

- Abstract:
- Over three hundred native Australian vertebrates use hollows in eucalypts for shelter, including at least 43 insectivorous bat species, which use them as maternity, bachelor, migrating, mating or hibernation sites. Hollow formation in eucalypts is a long process that may take place over several hundred years, making habitat trees a valuable resource for hollow-dependent species. However decisions may have to be made concerning the protection or removal of habitat trees, particularly where they occur in State Forests or urban parks. Unfortunately, limited understanding of the structure of networks of habitat trees prevents informed judgment concerning the importance of individual trees. We applied current network theory to the patterns of day-roost usage of a population of the white-striped freetail bat, *Tadarida australis* (Microchiroptera: Molossidae), in suburban Brisbane. The roost network topology resembled a scale-free network where one roost (the hub) had the majority of connections. This roost network also enabled small-world properties such as high connectivity, short path lengths between roosts and tolerance against stochastic events, such as roost removals. Understanding the network type allows conservation practices to move from descriptive ecology to predictive understanding of complex ecological networks. Ecologists can model the effects of stochastic events or systematic attacks, and apply the appropriate protection for each system. Efficient allocation of resources to conservation planning and management would emphasise the differential importance of roost sites; analogous to protecting vital communication and service centers in human societies.