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Flying Foxes in Melanesia: Populations at Risk
Small populations on islands have unique conservation problems--
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Small populations on islands have unique conservation problems--

by T.F. Flannery

Island flying foxes are at particularly high risk of extinction. With their restricted distributions and small population sizes, they face a series of complex problems. Although the major threat to Pacific island flying fox populations is unregulated hunting for commercial trade, many additional threats add up to a serious background risk. During extensive faunal surveys in Papua New Guinea and the Solomon Islands, I observed some of these other processes that have caused changes in the status of several flying fox species and populations.

Effects of modernization

Bulmer's fruit bat *(Aproteles bulmerae)* was unique to the mountains of New Guinea. It was a large cavedwelling species that was first described from 12,000 year old fossil remains discovered in ancient human garbage. Found in an area densely populated with humans, the bat appears to have been hunted to extinction locally. In 1975, however, several live individuals were collected by native hunters from a huge cave called Luplupwintem in the sparsely populated western region of Papua New Guinea.

Luplupwintem is an enormous, vertical-sided cave near the edge of a large escarpment. At an altitude of 7,500 feet, this cathedral-like cavern, with its virtually unclimbable walls, was accessible only to the most daring of traditional hunters in times past. Furthermore, even if they reached the cave, arrows were of little use in procuring large numbers of bats for human consumption since the bats were roosting at such a great height. This difficulty of access, com bined with some of the lowest human population densities in New Guinea, appears to have allowed Bulmer's fruit bat to survive at this one location.

The situation changed in 1975 when a mining company took an interest in copper and gold-bearing deposits discovered on a nearby mountain. The cash earned by members of the indigenous Wopkaimin tribe in the early days of mineral exploration allowed them to purchase shotguns and nylon rope. For the first time, Luplupwintem could be easily entered and many hundreds of bats killed on a single trip. The bats were abundant in the cave when first dis covered, but on a visit in 1977, only two were seen circling near the roost. A subsequent trip ten years later revealed that the cave had long been deserted. The intense harvesting destroyed the Bulmer's fruit bat population in a very short time. Since Luplupwintem was the only known roost of this unique cave-dwelling bat, the species must now be considered extinct.

Although Bulmer's fruit bat may have been unusually vulnerable to human predation, continued disturbance in any bat roost may prove highly detrimental. The intrusion of 20th century technology and culture is making such disturbance ever more common throughout Melanesia, and other species may follow Bulmer's fruit bat to extinction if disturbance levels become sufficiently high.

Catastrophic diseases
Flying foxes can also be threatened by humans in other ways than hunting and disturbance at their roosts. The Bismarck flying fox *(P. neohibernicus)* is the largest bat to be found in Melanesia, with weights of over three pounds (1.5 kilos) being recorded. *P. n. hilli,* a distinctive subspecies, is unique to the Admiralty Islands north of the New Guinean mainland. I visited Manus Island, the largest of the Admiralty Islands, in June 1988, and knowing how abundant Bismarck flying foxes could be elsewhere, I expected to encounter them commonly. During a week of searching in central Manus, not a single Bismarck flying fox was found, but the smaller Admiralty flying fox (P. *admiraltatum)* was abundant.

Based upon information from local people and national government employees, the following account of the decline of the Bismarck flying fox throughout Manus was compiled. During 1985, many Bismarck flying foxes were found dead and dying from disease under large and well-known roosts. The deaths occurred throughout the entire island over a period of a few weeks, and afterward no large flying foxes were seen for several years. Just before the time of our expedition three years later, several hunters reported having seen an occasional large flying fox, suggesting that the entire population had not been wiped out. Some carcasses had been retained by local officials, but unfortunately they deteriorated before they could be examined.

A similar epidemic was reported on the islands of Bougainville and Buka in the northern Solomons in 1987. In this case, the dead bats were largely or entirely Rayner's flying fox *(P. rayneri grandis). I* suspect that a similar disease decimated the Bismarck flying fox population on Manus two years before. It is noteworthy that the Bismarck flying fox populations on New Ireland and New Britain, which lie between Manus and Bougainville, were examined by us in 1988 and 1989 and have suffered no such decline.

