

**JOB PROGRESS REPORT
RESEARCH PROJECT SEGMENT**

STATE: Territory of Guam

PROJECT NO.: W-1R-5
SUB-PROJECT NO.: W-5
STUDY NO.: 1
JOB NO.: 1

JOB TITLE: Current Status, Distribution, and Natural History of Mariana Fruit Bats (1460)

PERIOD COVERED: October 1, 1996 to September 30, 1997

SUMMARY

During FY97, Guam's fruit bat population ranged in size from an estimated high of 425-470 animals in March to a low of 210-245 animals in September. However, numbers were low (< 200 animals) for much of the year at the island's only bat colony, with a September count of 125 animals being the lowest count since 1979. The colony continued to roost at a single site on Pati Point for the third consecutive year. The U.S. Fish and Wildlife Service (USFWS) announced its intention to down-list the Guam fruit bat population from Endangered to Threatened under the U.S. Endangered Species Act if bat populations in the Commonwealth of the Northern Mariana Islands (CNMI) are designated as Threatened.

BACKGROUND

The Mariana fruit bat (*Pteropus mariannus mariannus*) has been studied by the Division of Aquatic and Wildlife Resources (DAWR) since 1962 (DAWR 1964-1996). Considered a delicacy by Chamorro residents, bat abundance declined during the 1960s and 1970s until only a few solitary animals remained (Perez 1972, Wheeler and Aguon 1978, Wiles 1987a). A second species, the little Mariana fruit bat (*P. tokudae*), also occurred on the island, but is now extinct (Wiles 1987a). Reasons for the declines were primarily overhunting and some loss of habitat (Wheeler 1979). Both *Pteropus* occur on the US and Guam Endangered Species Lists. The island's population of Mariana fruit bats grew to an estimated 850-1,000 animals in the early 1980s, probably from immigration of bats from Rota (Wiles 1987a, Wiles and Glass 1990). However, numbers have gradually declined since 1983 because of continued illegal hunting and suspected predation by brown tree snakes (*Boiga irregularis*) (Wiles 1987a, 1987b, Wiles et al 1995). During FY96, Guam's fruit bat population ranged in size from an estimated low of 230-265 animals to a high of 370-410 animals (DAWR 1996).

OBJECTIVES

To continue status surveys and natural history studies and to provide for continued protection of habitat as recommended in the Mariana Fruit Bat Recovery Plan (Wiles 1990).

PROCEDURES

1. Survey fruit bat distribution and numbers in Guam and the CNMI.
 - a. Conduct annual surveys of fruit bats along Guam's northern cliffline with periodic surveys made elsewhere on the island. The emphasis of surveys should be to search for solitary bats and additional bat colonies.
 - b. Conduct monthly censuses at known bat colonies on Guam.
 - c. Assist the CNMI Division of Fish and Wildlife with surveys of fruit bats on other islands as needed.
2. Record information on the behavior and reproduction of fruit bats in colonies.
3. Determine habitat use of fruit bats. Visit abandoned roosts and record information about terrain and the size and abundance of vegetation present.
4. Monitor fruit bat imports to Guam from other Pacific islands.
5. Investigate illegal hunting of fruit bats on Guam. Visit abandoned roosting sites of colonies to determine illegal hunting effort. Assist conservation officers with investigations of bat poaching.

RESULTS

Locations of Bat Colonies on Guam

The island's only known fruit bat colony continued to occupy Roost 1 on Pati Point at Andersen Air Force Base (AAFB) throughout FY97 (Tables 1 and 2). The colony has used this location since July 1994. It has been a preferred roosting site for many years (DAWR 1987-1996).

Table 1. Approximate dates of use of the roost used by the only known colony of Mariana fruit bats on Guam in FY97.

Roost Number	Roost Location	Approximate periods of use by bats
1	North Pati Point	2 July 1994 - present

Table 2. Counts of Mariana fruit bats at roosts on Andersen AFB, Guam in FY97.

