

3.7 Fauna

3.7.1 Construction

To minimise impacts to fauna, vegetation within the road footprint containing habitat characteristics was cleared in a two-stage process to reduce impacts on fauna. Habitat trees were selected on the basis that they comprised potential shelter sites for vertebrate fauna. Typically this was evident in the form of hollows visible in the tree trunk or branches. All such habitat trees along the alignment were marked and the surrounding trees were cleared to promote the natural relocation of animals.

Before felling, habitat trees were first examined for the presence of any visible fauna. This was done in order to avoid operators felling a tree with vulnerable fauna in the canopy. In the single situation where live fauna were visible in a habitat tree; a mobile boom lift was used to remove the nestling Pied Currawongs from a Forest Red Gum near the Brunswick River. Once felled, habitat trees were inspected as soon as possible. The interior of any visible hollows was examined with a torch and following this, the canopy of the tree was inspected. Very few fauna were discovered in these hollows. Where fauna were detected, they were either captured by hand, or kept in the hollow (by stuffing the entrance with a cloth bag full of cloth bags).



Photograph 3.24 Progressive clearing with habitat trees (marked with 'H' in photo) felled in the presence of a fauna specialist.



Photograph 3.25 Inspecting tree hollows with a cherry-picker for fauna prior to clearing



**Photog
followi**



Photograph 3.27 Inspecting tree hollows with a cherry-picker for fauna prior to clearing

Photos on this page c/- Abigroup)

Table 3.2 Fauna records for the clearing process are as follows:

Date	Tree Species	Scientific Name	dbh (cm.)	Trunk Hollows	Branch Hollows	Fauna	Fate
25/7/05	Flooded Gum	<i>Eucalyptus grandis</i>	55		3	sub-adult carpet python	Survived, released nearby
25/7/05	Blackbutt	<i>Eucalyptus pilularis</i>	106.5		3	fence skink, 2 microbats	Fence skink rescued and released nearby; microbats flew off
1/8/05	Forest Red Gum	<i>E. tereticornis</i>	143		9	4 sugar gliders	Released that night
2/8/05	Forest Red Gum	<i>E. tereticornis</i>	74			6 fence skink, common tree snake, dainty tree frog	All survived, released nearby
8/8/05	Flooded Gum	<i>Eucalyptus grandis</i>	75	1	4	lorikeet eggs	Smashed by the fall
8/8/05	Strangler Fig	<i>Ficus watkinsiana</i>	200	1		dead GH F-fox	Death unrelated to B2Y activities
11/8/05	Blackbutt	<i>Eucalyptus pilularis</i>	80			common brushtail possum	Escaped safely
20/8/05	Tallowwood	<i>E. microcorys</i>	50	1	1	sugar glider group	Released that night
1/9/05	Swamp Oak	<i>Casuarina glauca</i>	30	1		fence skink	Survived, released nearby
29/10/05	Forest Red Gum	<i>E. tereticornis</i>	130	1		3 pied currawong chicks	Rescued and delivered to Billinudgel vet for distribution to a wildlife carer; advanced chicks likely to be successfully rehabilitated

Ospreys

A pair of ospreys, a Threatened species, was nesting in a dead tree at the southern end of the alignment. The tree was old, and leaning at a precarious angle, and exposed by both partial clearing near it for grazing, and the clearing associated with the project. It was subsequently blown over in a storm. A new pole and frame was erected close-by, however no subsequent usage has been observed.

Pied Oystercatcher

A pair of Pied Oystercatchers nested on the construction zone immediately south of the Brunswick River. Following advice from a specialist in this field, the bird and eggs were left in place, and the area was fenced-off leaving as much buffer distance as is practically possible. As a consequence, a successful breeding occurred.

Cane Toads

The construction process resulted in significant amounts of disturbed habitats (particularly sediment traps and basins) which greatly contributed to cane toad breeding and thus cane toad abundance. This is a significantly deleterious factor for local fauna, and is most significant during the first two to three years post-construction. This impact could be minimised by keeping water levels in traps as small as possible, and/or by chemical treatment of the residual water.

