

## **Demise of the Polynesian Sheath-tailed Bat *Emballonura semicaudata* in Samoa**

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**Abstract**—A search of 41 lava tube caves during 1994-97 in Samoa revealed only two caves containing five Polynesian Sheath-tailed Bats. At least five other caves showed signs of previous bat occupation, and several caves have historical records of large numbers of sheath-tailed bats. The suggested causes for the decline to the verge of extinction in decreasing order of significance are Cyclones Val & Ofa, agro-deforestation, and use of pesticides.

The Polynesian Sheath-tailed Bat *Emballonura semicaudata* used to be common in Fiji (pers. obs. 1970's), Samoa (Ollier et al. 1979), American Samoa, (Amerson et al. 1982, Grant et al. 1994), the Marianas (Perez 1972), and Palau (Bruner & Pratt 1979). However, its decline and probable extinction on some islands has already been reported in the Marianas (Bruner & Pratt 1979, Lemke 1986), and American Samoa (Grant et al. 1994). In 1995 Holly Freifeld of the American Samoa Dept. of Marine and Wildlife resources visited the Fijian caves I had worked in and found very few Sheath-tailed Bats remaining. (pers comm.). The Sheath-tailed Bat has apparently died out on Rota (Lemke 1986, Steadman 1992), but is possibly still common on Palau (Bruner & Pratt 1979, Wiles in Grant et al. 1994). The frequent inclusion of Vanuatu in the range of this species was based on just one specimen which is now thought to have come from Fiji (Flannery 1995), thus the actual status of the species is much more restricted and less common than previously believed.

From 1994-1997 I lived in Samoa and during this time I located and searched 41 larva caves for White-rumped Swiftlets *Aerodramus spodiopygius* and Sheath-tailed Bats. Old and experienced Samoans know the Sheath-tailed Bat as *Tagiti*. However, many Samoans do not distinguish it from the White-rumped Swiftlet and so they call both the bat and the bird Pe'a pe'a, though a few sometimes call the bat Pe'a vai, and the bird Pe'a pe'a.

Ollier et al. (1979) found that the Sheath-tailed Bat bred and slept in Pe'a pe'a Cave in the Afuiva Valley of O le Pupu pue National Park, Upolu. They estimated several thousand to be present on 4 Sept. 1978. Soon after this (29 Jun 1982), Tim Lovegrove (pers. comm.) was taken to the cave by the ranger Kalati Poai and he estimated many hundreds of the Sheath-tailed Bat still present. Rod Hay (Park et al. 1992) confirmed they were still there in 1983.

These bats had been common on Upolu for a long time. R. H. Beck, a renowned American Museum collector, was on Upolu 23-29 April 1924. He visited a cave while staying at the Malolelei Rest House six miles inland from Apia and at an elevation of 1800 feet. In this long lava tunnel he described some swift nests being close to hanging bats, which had deposited lots of guano. Some of the bats left the cave and flew along the stream that flows into the cave. From this description I believe this cave is one of the 37 caves I found to be occupied by swiftlets and one I visited 10 times. I call it the Tiapapata cave for it is just beyond Tiapapata on the edge of the Afiamalu Plateau.

It is reasonable to assume that this cave was also visited by Reed, an Australian naturalist that Aggie Grey sometimes spoke about (Eustis 1979). He told Grey that in a 2 mile long cave near Lake Lanoto'o he trudged knee deep through pure bat guano. Moe, the man who first showed me the cave, used to visit it prior to the two large cyclones of 1990/1 for the purpose of collecting guano for his garden. The presence of this amount of guano also indicates a large bat and/or bird population up until that time.

When I arrived in Samoa in January 1994 David Butler and Tony Robinson of the Environment and Conservation Department, Apia, alerted me to the apparent decline of insectivorous bats in Samoa. As I was intent on locating as many caves as possible containing nesting swiftlets I decided to also look for Sheath-tailed Bats. It did not take me long to locate and visit the cave in O le Pupu-pue National Park (for that is the only one that most local people are aware of). In all I visited it three times, (6 Mar. 1994, 31 Mar. 1994, 14 Oct. 1996) and although the swiftlet numbers built from nine pairs to 72 pairs over that time, I never saw or heard one Sheath-tailed bat. They were extinct in that cave. On 30 March 1994 David Butler located four insect bats alongside the sea cliffs at Vavau, Upolu, but further searching failed to locate their roost site or any further bats.

Further success came when I located Tiapapata Cave, for two Sheath-tailed Bats were seen and heard in the largest chambers on 2 Apr. 1995. Although cyclones Ofa (Feb 1-3, 1990) and Val (Dec 6-9, 1991) had washed any guano out of the cave that may have been left by the taro growers, the cave structure was such that the bats would be fairly visible or audible if present. This sad picture was made only slightly more hopeful when four Sheath-tailed bats were located 28 May 1995. These had been flushed to the far end of the cave and returned fairly slowly back past us where the roof was just overhead, providing a good look.

On 1 Oct. 1995 two or three Sheath-tailed Bats were again detected, and on 16 Apr. 1997 only two were present. On 16 Nov. 1997 none were heard or seen meaning at best, the numbers had declined (they might be all one sex) or, at worst, that this colony had also become extinct.

The only other cave in which I heard or saw Sheath-tailed Bats was Satuiatua, on the South Coast of Savaii. Here I located one individual on 3 Oct. 1997. It might have been carrying the genes of a survivor but with no mates to procreate, those genes appear doomed.