Date	Roost Number									Total
	1	14	15	16	17	18	19	20	21	
8 Oct 1996	168	-	-	-	-	-	-	-	-	168
28 Oct	165	0	0	0	-	0	0	0	0	165
11 Dec	171	-	-	-	-	-	-	-	-	171
2 Jan 1997	192	-	-	-	-	-	-	-	-	192
30 Jan	216	-	-	-	-	-	-	-	-	216
4 Mar	322	-	-	-	-	-	-	-	-	322
27 Mar	257	0	0	0	-	0	0	0	0	257
28 Apr	135	0	0	0	0	0	0	0	0	135
24 June	*	-	-	-	-	-	-	-	-	*
31 July	151	-	-	-	-	-	-	-	-	151
8 Sept	125	-	-	-	-	-	-	-	-	125

- = site was not checked for bats; * = colony was present, but complete count was not made.

Surveys of Fruit Bats on Guam

Counts at Roost 1 were relatively low throughout the year. Numbers increased dramatically from 171 fruit bats in mid-December to a peak of 322 bats in early March, then rapidly declined to 135 bats in late April (Table 2). Eventually, a low count of 125 bats was obtained in September. The latter count represents the smallest number of bats recorded in colonies on Guam since 1979 (DAWR 1979-1996). The overall pattern in animal numbers at the colony generally follows a trend observed in recent years of larger counts during the winter months and reduced counts from May-September (DAWR 1994). Data analyses indicate that bat numbers on Guam and Rota fluctuate inversely with one another and are highly suggestive of seasonal inter-island movements (Wiles et al., in prep.).

Estimates of fruit bat numbers at the main colony on Pati Point can be made using the high and low roost counts for the year. Because some individuals were probably hidden by thick foliage during counts, the total number of adults in the roost was likely to be 5-10% higher than the actual number recorded. Assuming that about half the colony were harem females and that 10% of these had unweaned young (DAWR 1994), then the roost held an estimated high of 338-354 adults and 17 juveniles, or a total of 355-371 bats in early March, and a low of 131-138 adults and 7 juveniles, or a total of 138-145 bats in September.

Regular fruit bat sightings were made along the cliffs at Ritidian Point by staff of the Guam National Wildlife Refuge throughout the year (M. Ritter and K. Allen, unpubl. data). Observations peaked from mid-June through July and again during September, when 2-3 individuals were seen almost daily. Copulations were regularly seen or heard, but there was no evidence of a small colony residing in the area. Bat feeding sign on *Artocarpus mariannensis* was found in early July.

Incidental sightings of single fruit bats or pairs of bats were made elsewhere on the island during the year, as follows: daytime sightings -- Conventional Weapons Storage Area on AAFB (2 sightings), Fena Lake (1); nighttime sightings -- west end of the main airfield at AAFB (2), forest northwest of the main airfield on AAFB (1), Tarague basin (1), Route 16 near Mt. Barrigada (1, this bat flew from Tiyan towards Mt. Barrigada at dawn), the Asalanso region of

Malojloj (1), the High Road (1) and the 15 Group (1) on U.S. Naval Ordnance Annex (formerly Naval Magazine), and Fena Lake (1).

Excluding bats residing in the colony at Pati Point, an estimated 50-75 fruit bats are still believed to live solitarily or in small groups in northern Guam, primarily along the cliffline extending from Bija Point to Iates Point. An additional, 20-25 animals probably inhabit the Ordnance Annex and other forested areas in southern and central Guam. Based on these figures, Guam's island-wide population of fruit bats varied from an estimated high of 425-470 animals in March to a low of 210-245 animals in September.

A summary of fruit bat sightings on Ordnance Annex from 1985-1996 appeared in Morton (1996).

David Woodside, a former biologist with the state of Hawaii and the USFWS, visited Guam in November and recalled some interesting historical information about fruit bats in the southern part of the island, based on observations he made during his 6-month temporary work assignment in 1957. He remembered sighting two bat colonies on Ordnance Magazine during a helicopter survey of the base. This record is significant because of the few previous reports of bat colonies documented for southern Guam.

Surveys of Fruit Bats on Other Islands

The DAWR did not assist in any bat surveys in the CNMI during FY97.