For the operational phase, there are planting designs which can be used to preclude cane toads from these structures but still allow native amphibians to utilise them.

Fishing bat

A pre-demolition fauna inspection of the Brunswick River Bridge by the project ecologist identified a roost of approximately 109 micro-bats (*Myotis adversus*) inhabiting the original scuppers of the bridge. *Myotis adversus* (fishing bat) is listed as a threatened species under the *Threatened Species Conservation Act 1995*. A specialist bat ecologist was engaged by the RTA to assist the project team with the translocation of the bat colony prior to bridge demolition. An independent specialist bat ecologist was also engaged by the RTA to undertake a peer review of the translocation methodology.



Photograph 3.28 Removal of fishing bats from scuppers in the old Brunswick River Bridge prior to demolition.



Photograph 3.29 A fishing bat removed from scuppers in old Brunswick River Bridge prior to demolition.

Habitat Boxes

A program of habitat box construction was initiated with the project Community Liaison Group, to assist in offsetting the removal of habitat along the Upgrade alignment. Funding for this component of the project came from the Natural Resources Advisory Council and Forging Partnerships Program.

3.7.2 Operation

Underpasses

A study (Taylor DT and Goldingay RL 2003) used sand-strip surveys to investigate wildlife usage of nine purpose-built culverts along the existing bypass in 2000. It revealed that:

Surveys during two eight-day periods in spring and summer 2000 found 1,202 traverses by wildlife through the culverts. Frequent culvert users were bandicoots (25% of traverses), rats (25%), wallabies (13%) and cane toads (14%). All culverts were used by these species, suggesting that at least several individuals of each species were involved. Infrequent users (each <2% of crossings) were possums, echidnas, lizards, birds, and introduced carnivores. A koala was recorded crossing on two occasions. The

long-nosed potoroo was observed in the surrounding habitat but was not confirmed traversing the culverts. Surveys for road-kills on this road section suggest that the exclusion fence bordering the highway prevented mammal road-kills and channeled mammals to the culverts. A single survey on a wet night found many frogs crossing the road surface and many were killed. This study confirms that culverts and exclusion fencing facilitate safe passage across a road for a range of wildlife species. This suggests that this form of management response to extensive road mortality of wildlife is appropriate and should be adopted more widely. However, this form of mitigation is not effective for frogs.

As a consequence of the known use by many species of these structures, a further fifteen fauna underpasses were required to be constructed in accordance with the NPWS Concurrence Report for the modified project. These included combined drainage and fauna passages and dedicated fauna underpasses for terrestrial fauna and fish, and dedicated fauna passages associated with the major river crossings.

In one particular dedicated fauna underpass structure, located at the northern end of the project, timber logs have been included into this structure to further enhance its potential usage. The project ecologist was unable to provide more information on the reinstatement of hollows identified during clearing for this purpose.

A local naturalist performed monitoring of usage by fauna of some of the pre-existing fauna underpasses. The results for monitoring using a sand-strip near the western entrance of each respective culvert indicated usage by bandicoot, rodent, wallaby, brushtail possum, ringtail possum, goanna, lizard, bird, cane toad, fox, echidna, and snake.

Monitoring of the Upgrade is proposed for February 2009.

Fishing Bats

Activity levels at the Brunswick River Bridge were consistent over the monitoring period from May 2007 to date. On average, fewer than 80 *M. adversus* bat passes per night were recorded on each Anabat during the summer monitoring surveys. In contrast, during March and April 2007 and at other actively used sites such as Federation Bridge and Orana Bridge, bat passes per night were in the order of several hundred.

