JOB PROGRESS REPORT
RESEARCH PROJECT SEGMENT

STATE: Territory of Guam

PROJECT NO.: W-1R-5
SUB-PROJECT NO: W-4
STUDY NO.: 1
JOB NO.: 1

JOB TITLE: Survey and Inventory of Non-Game Birds (1460)

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

SUMMARY

Seven species of resident and migrant birds were recorded on roadside counts in northern Guam. Censuses of island swiftlets (*Collocalia bartschi*) at Mahlac Cave indicated that the population increased from about 280 to 350 birds during the year. A much smaller count of 31 birds was made at Fachi Cave. Seven Mariana crows (*Corvus kubaryi*) were detected in the annual crow survey. The estimated number of crows remaining in the Guam population is 16 birds, which is a slight increase over last year. This increase was achieved through the release into the wild of four translocated zoo birds and two hand-reared birds. A small artificial nest box program for Micronesian starlings (*Aplonis opaca*) was started in the main housing area on Andersen Air Force Base (AAFB) this year.

BACKGROUND

Predation by brown tree snakes (*Boiga irregularis*) is the major factor in the decline of most of Guam's native bird species during the last few decades (Savidge 1987, Conry 1988, Engbring and Fritts 1988). Census data from a variety of sources have documented the extirpations of eight species, while four others have undergone severe population decreases, both in terms of overall numbers and geographic range (Division of Aquatic and Wildlife Resources [DAWR] 1963-1996, Engbring and Ramsey 1984, Wiles et al. 1995).

Common moorhens (*Gallinula chloropus guami*) continue to be scattered throughout the southern and central parts of Guam, with recent population estimates placed at 100-125 birds (Stinson et al. 1991). Island swiftlets occur primarily in one large colony on Naval Ordnance Annex (formerly Naval Magazine). Three much smaller colonies are also known and occur on the Ordnance Annex, in the Lumuna district of Yigo, and in the vicinity of the Geus River Valley in Merizo (DAWR 1987-1995, Wiles et al. 1995). Mariana crows are now restricted to AAFB (DAWR 1992-1996, Wiles et al. 1995). Their population declined to an estimated 14 birds in 1996 (DAWR 1996). Two small populations of Micronesian starlings also persist on the island, with most birds remaining on AAFB and Yigo, while smaller numbers occur on Cocos Island and coastal areas of southern Guam (DAWR 1991-1996, Wiles et al. 1995).

Recovery plans have been written for each of these species except the starling (Beck and Savidge 1990, US Fish and Wildlife Service 1991a, 1991b). In addition, the island continues to retain small to moderate numbers of several other resident bird species, as well as migratory shorebirds, seabirds, and waterfowl.

OBJECTIVES

To continue status surveys and natural history studies as called for in the recovery plans for Guam's endangered native birds (Beck and Savidge 1990, US Fish and Wildlife Service 1991a, 1991b).

PROCEDURES

1. Roadside counts were conducted at bi-weekly intervals on three routes (North, North-Central, and Northwest Field; see previous annual reports for locations of routes) in northern Guam by DAWR conservation officers. These routes were driven at approximately 15-25 kph beginning at sunrise. Numbers and species of all birds seen or heard were recorded, irrespective of the distance from the observer.

2. Monthly visits to Mahlac Cave on Ordnance Annex were made to monitor the island swiftlet colony. When counts were conducted, observers sat at both entrances of the cave for a period of 1-2 hours before dark and recorded the numbers of birds flying in and out. The total number of birds inhabiting the cave was determined by subtracting the number of departures from the number of arrivals and by adding the number of birds estimated to be in the cave at the start of the count. During all visits, observers entered the cave for about 1 hr (prior to any counts) to record numbers of nestlings and listen for their calls. In order to avoid disturbing nesting birds, nests were viewed from a slightly elevated position off to the side of the cave rather than by using a mirror to look inside the nests. The cave floor was searched and cleaned each month of eggshell fragments and whole eggs that had fallen from nests overhead in the guano.

