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Bats by the Sea

Protecting Australia's coastal sheath-tailed bat

Maree Cali



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Maree Cali presented the results of this excellent study at the 2010 Australasian Bat Society Conference in Darwin, Australia, last summer. The paper received the Bat Conservation International Prize as the best conservation report of the conference. Through extremely strenuous fieldwork and outstanding analyses, Cali and her colleagues gathered essential data on this vulnerable bat species and documented its conservation requirements. They took this new knowledge through government channels to help protect vital habitat for one of Australia's unique bat species.

Australian Biologist Greg Richards

Scrambling along rocky shorelines between sea cliffs and the incoming tide, àœcommando crawlingàœ through boulder piles and dodging waves to skip from boats onto slippery rocks are all in a day's work when searching for roosting sites of Australia's elusive coastal sheath-tailed bat.

This cave-dwelling bat (*Taphozous australis*) is found only in a narrow strip of Australia's northeastern coast and islands, along with scattered reports from the southern coast of Papua New Guinea, about 100 miles (160 kilometers) distant. The species is listed as vulnerable at the state level and as near-threatened by the IUCN (International Union for Conservation of Nature). Its total population is believed to be declining.

The coastal sheath-tailed bat is relatively large for a cave-dwelling bat with a wingspan of roughly 15.5 inches (39.5 centimeters) and an average head-and-body length of 2.75 inches (7 centimeters). It has a foxlike head with soft gray-brown fur. Males have a distinctive throat pouch, while females have a rudimentary pouch. When roosting, these bats are readily identified by the unusual, spiderlike way they cling to cave walls with both feet and thumbs.

Previous observations suggest the coastal sheath-tailed bat is a rather solitary animal, with colonies that normally range from 2 to 25 individuals, although as many as 100 have been reported historically. Known roosts, all within a few miles of the coastline, are primarily in sea caves (formed by wave action) or abandoned mines. These bats typically forage high above the canopy for flying insects.

Despite periodic reports and observations, no systematic research had ever targeted coastal sheath-tailed bats until we began our study about two years ago to produce habitat maps for the species. A team of scientists, conservation officers, rangers and volunteers surveyed potential cave roosts along the tropical eastern coast of Queensland and radiotracked individual bats to document the roosting and foraging needs of this unique species. I coordinated the project along with Conservation Officer Tina Ball and Resource Ranger Eddie Adams. All of us are with the Queensland Department of Environment and Resource Management. Funding for transmitters, as well as input from experienced scientists, was provided through Reef Catchments Mackay Whitsunday Incorporated.

The information we gathered was used to begin mapping the coastal sheath-tailed bat's habitat, including how far inland they travel to forage. The results are being used to plan and execute conservation action for the species, and our data will provide a vital tool for protecting the bat's habitat under Queensland's Vegetation Management Act.

We surveyed sea caves, boulder piles and rock fissures along the coastline and islands for use by coastal sheath-tailed bats and also visited inland caves to confirm that the bats roosted only on the coast.

Confirming the presence of coastal sheath-tailed bats required us to capture and examine individuals from each colony we discovered, since a related species, the common sheath-tailed bat (*Taphozous georgianus*), was also found in the area. Along with body measurements, the presence of a distinctive throat pouch only in *T. australis* provided a quick way to separate species. At a few sites, we were unable to capture any bats in our mist nets, although we did obtain photos that clearly showed the throat pouch.

Of the 15 coastal sheath-tailed bat roosts found in the study, all were within yards (meters) of the high-tide line and were often partly underwater at high tide. Almost all the roosts had more than one entrance.

Although temperature loggers were not used, roost sites were noticeably lower in humidity and temperature than those inhabited by common sheath-tailed bats. It was especially pleasant on humid summer days to sit in *T. australis* roosts with a fresh sea breeze blowing through the cave.

Determining the bat's foraging range proved more difficult. The bat's high-altitude feeding patterns made it impossible to trap them within their foraging habitat, so we tried using bat detectors to collect echolocation calls. With support from Reef Catchments Mackay Whitsunday Inc., we were able to enlist the echolocation and radiotracking expertise of Roger Coles and Bruce Thomson. We recorded and analyzed calls from both common and coastal sheath-tailed bats, only to discover that they are too similar to reliably distinguish one from the other.

We moved on to radiotracking. We obtained miniature \hat{A} -radiotransmitters and chose three colonies that were reasonably accessible and about evenly spread throughout our study area. We established a stationary base station and used mobile antennas to track up to three bats at a time for three to ten nights, depending on how long the transmitters remained glued to the bat. A total of seven bats were tracked during the summer at one site, fall at another and winter at a third.

Our radiotagged bats foraged within just two miles (3 kilometers) of the coast. The longest distance traveled within that range was less than 10 miles (15 kilometers) from the roost.

During one observation at a floodlit area adjacent to mangroves, several bats, including one with a transmitter, dropped rapidly from a height of about 100 feet (30 meters) above the lights to almost level with them, then again climbing, dropping and swooping in a lovely figure-eight pattern. They continued this behavior for some time above and between two floodlights. The bats spent most of their time foraging over mangrove, eucalypt, melaleuca and rainforest communities on the lowlands and along the lower slopes of hills.

Foraging above mangroves appeared to be a nightly activity. At two of the sites, the mangrove forest closest to the roost was the first habitat visited on most nights. But other

than that, the radiotracked bats did not forage together and usually flew off in different directions.

In the summer and fall, bats would return to the roost individually after foraging for a couple of hours. Less than an hour after returning, individuals would once again leave to forage for about two hours, then return again to the roost. That forage-and-return process was usually repeated a third time before dawn. That pattern was similar for virtually all the bats, but the timing of resting and foraging periods varied sharply, with bats coming and going at different times.

The results of our two-year study were used, with geographical information system (GIS) mapping, to create a robust computer model of known and probable habitat for coastal sheath-tailed bats within the Central Queensland Coast Bioregion. In this way, we calculated not only the required roosting habitat, but also the foraging areas each colony likely requires.

This model essentially calculates the complete habitat needs for conservation of the whole population of the region.

Based on our research, we designated all remnant vegetation within a buffer zone of 1.9 miles (3 kilometers) inland and 9.5 miles (15 kilometers) north and south of each known roost site as known habitat.

We used physical shoreline mapping of the Queensland coast and islands of the Great Barrier Reef Lagoon to identify potential roosting sites “ cliff lines, boulder fields and rock ramps ” then factored in the buffer and foraging distances to select possible habitat.

We hope this wealth of new information can be used to legislate protection for these bats through appropriate regulation of development along this stretch of coastline. Similar habitat-mapping projects are urgently needed throughout the range of this intriguing bat species in North Queensland.

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