Whilst there is activity in the vicinity of the Brunswick River Bridges, they are not used as a roost. In contrast, there is roosting at the new Marshalls Creek

More than 50 fishing bats were discovered roosting in Federation Bridge, Mullumbimby. Other bat species recorded at Federation Bridge include those of the Eastern Freetail Bat, the threatened Common and Little Bentwing Bats (*Miniopterus scheriberseii oceanensis* and *Miniopterus australis*), the Eastern Horsehoe Bat (*Rhinolophus megaphyllus*), White-striped Freetail Bat, Gould's Wattled Bat and the Eastern Forest Bat (*Vespadelus pumilus*).

Anabat call records from Orana Bridge produced the greatest number of microbat species in any of the locations that have been surveyed and monitored in the Brunswick River catchment to date. In addition to the species recorded at Federation and the Brunswick River Bridges, the

Orana Bridge site is also visited by two other threatened species – Eastern Freetail Bat (*Mormopterus norfolkensis*) and the Yellow-bellied Sheath-tail-Bat (*Saccolaimus flaviventrus*).

The Pacific Highway crossing of Marshalls Creek has three bridges each containing two lanes of traffic. Anabat recordings taken from beneath the southern abutment of the local access road on 7th May 2008 indicate moderate levels of microbat activity at this location. Over 100 bat passes were recorded, with 64% identified as *M. adversus*. Activity patterns clearly show the emergence and return of *M. adversus* to roost, as well as a significant number of Eastern Horseshoe Bat calls indicating use of the abutment as a foraging area and feeding perch (Photograph 3.29.).

Consequently it is concluded that the loss of habitat associated with the demolition of the Brunswick River bridge may have been, at least partially, compensated by the new bridges at Marshalls Creek, however it is too early in the study to be conclusive. The additional research funded by the RTA has revealed that the road bridges provide roosts for a large number of individuals and species of micro-bat.



Figure 3.30 The Pacific Highway Road Bridge over Marshalls Creek, Billinudgel, local access road as viewed from the eastern edge of the southern abutment.

3.7.3 Learnings

Hollows

Logs and hollows were salvaged during the clearing stage. The project ecologist advises that he does not know whether these were subsequently stored and reused during the landscaping phase. The initial report on monitoring the use of fauna boxes erected on the alignment, notes the extensive use by a variety of species which would otherwise be precluded from the area.

The high value of the salvageable hollows needs to be recognised, and care exercised in the early stages to recover, appropriately store, and relocate them to adjacent habitat. The significant cost associated with this process also needs to be factored in the project design and construction phases.

Bats

The RTA has taken on a number of learnings from the Upgrade, and is now applying these to other projects. This includes a practice note to inform RTA staff of bridge and structure work activities that may impact upon bats roosting in these structures, and to provide procedures and guidance for minimising these impacts. It targets RTA staff involved in the various stages of bridge and structure construction, maintenance, and demolition activities that may inadvertently impact upon bats. It seeks to address the frequent problem of discovering bats during or immediately before commencement of works and the resulting delays and potential harm to microchiropteran bats (microbats). The practice note is still in draft form, and not yet for public release.

Underpass Design

Where possible, underpasses need to be designed for the specific fauna being targeted. Wet underpasses will favour fish, platypus, and water rat, and exclude other species. Some fauna are ambivalent, whilst others need dry crossings. Similarly dark tunnels would suit nocturnal species and not others. A pool at the end of the crossing will also advantage some fauna over others.

There is still a lot of work to be undertaken to gain sufficient knowledge to meet the needs of specific fauna. Further, detailed knowledge of the fauna in the affected area needs to be gained before any design can be recommended.

Cane Toads

Sediment basins greatly contribute to cane toad breeding with a significantly deleterious impact upon local fauna. These need to be planted out with vegetation and physical barriers which prevent the toads accessing the water.

This impact needs to be recognised in the planning (environmental assessment) stage and be addressed during the design phase with solutions for the construction and operational phases.

Byron Shire Council has recently been working with local golf course owners to address this issue on their dams.