3. Recorded-call playback surveys for Mariana crows were conducted in northern Guam. At each station, tape-recorded calls were played for 2.5 minutes. This was followed by a 2-minute silent period during which the observer listened for crows. The numbers, distance, and plumage condition of the crows observed were recorded.

RESULTS

Roadside Counts

Roadside counts continue to document the status of birds in northern Guam. Six species were observed on each of the three count routes in FY97 (Table 1). On the North route, four species (yellow bittern [*Ixobrychus sinensis*], Pacific golden plover [*Pluvialus fulva*], Philippine turtle-dove [*Streptopelia bitorquata*], black drongo [*Dicrurus macrocercus*])

showed increases in abundance this year. Three species (Philippine turtle-dove, black drongo, and Eurasian tree sparrow [*Passer montanus*]) were more numerous along the Northwest Field route, however, one species (Mariana crow) recorded in FY96 was not detected this year. The North-Central route also had three species (black francolin [*Francolinus francolinus*], black drongo, and Eurasian tree sparrow) that were more common this year.

Dr. Jonathan Bart of the USGS Biological Resources Division analyzed trends in Guam's roadside count results dating back to mid-1970s. His findings were presented at the Cooper Ornithological Society's annual meeting in Hilo, Hawaii in May. A manuscript detailing the results will be prepared during the upcoming year, with several DAWR staff biologists co-authoring the report (R.E. Beck et al., in prep.).

Table 1. Results of North, Northwest Field, and North-Central roadside counts in FY97, showing the species and mean (± SD) number of birds recorded per 100 km of travel.

	North		**Northwest Field**		**North-Central**	
Species	No. per 100 km	SD	No. per 100 km	SD	No. per 100 km	SD
Yellow bittern	11.1	14.3	4.4	2.8	4.8	2.0
Black francolin	8.0	4.7	0.0	0.0	16.1	3.9
Pacific golden plover	28.8	11.4	91.6	18.6	46.5	9.0
Brown noddy	0.0	0.0	1.3	0.6	0.0	0.0
Philippine turtle-dove	16.1	4.8	29.1	4.0	15.7	3.1
Black drongo	18.1	6.1	24.4	3.4	10.9	3.8
Eurasian tree sparrow	48.5	16.5	7.8	3.5	213.3	42.0
Number of counts	20		18		19	

Common Moorhens

The DAWR did not conduct moorhen surveys at the Fena Reservoir in FY97. However, five counts were made by staff of the US Fish and Wildlife Service (USFWS) (M. Ritter, pers. comm.). Survey results were as follows: January, 19 birds (adults and juveniles combined); February, 18 birds; March, 24 birds; April, 27 birds; and May, 19 birds. As in previous years, nearly all moorhens were recorded in the southern half of the reservoir. Two active nests were located in February, while chicks were seen during January, March, and April.

Moorhen records of special interest during the year included the following: 1) two adults and a possible juvenile seen at the small wetland on Tiyan (formerly Naval Air Station) near Route 8 on 12 April, and 2) a subadult found injured along the side of Route 15 in the Pinate area of Mangilao on 15 August. Because the latter area has no known wetlands, the bird was possibly dispersing to suitable habitat.

Island Swiftlets

Mahlac Cave - Swiftlet numbers at this site showed some recovery in FY97 after experiencing a sudden decline from about 495 to 280 birds in FY96 (DAWR 1996). Censuses made between early February and late April 1997 indicated that numbers grew from about 315 birds

to 350 birds (Table 2). A much higher count of 411 swiftlets was obtained on 1 April, but was assumed to be erroneous based on the large difference between it and other counts during the year. A final census on 28 August also tallied approximately 350 birds. Count results therefore suggest that the Mahlac Cave population has increased by about 70 birds, or 25%, since last year.