Illegal Hunting and Importations

Poaching has long been a major cause of mortality of *P. mariannus* in the southern Mariana Islands (Wiles 1987a, Wiles et al. 1989, Stinson et al. 1992). Poaching still occurs commonly on Rota and other islands in the Marianas (E. Taisacan, pers. comm., 1997). No reports of illegal hunting were recorded on Guam during the year.

Several illegal shipments of bats were confiscated by customs authorities on Guam and in the CNMI during the year (K. Garlick, pers. comm.). Confiscations made on Guam totaled: 26 bats from Palau in shipments of 1, 7, 9, and 9 bats; 5 bats from Yap (1 shipment); 1 bat from Saipan; and 1 bat from Rota. Confiscations on Saipan were as follows: 7 bats from Yap (1 shipment) and 4 bats from Palau (1 shipment).

The DAWR received one credible report of several bats being eaten at a party on Guam during the year. It was unknown whether the bats had been illegally killed on Guam or smuggled into the island.

Of historic interest, David Woodside stated that occasional shipments of fruit bats from Saipan and Rota were already entering Guam by 1957. This predates other known records of bat importations to Guam by 6-10 years.

Proposed Downlisting of the Mariana Fruit Bat Population on Guam

During FY97, the USFWS prepared documentation to designate *P. mariannus* throughout the CNMI as Threatened under the U.S. Endangered Species Act. Because the Guam population was previously listed as Endangered in 1984, this will result in federal protection for the species throughout the island chain. Based on evidence of inter-island movements, the USFWS believes that the archipelago's fruit bats constitute a single population. Because USFWS policy does not allow for different listing statuses within a population, the agency informed the DAWR in September of its intention to downlist bats on Guam to Threatened to coincide with their proposed legal status in the CNMI. This action will presumably occur when listing of the CNMI bats receives final approval.

Emballonura semicaudata

Dr. David Steadman of the Florida Museum of Natural History and Dr. Greg Pregill of the University of San Diego visited Guam in January to make preliminary site inspections for future archaeological digs of animal bones. During their investigation, they located the bones of *E. semicaudata* at several caves where this species had not been previously recorded, including the former Tarague swiftlet cave in the Tarague basin, a cliffside cave located 10-15 m above the beach level at Mergagan Point, and Mahlac Cave on Ordnance Annex.

RECOMMENDATIONS

1. Survey bat numbers and distribution along Guam's entire northern cliffline once or twice annually. Searches for additional colonies may be productive because continued poaching at bat roosts on Rota can cause large numbers of bats to move to Guam (Wiles and Glass 1990).
2. Continue observations at Guam's bat colonies. Information on reproductive biology, behavior, and social organization will be used to supplement data already gathered.
3. Summarize data previously collected and write reports on the diet, reproduction, and amount of snake predation on fruit bats.
4. Conduct a study of the vegetation, terrain, and proximity to development of known roosting sites to determine what site characteristics are important in the selection of roosting sites by fruit bat colonies.
5. Known bat roosting and foraging areas should be patrolled regularly by DAWR conservation officers.
6. Continue to assist the CNMI as needed with island censuses and other biological studies. Studies conducted on Rota would be most valuable for understanding the aspects of Guam's fruit bat population.

7. Continue to monitor illegal fruit bat imports entering Guam.

PROGRAM COST

The estimated cost of the fruit bat project under W-1R-5 is \$30,000.

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Report was prepared by: Gary J. Wiles

**JOB PROGRESS REPORT
RESEARCH PROJECT SEGMENT**

STATE: Territory of Guam

PROJECT NO.: W-1R-5

SUB-PROJECT NO.: W-5

STUDY NO.: 1

JOB NO.: 4

JOB TITLE: Roost Site Characteristics of Mariana Fruit Bats

PERIOD COVERED: October 1, 1996 to September 30, 1997

SUMMARY

No significant effort was expended on this job during this segment.

PROGRAM COST

The estimated cost of the fruit bat project under W-1R-5 is zero.

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