

JOB PROGRESS REPORT RESEARCH PROJECT SEGMENT

STATE: Territory of Guam

PROJECT NO.: W-1R-6
SUBPROJECT NO.: W-4
STUDY NO.: 1
JOB NO.: 1

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

PERIOD COVERED: October 1, 1997 to September 30, 1998

SUMMARY

Six species of resident and migrant birds were recorded on roadside counts in northern Guam, while eight species were detected on spring bird counts made throughout the island. Censuses of island swiftlets (*Collocalia bartschi*) at Mahlac Cave indicated that the population has increased to about 400-430 birds this year. A much smaller count of 34 birds was made at Fachi Cave. Eight Mariana crows (*Corvus kubaryi*) were detected in the annual crow survey on Andersen Air Force Base (AAFB). The estimated number of crows remaining in the Guam population has fallen to 12 birds, which is a 25% decrease from last 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] 1963-1997, 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, Ritter 1997). Island swiftlets occur primarily in one large colony on Naval Ordnance Annex. 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 1987-1997, Wiles et al. 1995). Mariana crows are now restricted to AAFB (DAWR 1992-1997, Wiles et al. 1995, National Research Council 1997). Their population was estimated at 16 birds in 1997 (DAWR 1997). 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 1991-1997, Wiles et al. 1995). Recovery plans have been written for each of these species except the starling (Beck and Savidge 1990, U.S. 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 (Stinson et al. 1997a, b).

Guam experienced its most destructive storm since 1976 when Supertyphoon Paka hit the island on 16-17 December. Sustained wind speeds were estimated at 150 mph, with gusts of up to 185 mph. Information on the storm's impacts on wildlife and other natural resources appears in Appendix 1.

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, U.S. 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. Spring bird counts were conducted on 23 routes throughout Guam during June. Locations of survey route are presented in DAWR (1987). These surveys consisted of 5-minute station counts at up to 10 stations per route with the numbers of birds seen or heard recorded per species at each station.
3. 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. 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.
4. 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 when the observer listened for crows. The numbers, distance, and plumage condition were recorded for detected birds.

RESULTS

Roadside and Spring Bird Counts

Roadside counts continue to document the status of birds in northern Guam. All five of the species recorded on the North route showed decreases in abundance this year (Table 1). Five species were also detected on the Northwest Field count, with only Eurasian tree sparrows (*Passer montanus*) increasing. The North-Central route had six species, with Pacific golden plovers (*Pluvialis fulva*) more common than in FY97 and yellow bitterns (*Ixobrychus sinensis*) equal in abundance. The general downward trend in abundance of most species may indicate that sizable numbers of birds died during Super typhoon Paka.

Spring bird counts have been conducted annually since 1985 (DAWR 1985), but this is the first year that census results for all species have been published in the DAWR's annual reports. Eight bird species were recorded on 23 count routes during FY98 (Table 2). Comparisons of count results with previous years were not made.

Table 1. Results of North, Northwest Field, and North-Central roadside counts in FY98, showing the species and mean (\pm SD) number of birds recorded per 100 km of travel.

Species	North		Northwest Field		North-Central	
	No. per 100 km	SD	No. per 100 km	SD	No. per 100 km	SD
Yellow bittern	0.0	0.0	0.4	0.3	4.7	1.2
Black francolin	3.7	2.0	0.0	0.0	4.7	2.1
Pacific golden plover	18.5	9.7	54.7	10.4	86.5	26.5
Philippine turtle-dove	7.1	5.6	18.0	3.7	8.4	2.3
Black drongo	6.4	2.7	8.3	2.7	3.4	1.1
Eurasian tree sparrow	28.2	20.4	8.3	3.7	35.1	8.1
Number of counts	13		17		15	

Table 2. Mean numbers of birds recorded per station along surveys routes in northern and southern Guam. Abbreviations are YEBI - yellow bittern, BLFR – black francolin, BBQU- blue-breasted quail, FATE - fairy tern, PTDO - Philippine turtle-dove, BLDR - black drongo, MIST - Micronesian starling, and ETSP - Eurasian tree sparrow. Black francolin and Philippine turtle-doves are also discussed in their respective reports.

Survey Location	No. Stations	YEBI	BLFR	BBQU	FATE	PTDO	BLDR	MIST	ETSP
Northern Surveys									
Tarague	8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
MSA (formerlyCWSA)	10	0.0	0.2	0.0	0.0	1.8	0.5	0.0	0.1
NWF	10	0.0	0.1	0.0	0.0	1.1	0.6	0.0	0.3
NCTAMS	10	0.0	0.5	0.0	0.0	0.1	0.3	0.0	0.6
Capitol Improvemt Rd	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mt. Santa Rosa	10	0.2	0.3	0.0	1.1	0.7	1.0	0.1	2.4
Y-Sengsong Road	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Two Lover's Point	10	0.1	1.7	0.0	0.0	0.0	0.0	0.0	3.2
Andersen South	10	0.0	0.5	0.0	0.0	1.0	0.0	0.0	0.0
Navy Golf Course, Barrigada	10	0.1	3.0	0.0	0.0	0.2	0.0	0.0	1.2
Barrigada Hill	10	0.2	1.6	0.0	0.0	0.0	0.0	0.0	1.7
Toto Pipeline	8	0.6	0.3	0.0	0.0	0.5	0.0	0.0	2.2
Southern Surveys									
Nimitz Hill	10	0.0	4.0	0.0	0.0	0.1	0.0	0.0	0.9
Reserv Craft Beach Rd	4	1.5	0.0	0.0	0.0	2.5	0.5	0.0	6.5
Orote Point	6	0.8	4.3	0.0	0.0	2.2	0.3	0.0	0.0
Pulantat	10	0.0	2.6	0.6	0.0	0.6	0.5	0.0	1.8
Cross Island Road	10	0.1	4.0	0.2	0.0	0.0	0.2	0.0	5.2
Ordnance Annex	10	0.1	3.5	0.0	0.0	0.5	0.0	0.0	0.1
Umatac	10	0.1	3.4	0.1	0.0	0.0	0.0	0.0	0.8
Dandan	10	0.8	4.8	1.9	0.0	1.0	0.0	0.0	3.6
Ija	8	0.7	6.4	1.3	0.0	1.0	0.8	0.0	1.2
Merizo	4	0.1	4.3	0.1	0.0	0.4	0.0	0.0	0.8
Cocos Island	10	0.0	0.0	0.0	8.2	2.6	0.0	1.5	1.3