Snake trapping was not conducted at the cave this year by either the USFWS or DAWR. One live snake was captured by hand on 30 April. It was a male with a snout-vent length of 111.0 cm, a total length of 130.5 cm, a weight of 182 gr, and a body fat weight of 11.65 gr. Its stomach and intestine were empty. On 6 May, a snake pellet containing swiftlet feathers was found on the ground just outside the cave's south entrance.

Reproductive activity in the colony was monitored again this year. Nesting seasonality generally agreed with observations from previous years (DAWR 1987-1996), with the greatest egg and chick production occurring from February through August (no observations made during September). However, the nesting season appeared to be delayed by about a month this year, with most egg laying and chick hatching not starting until late January or February. Reasons for the delay were not readily apparent, but were possibly related to greater than normal rainfall during January.

Table 2. Results of censuses for island swiftlets at Mahlac and Fachi Caves on Ordnance Annex during FY97. Evidence of reproductive activities of swiftlets is also presented.

				Reproductive Parameters					
Date	Net No. of Birds Entering Cave	No. of Birds Estimated in Cave at Start of Count	Total No. of Birds Counted	No. of Whole Eggs Found on Cave Floor	No. of Eggshell Fragments on Cave Floor	No. of Nestlings Heard	No. of Nestlings Seen small	med	large
Mahlac Cave									
7 October 1996	-	-	-	1	5	3-4	1	2	5
31 October	-	-	-	2	2	2-3	2	2	2
26 November	-	-	-	0	2	2-3	0	2	2
3 Janaury 1997	-	-	-	1	0	0	0	0	0
31 Janaury	-	-	-	0	1	1	3	0	0
6 February	299	16	315	-	-	-	-	-	-
27 Febraury	330	6	336	3	9	5+	9	7	2
1 April	386	25	411	1	16	3-4	2	7	10
30 April	330	20	350	3	14	3-4	5	3	4
30 May	-	-	-	2	31	many	10	3	11
30 June	-	-	-	6	23	2-3	1	5	13
30 July	-	-	-	4	17	2-3	4	8	4
28 August	330	19	349	1	14	2-3	2	14	7
Fachi Cave									
23 June 29	2	31	0	-	-	0	-----7-----		

Key: - = no data gathered.

The USFWS continued its study of monitoring swiftlet nesting activity and snake presence in the cave using a video camera system. Data analyses are now underway.

In February, the DAWR and USFWS installed eight artificial nest structures in Mahlac Cave to test whether they might be used as nesting substrate by swiftlets. This experiment was conducted because of the consideration that the cave's swiftlet population perhaps may be limited by a lack of available natural nest attachment sites in snake-free areas. Four types of nest mounts were built from the following material: 1) a modified plastic drinking cup holder, 2) a modified plastic screw-in pipe cap, 3) a plastic water bottle cut down to form a lipped hoop, and 4) a piece of hardened spray insulating foam resembling a rounded stalactite. The mounts were glued to the cave ceiling in two groups, both containing each type of mount, within 1-2 m of existing natural nests. All of the mounts remained attached to the ceiling through September, but none had nest material added to them. However, video-taping photographed three instances of swiftlets roosting on mounts (J. Morton, pers. comm.). Two of these were of birds sitting for short intervals, however, in the third case, a bird roosted on a foam mount for most of one night (from 2100-0600 hrs).

