Transport Sustainability
Case study

Protecting microbat habitat

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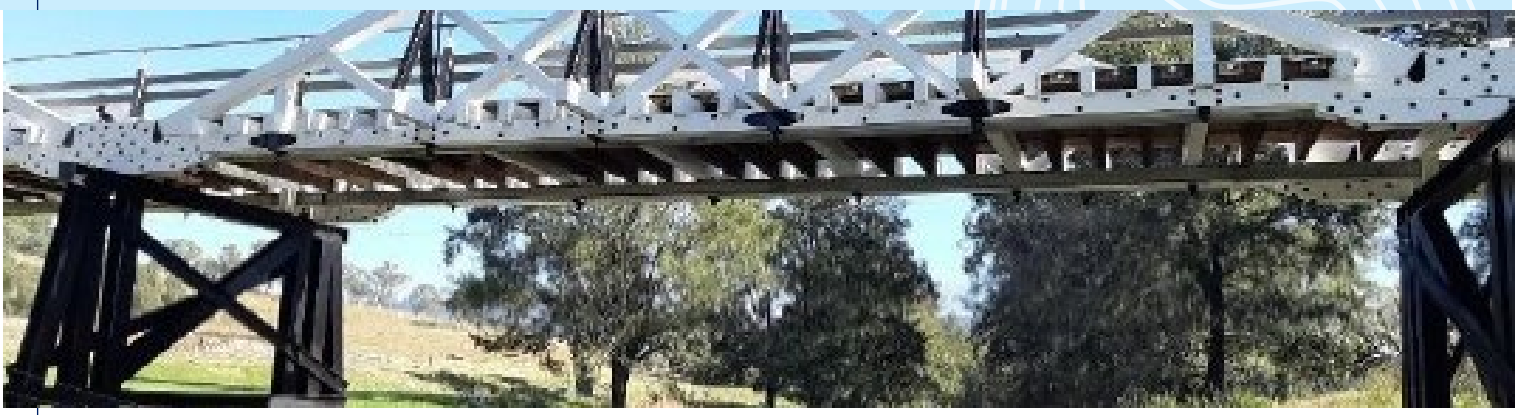

Through Transport's extensive network of road and rail infrastructure, we are responsible for creating structures which become habitats for a diverse range of native fauna, including the microbat.

Across Transport we are developing innovative solutions to create habitats for microbat species within new bridge structures. These design modifications are an improvement on the installation of timber boxes, which can deteriorate over time and can also be dislodged. Ongoing microbat tracking and reviews prove the innovative habitats are continuing to be used well beyond completion of the infrastructure project.

Key achievements

- Transport for NSW is responsible for a network of public roads and rail which traverse the breadth and length of the state. As our infrastructure network continues to grow and improve, it is crucial we are building and operating infrastructure which has the least possible impact on biodiversity.
- Observations confirm colonies of microbats use timber and concrete structures for their habitat. Transport is critically aware that any operations carried out on these bridges must take into account the vital role they play as microbat habitat and ensure minimal disruption to the animals. Our Microbat Management Guideline ensures their protection across our diverse range of structures.

Alignment to sustainability commitments and strategies

Sustainability focus areas	Transport strategies
Protect and enhance biodiversity	Connecting to the future – Our 10 Year Blueprint Transport Sustainability Plan

Check out our Microbat Management Guideline for ways we are protecting microbat habitat.

Learn more about our commitments and achievements on our sustainability website.

NSW GOVERNMENT

Our state's truss bridge heritage

Across NSW, 63 timber truss bridges, constructed between the 1860s and 1936, remain standing and of these, 48 bridges are managed by Transport. The bridges are an important element of the state's heritage, and 29 of the bridges are currently listed on the State Heritage Register (Roads and Maritime, 2012).

Transport, with the assistance of the NSW Heritage Council, developed The Timber Truss Bridge Strategy to identify bridges which need to be conserved and/or replaced due to operational limitations. This case study looks at one bridge which required conservation-focused upgrading and another which had to be replaced.

63 historical timber truss bridges remain standing

Protect and enhance biodiversity

Mighty Microbats

All bats play an important role in Australia's environment, providing beneficial services which support the overall health of various ecosystems. The abundant diversity of the dietary needs of bats varies across species and can range from insects and small vertebrates, fish and insects, to species which feed on fruit, nectar and pollen.

