPaC 2012h, Schulz & Lumdsen 2010).

‘Essential habitat’ is generally associated with large tracts of vegetation (100s to 1,000s of ha), including open forest with open to dense understorey (but also found in SEVT and Brigalow/Belah); mixed Eucalyptus/ Corymbia/ Angophora +/- Cypress/ Bull-oak (pers comm. Greg Ford). ‘General habitat’ seems to be associated mainly with large tracts of relatively undisturbed woodland and forest, particularly on landzones 5, 7 and 10 (and landzone 3 within these), although it does venture into landzone 4 and 9 (per comm. Greg Ford).

The species is known to fly large distances (greater than 7 km in a night) from roosts to foraging areas. There is limited information on species habitat in Queensland, with data based on capture records only (Curtis et al 2012).

Limited information is available regarding the roosting ecology of this species, however surveys undertaken by others suggest that these bats may change roosting sites as frequently as each day (most roosts used for just a single day) and are likely to travel across large distances between consecutive roosts (up to 2 km). No information is available on maternity roosts where larger groups may form (DSEWPaC 2012h, Schulz & Lumdsen 2010).

13.4 Habitat assessment

Information obtained from BPA (ie Brigalow Belt South Fauna Expert Panel Report (EPA 2006)), together with expert advice, site based species records and pre-clearance survey data have been used to define a set of assumptions that have been used to identify areas of habitat that are consistent with the definitions of ‘core habitat’, ‘essential habitat’ and ‘general habitat’ that have been presented in Part 1 of this SSMP. The South-eastern long-eared bat habitat assumptions are presented below.

13.4.1 General assumptions

The following habitat assumptions have been made based on current scientific knowledge of this species:
• Occurs in a range of inland woodland vegetation types, including Box, Ironbark and Cypress pine woodlands (DSEWPaC 2012h)

• Also occurs in Bull-oak woodland, Brigalow woodland, Belah woodland, Smooth-barked apple (Angophora leiocarpa), woodland; River red gum (Eucalyptus camaldulensis), forests lining watercourses and lakes, Black box (Eucalyptus largiflorens), woodland, dry sclerophyll forest (DSEWPaC 2012h)

13.4.2 Core habitat

‘Core habitat’ consists of ‘essential habitat’ in which the species is known and the habitat is recognised under relevant recovery plans or other relevant plans/policies/regulations. Also included within this category are populations that are limited geographically within the region.

For the South-eastern long-eared bat, all REs that are considered to be habitat for this species, which overlap with areas identified in the BPA mapping that have been identified as containing a ‘State’ or ‘Regional’ ‘Corridor’ (J-Rating) and/or ‘Core Habitat’ (H-Rating) and/or ‘Habitat for EVR Taxa’ (A-Rating) have been mapped as ‘core habitat’.

KP0 to KP30

The location of the ‘core habitat’ for this species within KP0 to KP30 is shown in Figure 13.2a.

KP30 to KP40

No individuals of this species have been identified within the general vicinity of KP30 to KP40 although habitat identified during the pre-clearance surveys overlaps with areas identified in the BPA mapping as containing a ‘State’ or ‘Regional’ ‘Corridor’ (J-Rating) and/or ‘Core Habitat’ (H-Rating) and/or ‘Habitat for EVR Taxa’ (A-Rating); therefore ‘core habitat’ exists within this section of the GTP.

The location of the ‘core habitat’ for this species within KP30 to KP40 is shown in Figure 13.2b.

KP40 to KP130

The location of the ‘core habitat’ for this species within KP40 to KP130 is shown in Figure 13.2c.

KP130 to KP312

No individuals of this species have been identified within the general vicinity of KP130 to KP312 although habitat identified during the pre-clearance surveys overlaps with areas identified in the BPA mapping as containing a ‘State’ or ‘Regional’ ‘Corridor’ (J-Rating) and/or ‘Core Habitat’ (H-Rating) and/or ‘Habitat for EVR Taxa’ (A-Rating); therefore ‘core habitat’ exists within this section of the GTP.

The location of the ‘core habitat’ for this species within KP130 to KP312 is shown in Figure 13.2d and Figure 13.2e.