Fachi Cave - Flooding affected swiftlet use of Fachi Cave on four occasions this year, the most since work began at the cave in 1990. High water levels were recorded in late September 1996 (DAWR 1996) and probably remained moderately high into October, although no actual observations were made. Heavy rains associated with the passage of Typhoon Dale on 7-8 November apparently closed off the entrance entirely, based on the presence of debris sticking to rocks over the entrance. Water levels dropped to 15 cm and 51 cm below the entrance top on 13 and 22 November, respectively. On 31 January, water was again within 5 cm of the entrance top following 20 cm of rain in the latter part of the month. The level fell to 51 cm below the entrance top on 4 February. Entry into the cave in the late afternoon that day revealed an estimated 10-30 birds roosting in the cave's nesting chamber. An extremely high record rainfall of 98 cm for August closed the cave entirely on 20 August. The water level was 8 cm below the entrance top on 22 and 25 August, but the cave was again closed from 28 August to 4 September. Water levels were 20 cm below the entrance top by 8 September and continued to fall into mid-October, when the cave was found to be relatively free of water.

A census of 31 swiftlets was made at Fachi Cave on 23 June (Table 2), which is slightly larger than counts obtained last year (DAWR 1996). It is not known how long the birds abandon the cave for during flooded conditions, nor how quickly they recolonize it after the water level falls. Swiftlets continued to fly down and closely investigate the cave's main entrance during August and early September, when the water level was high for an extended period. The birds circled 1-4 m in front of the entrance at a height of 0.5-1.5 m over the water's surface.

Firebreak 3 Cave - Visits to this cave revealed that it continued to remain unoccupied after the decline at Mahlac Cave.

Mariana Crows

Fourteen transects totaling 211 stations were used to survey crows in eight regions of northern Guam during July (Figure 1). Birds were present on two transects, which is a slight increase from last year. A total of seven crows were recorded during the survey (Table 3), including six

birds in the Conventional Weapons Storage Area (CWSA) and one bird in the C3 area of Northwest Field. This number is much lower than the actual number of birds still surviving in the wild (Table 3). Six crows were recorded on Transect 1, but three other birds known in the area were not detected. Five of these birds were individuals released into the wild during 1997. They included four Rota crows transferred to the DAWR from the National and Houston Zoos and released from March to June, and a hand-reared Guam crow released in January. Unfortunately, the hand-reared bird was found dead on August 22, reducing the number of crows in the CWSA to eight birds.

Table 3. Summary of results from playback of tape-recorded Mariana crow calls conducted in July 1997. Transect locations are shown in Figure 1.

Transect	No. of stations	No. of crows detected	No. of stations with crows	Known no. of crows missed in survey
1	50	6	4	3
2	36	0	0	1
3	12	0	0	0
4	10	0	0	0
5	8	0	0	0
6	11	0	0	0
7	10	0	0	3
8	23	0	0	0
9	9	0	0	1
10	9	0	0	0
11	7	0	0	0
12	9	0	0	0
13	8	1	1	0
14	9	0	0	2
Total	211	7	5	10