As far as I can ascertain, the bat epidemics on Manus and Bougainville in 1985 and 1987 are unprecedented. The high fatality rate and exceptional nature of these epidemics suggests that the organism responsible is not endemic within the bat populations, and indeed may have been newly introduced into these populations by domestic animals. Additional research is needed to fully understand these events.

Habitat destruction from cyclones
In addition to the threats introduced by humans, flying foxes on small islands are also vulnerable to natural occurrences. For nearly a week in 1986, Malaita, an island in the southern end of the Solomon Islands, was pounded by Cyclone Namu, causing a significant loss of human life. During the cyclone's passage over the southern islands, considerable damage was done; land slides bared large areas, and vast tracts of forest were stripped of leaves and fruit. I visited the Sinalaggu Harbor of Malaita's east coast in December 1987, where I was shown hundreds of lower jaw bones of flying foxes. They had all been collected in the few months following the cyclone; many were from bats found foraging on the ground or dying of starvation. The great majority of the bones represented Rayner's flying fox, but a few were from the Tongan flying fox *(P. tonganus).*

Despite a high mortality following the cyclone, numbers of Rayner's flying foxes recovered substantially within 18 months. This was based on observations of their numbers around flowering Malay apple (Siz*ygium* sp.) trees. Thus, the effects of Cyclone Namu, which in human terms was one of the most severe cyclones to have hit the Solomons in recent times, did not appear to cause long-term damage to flying fox populations.

Interacting threats
These three examples illustrate some of the many factors that influence bat populations in the Pacific. Modernization usually means easier access to bat habitats, leading to more efficient means of habitat destruction and hunting. The clearing of forests for development is widespread in the Pacific and effectively reduces the already small populations, adding to the threat. The complex nature of flying fox conservation in the Pacific is especially evident when the threats are compounded: if a small island's bat population is further reduced by deforestation or over-hunting, then hit with a cyclone or an epidemic, the population may never recover.

For some species it is already too late, but many more can be saved if their needs are promptly addressed. Research and management initiatives are urgently needed throughout the Pacific.

(bio)
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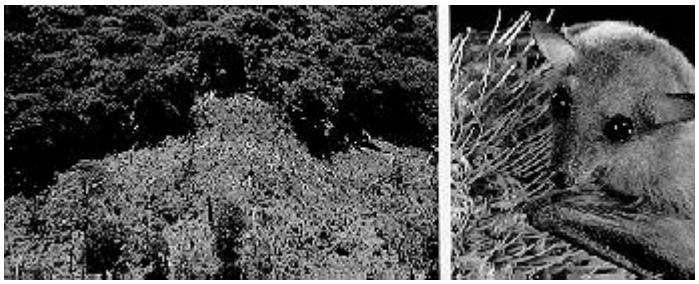
Cave bats are particularly vulnerable to hunters on many islands I the Pacific. Consequently, some populations, and at least one species (Bulmer's flying fox), are now extinct. PHOTO BY MERLIN D. TUTTLE



Cyclones and deforestation (left) are only two of the threats to Pacific island flying foxes. A major threat is over-hunting for human food. Even the smallest flying foxes (right), such as

this blossom bat (Syconycteris australis), are at risk. PHOTOS BY MERLIN D. TUTTLE

Tongan flying foxes are still the most widespread of Pacific island flying foxes, but some populations on small islands have been decimated. They recently were protected under the CITES treaty. PHOTO BY MERLIN D. TUTTLE

All articles in this issue:

- ON THE COVER. 1989-90
- Landmark Legislation to Protect Flying Foxes
- BCI to Host Pacific Island Flying Fox Conference
- Flying Foxes in Melanesia: Populations at Risk
- The Bats of Israel Yesterday and Today. 1989-90
- The Workshop Experience: Learning to Study Bats
- Spanish Educational Materials Available for Latin America
- Colossal Cave A Year Later
- Help for Little Brown Bats
- BCI Members Get Involved in 1989
- Help Celebrate Bats on Earth Day's 20-Year Anniversary!
- Happy New Year from the BCI Staff