

# Fauna monitoring data

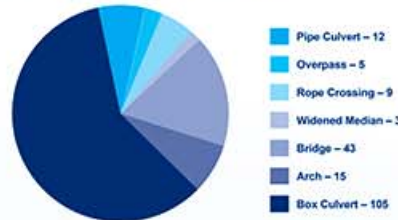
## Pacific Highway Upgrade



As part of the Pacific Highway upgrade, Roads and Maritime Services has commissioned a large number of fauna monitoring surveys in order to gain an understanding of what species are using our connectivity structures. This informs the measures that we use in future highway upgrade projects.

The data presented here is a compilation of results from over 14 years, representing 32 separate reports and equates to 192 different monitoring events. The monitoring period ranged from a minimum of five days to two years and tended to be seasonal in nature. The majority of monitoring was carried out within one year of construction completion.

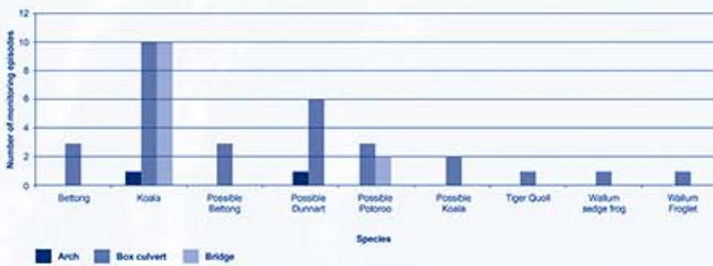
Number of Monitoring Episodes by Structure Type



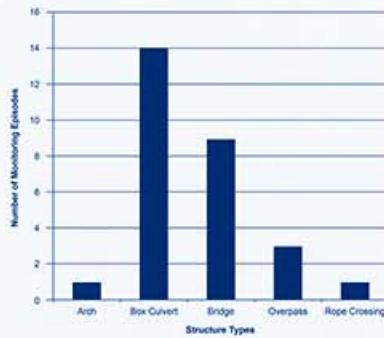
The chart summarises the number of monitoring episodes conducted for each structure type for the 32 monitoring reports reviewed. Culvert underpass monitoring included both dedicated and combined drainage structures. The type of monitoring method used varied and consists of sand trays placed at entry/exit point and/or within culverts, motion sensor and/or infrared cameras, hair tubes or a combination of the methods.

The graph highlights the types of different threatened species recorded in various types of underpass structure. Monitoring carried out to date has not recorded any threatened species using pipe culverts, further research is ongoing in this area, particularly in relation to threatened frog species. The results only indicate a use of a structure by fauna rather than a record of the number of times a particular species used a structure.

Threatened Species Recorded in Underpass Structures



### FROGS AND UNDERPASS STRUCTURES



The graph shows frogs recorded within or using connectivity structures.

Frogs have been observed using 'stepping stones' within a culvert and tadpoles were also observed in the low-flow channels of combined underpass structures possibly indicating breeding activity.

The methods used to detect frogs included sand trays, pit traps and more recently motion sensor cameras. Not all records were able to confirm a complete passage, however, some data collection confirmed that frogs did make a complete passage in some culverts but it was not possible to classify to species level.

### MOTION SENSOR DATA



More recently, motion sensor cameras have been installed to monitor fauna usage. This provides visual identification of the different species using the structures and whether they complete a successful passage. Data has shown that the length of an underpass or culvert can influence the number of successful complete crossings. The typical length of culverts/underpasses monitored ranged from 40 to 55 metres. The length of culverts was not recorded for all monitoring episodes, however, the confirmed successful passages of koalas in culverts 1.2 metres high where generally less than 40 metres in length. Nonetheless data collected as part of the Australian Museum Business Services (AMBS) koala research at Bonville did record passage of koalas on culvert lengths exceeding 80 metres.

### DESIGN IMPROVEMENTS TO FAUNA CONNECTIVITY MEASURES



The Karuah Bypass was the first time that trees were used to create a retained median on the highway. However, the width of the median was too small to sustain the trees and they were later removed and replaced with rope bridges. Vegetated highway medians were later designed at about 20 metres wide to allow for adequate soil moisture depth and have been successfully implemented in subsequent upgrade projects, such as the Bonville upgrade.

Post-construction monitoring at Karuah has since shown that the threatened squirrel glider, common sugar gliders and possums have used the rope bridges installed in place of the vegetated median.

### FAUNA UNDERPASS DESIGN PROGRESS



The first generation underpass structures along the Pacific Highway were built in the early 2000's. The cross support structure resulted in obstructing the fauna passage.

The more recent fauna underpass structures recognise the importance of a clear passage either side of the underpass and avoids the use of cross supports within the structure.

Combined underpasses are now regularly used which provides for fish and terrestrial fauna crossing. Installing culverts 200mm below bed level provides opportunity for fish passage.