Microbats play a particularly important role in controlling insect numbers. They can consume up to 40 percent of their body weight in insects each night including a variety of pest species as well as disease carrying mosquitoes.

Microbats such as the Southern Myotis, Large Bent-winged Bat and Little Bent-winged Bat are known to use a variety of structures for nesting purposes, including the underside of timber truss bridges. It is imperative in any operational, maintenance, upgrade and/or refurbishment projects the structure is treated as their habitat and managed accordingly.

Figure 1: Southern Myotis microbat

Microbats play a particular important role in controlling insect numbers

Monkerai Bridge upgrade

Figure 2: Monkerai bridge

Monkerai Bridge is a heritage-listed timber bridge which closed to traffic in 2004 and underwent a full refurbishment that was completed and reopened to traffic in May 2020.

Prior to the upgrade, the 140-year-old bridge's timber decking was highly deteriorated, which allowed light and rain to penetrate, making it less suitable for microbat colonies. Despite this, a number of colonies had made it their home.

As part of our preconstruction Environmental Impact Assessment, an inspection of the bridge identified a small colony of Southern Myotis microbats roosting in a decayed hole in one of the timber beams on the bridge. As a result, a Microbat Management Plan was developed for the project, which required several temporary timber bat boxes to be installed in nearby vegetation. These temporary structures provided supplementary habitat and enabled the relocation of the microbats that were roosting in the bridge.

Within the upgrade, the bridge's new cross girders contained two trial microbat habitat features, to determine their suitability for permanent habitat replacement. A number of holes and 150mm deep recesses were drilled in the girders under the bridge to create homes for the microbats. Alterations can be made to the girders under the bridges to accommodate the microbat colonies without compromising the heritage significance of the structure.

An inspection during the summer breeding period observed the microbats were utilising the new habitats created under the bridge structure. The final microbat monitoring event took place in April 2022 and showed evidence of a resident population of Southern Myotis in one of the trial habitat features and indications the species is highly likely to be breeding in the structure.

The success of the temporary relocation and establishment of permanent new habitat is evidence of the suitability of this unique new design concept. While timber bat boxes still represent effective short-term habitat replacement during construction, integrating permanent habitat into a new bridge structure provides long-term habitat.

Figure 3: Deep recesses were drilled in the girders under the bridge

Barrington Bridge replacement

Figure 4: Microbats in concrete crevices

During the development of the Timber Truss Bridge Strategy the Barrington Bridge was identified as needing to be replaced. The study showed it did not meet emerging load requirements, could not be upgraded to meet current loading standards and was expensive to maintain. Construction of a new bridge over the Barrington River was proposed.

Figure 5: Relocated timber bat box

The Barrington Bridge project required, arguably, the most complicated microbat management plan developed to date. The plan was required to manage the impact of the bridge replacement on an established breeding population of the threatened Southern Myotis microbat population, located under the existing bridge. It was imperative the colony be monitored continuously, to ensure the population was protected and was happy to continue occupation in the replacement habitats.

The comprehensive management plan included very specific staging of construction and bridge removal works to ensure works were scheduled outside of Southern Myotis breeding season.

The Southern Myotis colony was managed by providing a temporary habitat while the original habitat was blocked off. The temporary habitat was designed so it could later be moved, with the bats inside, to their new home.

The microbat management plan was the most complicated developed to date.

Continuing our commitment to innovation, the microbat habitat was built within the structure of the bridge.

Continuing our commitment to innovation, instead of adding an external structure to the bridge post construction, the microbat habitat was built within the structure of the bridge pre concrete pour. This methodology created a long-term habitat for the microbats, ensuring the ongoing health of the colony. On completion, microbats were found to be using the habitat and the population was larger than what was observed prior to the commencement of works.

Figure 6: Microbat habitat was built within the structure of the bridge

A recent survey undertaken within the summer breeding period observed healthy occupation of the habitat two years after the completion of construction. To further improve our understanding of which supplementary habitat type this species preferred, Transport engaged a microbat specialist to undertake a targeted tracking project of the bats. Using small radio-tracking transmitters attached to the backs of 10 Southern Myotis microbats we can understand the type of habits they frequented, and this information will help inform other projects and their bat management plans.

The overall outcomes prove this project was a great success, and the site is currently undergoing the last of the landscaping works.

Construction of the new bridge was finalised in June 2020, with removal of the timber truss bridge completed in early 2022