KP312 to KP408.81

No individuals of this species have been identified within the general vicinity of KP312 to KP408.81 although during the pre-clearance surveys, habitat was identified within the Callide and Calliope Ranges, at Calliope River (KP352.3), Larcom Creek (KP378) and within KP405.5 to KP407.5 (Santos GLNG 2013). This habitat overlaps with areas identified in the
Figure 13.2a: South-Eastern Long-Eared Bat (*Nyctophilus corbeni*)
Habitat Ratings Based on Predictive Modelling
KP0 to KP30
Figure 13.2b: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling
KP30 to KP40

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.
GLNG Gas Transmission Pipeline Corridor

Kilometre Post Distance Marker (km)

GLNG GTP ROW and Ancillary Work Areas

Habitat Rating
- Core Habitat
- General Habitat

Source:
- Gas Transmission Pipeline (GTP): Santos, Apr 2012.
- Aerial: BING, Feb 2011.
- Specimen Record: Ecologica, 2010.

Figure 13.2c: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling KP40 to KP130

Date: 06/09/2012
Version: c
Figure 13.2d: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling

KP130 to KP312

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.
Specimen Record: Ecologica, 2010.
Figure 13.2e: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling KP130 to KP312

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012
Aerial: BING, Feb 2011
Specimen Record: Ecologica, 2010.
BPA mapping as containing a ‘State’ or ‘Regional’ ‘Corridor’ (J-Rating) and/or ‘Core Habitat’ (H-Rating) and/or ‘Habitat for EVR Taxa’ (A-Rating); therefore ‘core habitat’ exists within this section of the GTP.

The location of the ‘core habitat’ for this species within KP312 to KP408.81 is shown in Figure 13.2f and Figure 13.2g.

**KP408.81 to KP409.04**

The location of the ‘core habitat’ for this species within KP408.81 to KP409.04 is shown in Figure 12.2h.

**KP413.57 to KP419.69**

No individuals of this species have been identified within the general vicinity of KP413.57 to KP419.69 and no habitat identified during the pre-clearance surveys overlaps with areas identified in the BPA mapping as containing a ‘State’ or ‘Regional’ ‘Corridor’ (J-Rating) and/or ‘Core Habitat’ (H-Rating) and/or ‘Habitat for EVR Taxa’ (A-Rating); therefore no ‘core habitat’ exists within this section of the GTP.

13.4.3 Essential habitat

‘Essential habitat’ is an area containing resources that are considered essential for the maintenance of populations of the species (e.g., potential habitat for breeding, roosting, foraging, shelter, for either migratory or non-migratory species). ‘Essential habitat’ is defined from known records and/or expert advice (including the findings of pre-clearance surveys). As there are no current site-based observation for the South-eastern long-eared bat, within or adjacent to (i.e., within 10 km) the proposed ROW, and pre-clearance surveys did not detect this species or identify areas of ‘essential habitat’, there is no ‘essential habitat’ considered to occur within the ROW and ancillary work areas.

13.4.4 General habitat

‘General habitat’ consists of areas or locations that are used by transient individuals or where species may have been recorded but where there is insufficient information to assess the area as essential/core habitat. ‘General habitat’ also includes areas defined from known records or habitat that is considered to potentially support a species according to expert knowledge of habitat relationships, despite the absence of specimen backed records. ‘General habitat’ may include areas of suboptimal habitat for species. As potential habitat for many species contained within this SSMP may include most of the regional ecosystems of the Brigalow Belt Bioregion, the ‘general habitat’ category restricts the habitat to a more limited and realistic set of environmental parameters that are supported by literature and field-based observation.

For the South-eastern long-eared bat, all areas that contain REs that provide habitat as identified by DSEWPaC are included within the ‘general habitat’ category.

**KP0 to KP30**

The location of the ‘general habitat’ for this species within KP0 to KP30 is shown in Figure 13.2a.

**KP30 to KP40**

No ‘general habitat’ for this species exists in this section of the GTP.
Figure 13.2f: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling
KP312 to KP408.81

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.
Specimen Record: Ecologica, 2010.

Version:
11/01/2013

Tate: 11/01/2013

GLNG Gas Transmission Pipeline Corridor

Kilometre Post Distance Marker (km)
GLNG GTP ROW and Ancillary Work Areas

Habitat Rating
Core Habitat
General Habitat
Figure 13.2g: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling
KP312 to KP408.81

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.
Specimen Record: Ecologica, 2010.