July crow population estimate = 7 + 10 = 17 birds

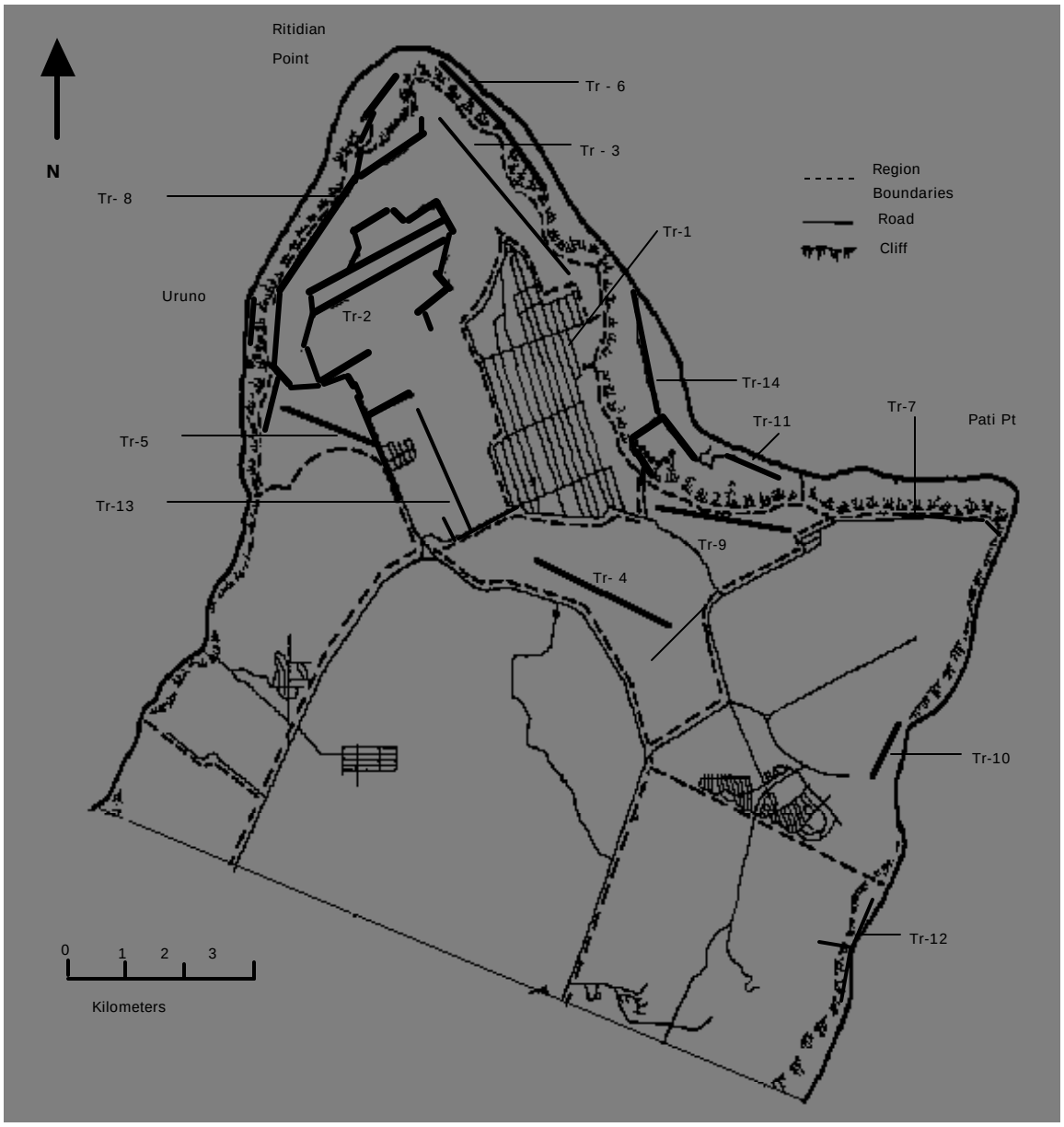

Figure 1. Locations of Mariana crow survey transects in northern Guam.

No birds were recorded on Transect 7 in the vicinity of Pati and Tagua Points, where four individuals are known to reside (Figure 2). The Tarague region still harbors one pair of birds, but both individuals were missed in the survey. This pair is known to fly fairly long distances between the CWSA and Tarague basin (Figure 2). No crows were recorded in Northwest Field, where a hand-reared female from Guam was released in February. Unfortunately, her transmitter failed in late April and there have been no subsequent sightings. Her status remains unknown.