The last record of Sheath-tailed Bats in Samoa prior to the devastation of the twin cyclones that I can locate is that of Cox (1983). He located a colony of more than 50 individuals downstream from Sauniatu, Upolu. On 24 Nov. 1997, I located this cave (which is closer to Manunu than Sauniatu) and found that the swiftlets were still there but not the bats. The cave is very short and they could not be overlooked. A senior guide said that it had been six years since he had seen the Sheath-tailed Bat in this cave, and that the children had chased them away. The timing (six years) coincides exactly with cyclones Val and Ofa, which I feel due to the shortness (15m) and openness of this cave, contributed more to their disappearance than the actions of children.

It appears that in some areas at least, the Sheath-tailed Bat had declined before cyclones Ofa and Val stripped every leaf off every tree, and reduced flying insects to almost zero for several weeks. This roughly correlated with the “boom years” in taro growing for export (1975-1985) and was a time when much spraying for insects was performed. Both these events I believe played a part in the demise of the Sheath-tailed Bat in both Samoa and American Samoa.

Grant et al. (1994) determined that something had caused the Sheath-tailed Bat to decline in American Samoa prior to the cyclones but dismissed insecticides as a cause, reasoning that if it were, the White-rumped Swiftlet would also have suffered the same decline. However, this need not be the case, as the bats are nocturnal feeders, and the swiftlets diurnal. Thus the insects they prey on are different species, with different life cycles, and niches, and so would not necessarily all be equally vulnerable to the spraying regime used on these islands. The sheath-tailed bats and swiftlets may also have differing sensitivities to the insecticides.

There is more to consider than just insecticides. The rapid acceleration of agro-deforestation will of itself reduce the number of flying insects as forests (particularly those such as tropical rainforests with a large range of species) support a greater number and range of species than open and farmed habitat (Hespenheide 1975, Waugh & Hails 1983). The use of herbicides, fungicides and insecticides may not only reduce the prey available to the aerial insectivores but also take poison to them through the food chain, having adverse effects on their survival.

The “taro boom years” peaked in the early 1980’s when pesticide use also peaked and by 1991- 1993 taro planting and pesticide use had declined. In 1981 about 207 tonnes of pesticide were imported into Samoa (Mowbray 1988) but this had declined to less than half that in 1991, 1992 and 1993 (Bill Cable pers. comm., Registrar of Pesticides for Samoa since 1992).

This timing fits the memories of people such as Tupua Tamasese (Tupuola Efi) of Tuaefu, and Tufue Toa of Aleipata, Upolu. These and other Samoans whose identities I have not recorded remember having so many swiftlets near their villages that as boys they spent considerable time trying to accomplish the difficult task of hitting one with a stone. Each of these men commented on the decline since the seventies or eighties. Tupua showed me the cave near his home where there used to be a colony but now there is none. It is clear that both the birds and the bats were in decline through the seventies and eighties and that

cyclones Ofa and Val brought the populations of both the swiftlet and the insect bat to dangerously low levels. From these levels the birds have recovered but the bats have not.

### References

- Amerson, A.B. Jr., W.A. Whistler, & T. D. Schwaner. 1982. Wildlife and Wildlife Habitat of American Samoa II. Accounts of flora and Fauna. USDI Fish & Wildlife Service, Washington, DC.
- Bruner, P.L. & H.D. Pratt. 1979. Notes on the status and natural history of Micronesian bats. *Elepaio* 40: 1–4.
- Cox, P.A. 1983. Observations on the Natural History of Samoan Bats. *Mammalia* 47: 519–523.
- Eustis, H.N. 1979. Aggie Grey of Samoa. Hobby Investments, Adelaide.
- Flannery, T. 1995. Mammals of the south-west Pacific and the Mollucas. Reed, Sydney.
- Grant, G.S., S.A. Banack & P. Trail. 1994. Decline of the Sheath-tailed Bat *Emballonura semicaudata* (Chiroptera: Emballonuridae) on American Samoa. *Micronesica* 27: 133–137.
- Hespenheide, H.A. 1975. Selective predation by two swifts and a swallow in Central America. *Ibis* 117: 82–99.
- Lemke, T.O. 1986. Distribution and status of the Sheath-tailed Bat (*Emballonura semicaudatus*) in the Mariana Islands. *Journal of Mammalogy* 67: 743–746.
- Mowbray, D.L. 1988. Pesticide Use in the South Pacific. UNEP Regional Sea Reports and Studies No. 89. (273pp). SPREP Topic Review No. 26.
- Ollier, C.D., W.A. Whistler, & A.B. Amerson Jr. 1979. O le Pupu Pue National Park, Samoa Vol. 1 Main Report. Environment Dept MSS. W. Samoa.
- Park, G., R. Hay, A. Whistler, & T. Lovegrove. 1992. The National Ecological Survey of Western Samoa: The Conservation of Biological Diversity in the Coastal Lowlands of Western Samoa. New Zealand Department of Conservation, Wellington.
- Perez, G.S.A. 1972. Observations of Guam bats. *Micronesica* 8: 141–149.
- Stair, J.B. 1838–45. Old Samoa or Flotsam and Jetsam from the Pacific Ocean. reprint R. McMillan, 40 President Ave, Papakura. NZ. also 1897 reprint by Religious Tract Society, Australia.
- Steadman, D.W. 1992. Extinct and extirpated birds from Rota, Mariana Islands. *Micronesica* 25: 71–84.
- Waugh, D.R. & C.J. Hails. Foraging ecology of a tropical aerial-feeding bird guild. *Ibis* 125: 200–217.