Version:
21/01/2013

GLNG Gas Transmission Pipeline Corridor

Kilometre Post Distance Marker (km)

GLNG GTP ROW and Ancillary Work Areas

Habitat Rating
- Core Habitat
- General Habitat

21/01/2013 Date:
0246 km
A1 scale: 1:65,000

GLNG Gas Transmission Pipeline Corridor

Habitat Rating

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.
Specimen Record: Ecologica, 2010.

Version:
21/01/2013

Figure 13.2g: South-Eastern Long-Eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling
KP312 to KP408.81

Date: 21/01/2013
Version: a
Figure 13.2h: South-eastern Long-eared Bat (Nyctophilus corbeni) Habitat Ratings Based on Predictive Modelling KP408.81 to KP409.04

Habitat Ratings
- General Habitat
- Core Habitat

Source:
Aerial BING, Feb 2011.
KP40 to KP130

The location of the ‘general habitat’ for this species within KP40 to KP130 is shown in Figure 13.2c.

KP130 to KP312

Expedition Range (KP137 to KP143), Conciliation Creek (KP207.47), Dawson Range (KP223.2 to KP224.2), Sellheim Creek area (KP280 to KP280.5), KP295.5 to KP298.95, Callide Creek area (KP298.95 to KP300.2) and KP309.7 to KP312 has been identified during the pre-clearance surveys as meeting the criteria of ‘general habitat’ for this species (Santos GLNG 2012).

The location of the ‘general habitat’ for this species within this section of the GTP is shown in Figure 13.2d and Figure 13.2e.

KP312 to KP408.81

Pre-clearance surveys identified ‘general habitat’ for this species within the Callide Range (KP330 to KP333), ‘General habitat’ was also identified at Harper Creek (KP360.3) where Nyctophilus species calls were recorded (Santos GLNG 2013).

The location of the ‘general habitat’ for this species within this section of the GTP is shown in Figure 13.2f and Figure 13.2g.

KP408.81 to KP409.04

The location of the ‘general habitat’ for this species within KP408.81 to KP409.04 is shown in Figure 12.2h.

KP413.57 to KP419.69

Pre-clearance surveys did not identify ‘general habitat’ for this species within this section of the GTP.

13.4.5 Unlikely habitat

‘Unlikely habitat’ areas are those areas that do not contain records of the particular species and do not contain sufficient habitat features to support the species (ie areas that do not meet the habitat assumptions identified above).

13.5 Anticipated threats and potential impacts as a result of the GTP

- Clearing of vegetation associated with Clematis Creek and Ironbark Creek. However, these habitats are considered ‘general habitat’ as they are not known to support the species and are considered sub-optimal (ie impacts by anthropogenic activity)
- Changes to foraging pattern as a result of loss of habitat and also due to lighting (eg light may result in the bat foraging in a darker area, light near a roost access point will delay bats from appearing and may also result in bats abandoning the roost site)
- Removal of potential roosting sites (ie hollow bearing trees), however the habitats in this section are unlikely to support this species
13.6 Unavoidable impacts

Areas of proposed disturbance associated with clearing and construction activities for the GTP between KP0 to KP30, KP30 to KP40, KP40 to KP130, KP130 to KP312, KP312 to KP408.81, KP408.81 to KP409.04 and KP413.57 to KP419.69 for the South-eastern long-eared bat are presented in Table 13.1. The location of this habitat is shown in Figure 13.2a, Figure 13.2b, Figure 13.2c, Figure 13.2d, Figure 13.2e, Figure 13.2f, Figure 13.2g and Figure 13.2h.

A cumulative total of proposed clearing of habitat for the South-eastern long-eared bat is provided in Table 13.1.