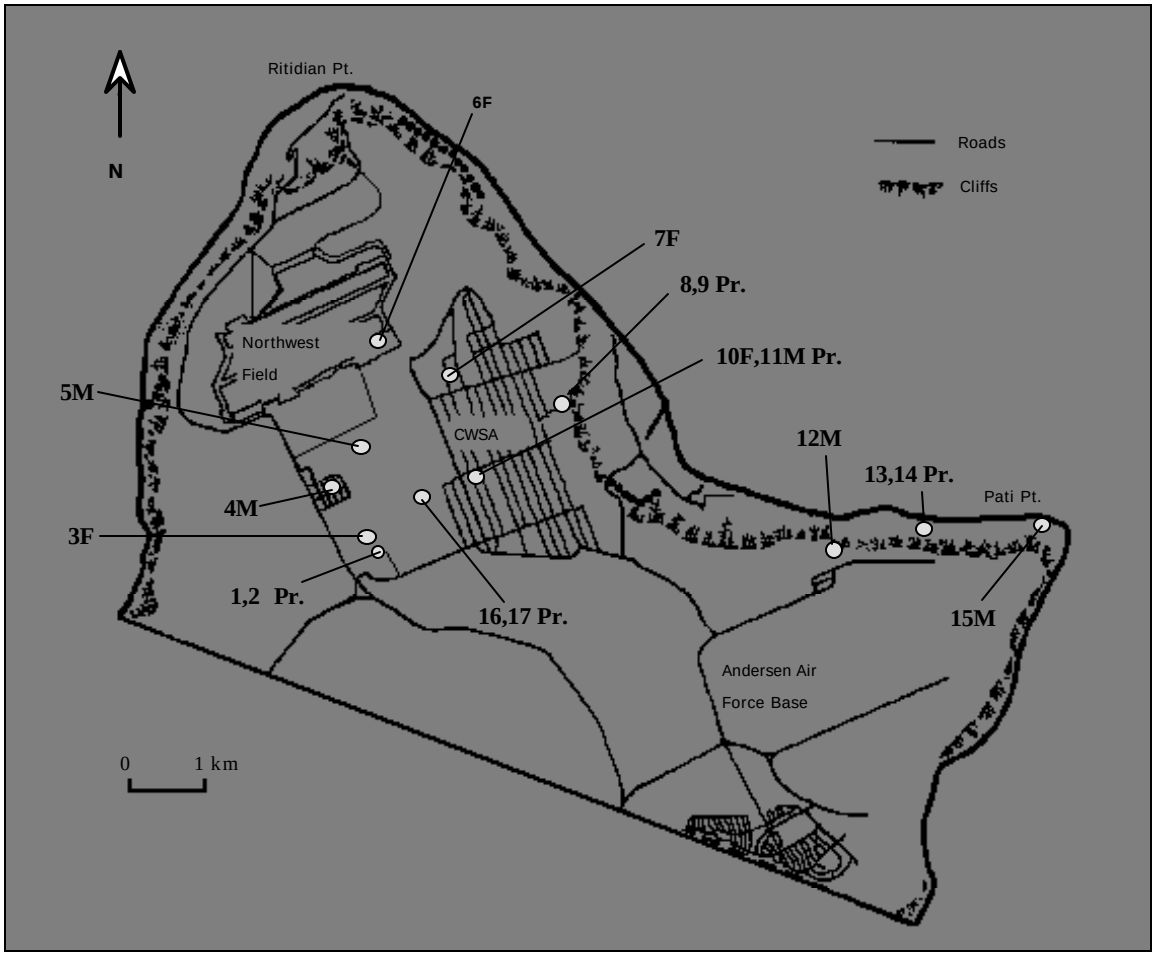

Figure 2. Locations of known crows (in circles) in Northwest Field, the Conventional Weapons Storage Area (CWSA), and at Pati Point in July 1997. Each location is noted as a male (M), female (F), or pair (Pr). Pair 1, 2 was composed of a hand-reared Guam male (named "Joga") and a translocated zoo female. Unfortunately, the male died in August. The status of the second hand-reared Guam crow (6F, named "Nunu") is unknown. Four translocated zoo crows were present in July, including 2F ("Fadang"), 4M ("Ahgao"), 7F ("Pengua"), and 10F ("Faia"). Two other translocated zoo crows, a male and female, died prior to the survey.

Guam's crow population is estimated at 16 birds at the end of September 1997. This figure is derived from the numbers of birds recorded and missed during the July survey, minus the known death of one bird in August. This estimate represents a 14% increase over last year's estimate, but was achieved only with the release of the four zoo birds. Guam's crow population continues to be very small (Figure 3). The population will not survive much longer without additional translocations of birds from Rota.