Table 13.1 Cumulative total of South-eastern long-eared bat habitat to be cleared

<table>
<thead>
<tr>
<th>Location</th>
<th>‘General habitat’</th>
<th>‘Core habitat’</th>
<th>Total habitat area per GTP section</th>
</tr>
</thead>
<tbody>
<tr>
<td>KP0 to KP30</td>
<td>0.61 ha</td>
<td>10.19 ha</td>
<td>10.80 ha</td>
</tr>
<tr>
<td>KP30 to KP40</td>
<td>0 ha</td>
<td>16.67 ha</td>
<td>16.67 ha</td>
</tr>
<tr>
<td>KP40 to KP130</td>
<td>0.45 ha</td>
<td>3.79 ha</td>
<td>4.24 ha</td>
</tr>
<tr>
<td>KP130 to KP312</td>
<td>41.18 ha</td>
<td>38.50 ha</td>
<td>79.68 ha</td>
</tr>
<tr>
<td>KP312 to KP408.81</td>
<td>8.05 ha</td>
<td>50.11 ha</td>
<td>58.16 ha</td>
</tr>
<tr>
<td>KP408.81 to KP409.04</td>
<td>0.001 ha</td>
<td>3.50 ha</td>
<td>3.501 ha</td>
</tr>
<tr>
<td>KP413.57 to KP419.69</td>
<td>0 ha</td>
<td>0 ha</td>
<td>0 ha</td>
</tr>
<tr>
<td>Total habitat area</td>
<td>50.29 ha</td>
<td>122.76 ha</td>
<td>173.05 ha</td>
</tr>
</tbody>
</table>

13.7 Management practices and methods

13.7.1 Pre-construction mitigation measures

Measures to avoid impact

- All reasonable and practical measures will be taken to locate site offices, construction camps, stockpiling/lay down areas and plant and equipment storage areas (including heavy machinery) on existing cleared lands

Measures to minimise impacts

- Pre-clearing ecological surveys have been undertaken by a suitably qualified Ecologist(s) in accordance with the Survey Guidelines for Australia’s Threatened Bats. These surveys included assessment within both remnant and non-remnant areas
- If a maternity roost(s) is located within or within close proximity to the GTP footprint all practical and reasonable steps will be taken to avoid disturbing these sites. This will include the investigation of alternative construction measures near known roost areas that will not cause the bats to abandon the roost
- Where practically feasible, efforts will be made to co-locate the pipeline adjacent to existing cleared areas to minimise fragmentation and reduction of core habitat within remnant communities
- Prior to the commencement of construction clearing, the limits of clearing will be clearly marked out by a suitably qualified and experienced EO. Barricade webbing or
similar should be used for temporary ‘No Go’ zones (where bats are found to be occupying tree hollows and loose bark, these areas should be barricaded off for 48hrs or until the animal has moved on naturally)

- Wherever practicable, signage will be erected to increase awareness of the bat and their roosts in the area
- Prior to site entry, all site personnel will be appropriately trained and made aware of the sensitive environs in which they will be working (refer Part 1, Section 7.7)

13.7.2 Construction phase mitigation measures

Measures to avoid impact

- Vehicle and pedestrian access to and from the GTP ROW will be restricted to the defined access tracks

Measures to minimise impacts

- All vegetation clearing and/or construction activities will comply with the clearing approval conditions (eg EPBC Act, EP Act, NC Act and other statutory approvals) and be supervised by the relevant EO
- Implementation of the Fauna Handling Procedures (refer Appendix C)
- A licensed and experienced spotter catcher(s) that is able to handle bats will be onsite during all clearing activities and must ensure any injured animals are given to an appropriate wildlife carer group or vet (refer Appendix C). DEHP will be notified within 24 hours of any native animal injuries or deaths. DSEWPaC
- Where habitat trees need to be removed the following measures will be implemented:
  - Non-hollow bearing trees will be removed before hollow-bearing (or potential habitat) trees, allowing fauna an opportunity to self-relocate from the potential habitat trees. This applies in the instance when the fauna cannot be relocated, and it is evident that an animal exists within the trees
  - Habitat trees will be left overnight from the time of the felling of the non-habitat trees nearby
  - Habitat trees will be inspected by a qualified spotter/catcher after at least one night has passed from the time that the surrounding vegetation has been cleared, to determine occupancy
  - In the case of the presence of bird species, the spotter/catcher will encourage the fauna to leave by reasonable means or capture and relocate it in the local environment prior to felling and trimming
  - Hollows identified as containing fauna will be plugged with a suitable material such as a towel, the section removed from the tree and gently lowered to the ground using ropes. Measures will be taken to avoid injuring animals
  - Habitat trees will be felled gently or lowered to the ground (by skilled plant operators), and trees will be left for a short period of time on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees. After this time the spotter catcher will thoroughly check the tree to ensure there are no injured animals
Displaced fauna will then be relocated (within their hollows) to a suitable, previously identified recipient site provided the animal did not sustain any injuries. Any injured animals (native or introduced) are to be taken to receive veterinary attention immediately. Once recovered, animals will be relocated to an area of similar habitat adjoining the project area.

All removed hollows not containing fauna will be in rehabilitation works, unless artificial bat boxes have been put in place.

- Clearing will be conducted in a sequential manner and in a way that directs escaping wildlife away from the clearing activities and into adjacent natural areas.
- Clearing activities will be restricted to the maximum disturbance limits authorised for the GTP footprint activities.
- All clearing activities within identified sensitive areas will be supervised by the relevant EO.
- Where practicable, direct any lighting associated within night works away from sensitive areas or use engineering solutions to limit light spillage. This may include the use of light shades and low lighting being applied to construction areas located adjacent to remnant native vegetation and known habitat areas for this species.
- Avoid the use of barb wire when erecting any project related fencing. Where barb wire fencing is unavoidable the top strand will be high tensile steel (non-barbed wire) to avoid fauna getting caught and tangled in the barbs.
- To minimise impact to potential maternity roosts, avoid the destruction of overhangs, caves and subterranean tunnels by using HDD and/or through micrositing. This includes:
  - Avoiding blasting in and adjacent ridges that contain caves, overhangs or old mine shafts.
  - Avoiding the clearance of vegetation in and around cave structures (avoid destabilisation).
  - Avoiding the alteration of local hydrology of subterranean waters.
- The construction phase component of the LRMP will be implemented.
- Weather permitting, rehabilitation of all areas identified will commence immediately after the pipeline has been lowered in and backfilled (refer LRMP). With the exception of operational constraints, revegetation will be consistent with the plant density, floristic composition and distribution of the adjacent communities.
- Where practically feasible, available hollows (empty) will be relocated into adjacent habitat outside the GTP ROW. The suitability of hollows for relocation will be determined on the basis of advice from a suitably qualified Ecologist or a licensed and experienced fauna handler.
- Potential sightings of the species will be reported to the relevant EO, who will confirm the sightings and record them in a SOCI logbook.
- The EO will record the extent of vegetation being cleared and provide a progressive report to GLNG. The EO Operations. The EO will use this information to ensure compliance with agreed disturbance of ‘general habitat’.
13.7.3 **Operational phase mitigation measures**

**Measures to avoid impact**

- Vehicle and pedestrian access within and along the GTP footprint will be restricted to the defined access tracks

**Measures to minimise impacts**

- Implementation of the Fauna Handling Procedures (refer Appendix C)
- Adopt maintenance measures to minimise potential risk associated with wildfires
- The operational component of the LRMP will be implemented to encourage the re-establishment of ecological communities impacted as a result of construction works. In particular, associated habitat areas for the South-eastern long-eared bat
- The operational phase component of the PWMP will be implemented to minimise the risk of weed and pest animal establishment
- Where necessary, work with the landowner to exclude stock from known habitats to support this species along the GTP footprint

13.7.4 **Decommissioning phase mitigation measures**

**Measures to minimise impacts**

- Implementation of the Fauna Handling Procedures (refer Appendix C)
- A decommissioning plan will be developed by GLNG Operations and provided for approval. The plan will aim to address the requirements of AS2885 and also to ensure environmental harm is avoided, including:
  - The Project area no longer contains hazardous contaminants and is left in stable condition
  - All the above ground infrastructure is removed
  - All areas disturbed by above ground infrastructure are rehabilitated in accordance with the relevant conditions
- For a minimum of five years after the completion of rehabilitation, rehabilitated areas will be monitored on a yearly basis
- The monitoring programme will include:
  - Methods to monitor subsidence and erosion rates at rehabilitated buried transmission pipeline corridors and buried flow lines
  - Monitoring of indicators identified in the LRMP at analogue sites to measure progressive and final rehabilitation success relevant to the final land use(s)
  - Frequency and seasonality of monitoring analogue sites and rehabilitated areas to assess rehabilitation success
  - Identification of the experimental design for analysing analogue and rehabilitated site data including statistical methods of analyses