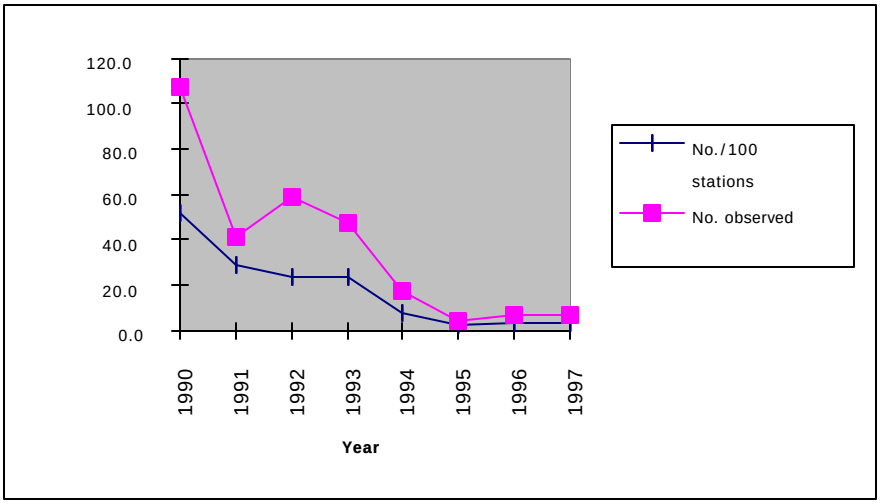

Figure 3. Results of annual playback surveys for Mariana crows conducted on Guam from 1990-1997. The 1997 estimate includes four translocated zoo crows released in the wild in FY97.

Micronesian Starlings

Six nest boxes made of plywood were erected for starlings by the Air Force and a Boy Scout troop in October and November. Two box designs were used. One was made with a roof and a large entry hole on the upper side of one wall and the second had an open top that functioned as the entry hole. All of the boxes were placed on the trunks of coconut trees about 1-1.3 m below the crown. Areas of known starling occurrence in the base's main housing area were selected for box sites. Boxes were checked fairly regularly for starling use from November to June, but no activity was recorded. The Air Force has agreed to continue monitoring the boxes in FY98 and erect a third type of box made of PVC piping.

Two starling nests were located in trunk cavities of flame trees (*Delonix regia*) this year. Both cavities occurred where dead branches (about 10-15 cm in diameter) had fallen off the main trunk, which allowed a hole to eventually form through wood rot.

Notable Species Recorded on Guam During FY97

Noteworthy records of birds for Guam in FY97 are presented here. A Matsudaira's Storm Petrel (*Oceanodroma matsudairea*) and an Audubons's Shearwater (*Puffinus lherminieri*) were captured by the public in Agat on 30 July and at an unreported location on 6 August, respectively, and turned over to the DAWR. A group of about 25 Brown Boobies (*Sula leucogaster*) roosted on Orote Point Island for at least several months from June to August. This is the largest aggregation of this species known to roost on Guam since at least the 1970s. Follow-up observations should be made to determine whether nesting may have occurred. Two Red-tailed Tropicbirds (*Phaethon rubricauda*) were sighted at Pati Point on 21 December.

The year's most unusual bird record was a male Surf Scoter (*Melanitta perspicillata*) found by a fisherman outside the reefline at Two Lovers Point on 2 January. This species had not been previously recorded in Micronesia. Its normal range is the Pacific Northwest. Unusually high total numbers of 69 Northern Pintails (*Anas acuta*) and 61 Tufted Ducks (*Aythya fuligula*) were seen at several wetlands on 21 December. A Chinese Goshawk (*Accipiter soloensis*) was observed twice in the eastern Talofofo River Valley on 3 and 16 October. Two reports of an unidentified hawk on Nimitz Hill came from the public in late October and early November.

Snowy Plovers (*Charadrius alexandrinus*) were found at Togcha Beach on 15-16 November (1 bird), at Dungcas Beach on 24 November (1 bird) and 1 January (1 bird), and at Tiyan on 1 January (1 bird) and 18 January (2 birds). A flock of seven Black-winged Stilts (*Himantopus himantopus*) was observed on Tiyan at a small pond on 18 September, representing the largest number of stilts ever recorded together on Guam. A Common Redshank (*Tringa totanus*) was sighted at Tiyan on 28-30 August. A leg-flagged Gray-tailed Tattler (*Heteroscelus brevipes*) was seen at the Merizo sewage treatment ponds on 21 December. The bird was tagged at Furen Lake, Nemuro City, Hokkaido, Japan (43°16' N, 144°40' E) (Y. Shigeta, Yamashina Institute for Ornithology, pers. comm.). A Eurasian Curlew (*Numenius arquata*) was found at Camp Covington, Piti on 21 December. A Bristle-thighed Curlew (*N. tahitiensis*) was sighted on a tidal reef flat between Nimitz Beach and Facpi Point in Agat on 9 March. A pair of Black-tailed Godwits (*Limosa limosa*) resided in the vicinity of Dungcas Beach from 24 November until 13 May, when one of the birds was found injured. A necropsy revealed that it had heavy fat deposits, but had a chipped sternum and a hematoma on the breast, indicating that it probably collided with an object. The remaining godwit oversummered on Guam and was last seen at Tiyan on 30 August. A Temminck's Stint (*Calidris temminckii*), a new record for Guam, was observed with four Long-toed Stints (*C. subminuta*) in a grassy field at Tiyan on 2 January. A single Dunlin (*C. alpina*) was seen at Dungcas Beach from 24 November to 15 February. Solitary Curlew Sandpipers (*C. ferruginea*) were noted at Ordnance Annex on 10-11 October and at Tiyan on 30 August. Single Pectoral Sandpipers (*C. milanotos*) were observed in the 12 Group at Ordnance Annex on 13 November and at Tiyan on 24-25 November and 1 January. A particularly large number of seven Ruffs (*Philomachus pugnax*) were sighted at Tiyan on 27-30 August, with five still present on 18 September.

Two Whiskered Terns (*Chlidonias hybridus*) were recorded at the Agfayan Bay fishponds in Inarajan on 6 October. Another was seen in inner Apra Harbor on 21 December. A Hill Myna (*Gracula religiosa*) was recorded for at least several weeks on NCTAMS in January. A pair of these mynas was also observed near Building 21000 on AAFB in early and late July.

Two papers were published during the year on the occurrence of migratory shorebirds, waterbirds, and land birds (Stinson et al. 1997a, b).

RECOMMENDATIONS

1. Develop and implement methods for controlling the brown tree snake.

2. Continue to monitor the population of common moorhens and develop an appropriate habitat improvement and development program.
3. Continue monthly cave censuses and efforts to assess population change and reproductive activity of island swiftlets. Consider snake-proofing Mahlac Cave to protect nesting swiftlets. Conduct further observations on the foraging behavior of swiftlets. Determine whether there is any seasonal variation in the foraging range of the colony. Interview farmers in the Talofofo River valley about the use of pesticides on their farms.
4. Continue to census the Mariana crow in order to estimate population size and distribution. Continue breeding biology studies and attempts to snake proof nest sites of crows.
5. Continue predator control efforts on Cocos Island until complete eradication of monitor lizards and feral cats is attained.
6. A review of ongoing and completed wetland mitigation projects should be made to assess the success of these projects. The evaluation should be done in cooperation with other Government of Guam agencies, the US Army Corps of Engineers, the USFWS, and private sector consultants.

PROGRAM COST

The estimated cost of the non-game bird project under W-1R-5 is $45,000.

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