Common Moorhens

Moorhen records of special interest during FY98 are listed here: 1) Two adults and three half-grown chicks were seen in the flooded lawn at Trinity Baptist Church in Maimai, Chalan Pago on 8 October. 2) Up to five moorhens were reported at a wetland surrounded by homes across from Carbullido Elementary School in Machaute, Barrigada on 22 April. Use of this site has been documented in the past. 3) An adult moorhen was found dead along Route 10 about 100-200 m south of the mayor's office and Catholic Church in Mangilao on 15 September. The bird had been hit by a car and was probably moving between the often seasonally flooded grassy fields in the area when it crossed the highway. 4) Several adults with chicks of two size classes were observed at a newly modified wetland on the north side of the Guam International Airport in late September. This site receives rain runoff from the airport's runways and taxiways.

The Department of Public Works scraped the Barrigada ponding basin clear of all vegetation and reworked its soil contours without any environmental review in March or April. The ponding basin has been used by a single pair of nesting moorhens for a number of years, with many chicks produced. Fortunately, the site has continued to accumulate and hold water since the completion of the project and a moorhen was observed there in late September. DPW installed a new chain link fence around the basin, which should help to protect birds from dogs, cats, and humans.

Native Doves

G. Wiles heard a calling white-throated ground-dove (*Gallicolumba xanthonura*) for about 10 minutes in limestone forest along the north cliffside of Pati Point on 28 August. It was heard well and was approached to within 30 m, but was never observed. Guam did not experience any storms or periods of strong winds between Supertyphoon Paka and the date of this sighting, indicating that the bird probably dispersed to Guam during normal weather.

A member of the public reported seeing a pair of ground-doves at Andersen South on 24 September. C. Aguon confirmed the report when he heard two ground-doves calling near him at the site on 28 September.

Island Swiftlets

Mahlac Cave - Swiftlet numbers in this colony showed further recovery from the decline that occurred in FY96 (DAWR 1996). Censuses made in late January and early March 1998 tallied 430 and 396 birds, respectively (Table 3), which represents an increase of about 50-80 birds over last year's estimate of 350 birds (DAWR 1997). These were the only counts made during the year. Unusually high wasp numbers along the trail to the cave restricted observer access from April to September.

Snake trapping was not conducted at the cave this year because of the wasp problem. Large numbers of snake tracks were noted in guano from June to early October 1998 and single bundles of swiftlet feathers were found on the cave floor on 3 March and 1 June, indicating predation events. Trapping needs to be a high priority at the cave next fiscal year.

Reproductive activity in the colony continued to be monitored this year. Nesting seasonality generally agreed with observations from previous years (DAWR 1987-1997). Egg and chick production was greatest from March to early December, with a peak in activity from March to July. The extension of nesting into December is unusual, but may reflect the delayed start of the nesting season earlier in 1997 (DAWR 1997).

Table 3. Results of censuses for island swiftlets at Mahlac and Fachi Caves on Ordnance Annex during FY98. Evidence of reproductive activities of swiftlets is also presented.

Date	Net No. of Birds Entering Cave	No. of Birds Estimated in Cave at Start of Count	Total No. of Birds Counted	Reproductive Parameters			No. of Nestlings Seen		
				No. of Whole Eggs Found on Cave Floor	No. of Eggshell Fragments on Cave Floor	No. of Nestlings Heard	small	med	large
Mahlac Cave									
31 October 1997	-	-	-	2	11	3-4	4	5	1
2 December	-	-	-	0	4	2-3	1	2	9
31 December	-	-	-	1	1	2	0	1	2
28 January 1998	422	8	430	2	2	2-3	3	2	3
3 March	365	31	396	0	11	4-5	5	3	7
31 March	-	-	-	7	28	4-5	4	18	7
1 May	-	-	-	2	26	4-5	7	2	10
1 June	-	-	-	4	46	4-5	11	6	15
1 July	-	-	-	2	18	3-4	1	5	14
30 July	-	-	-	3	13	1-2	6	5	7
1 September	-	-	-	1	2	1-2	2	5	10
3 October	-	-	-	0	8	3-4	8	3	3
Fachi Cave									
26 January	31	3	34	0	-	0	0	0	0

Key: - = no data gathered.

Supertyphoon Paka did not cause significant damage to the colony. Five nests appeared to have fallen to the cave floor and a number of leaves and small branches were blown inside the cave, but no other interior damage was detected. Foliage in front of the north entrance was heavily stripped, making it much easier for birds to enter and exit the cave. Results of swiftlet counts in January and March did not reveal any decline in bird numbers.

Fachi Cave – Fachi Cave again experienced flood conditions for part of the year. The cave's entrance was free of water in mid-October 1997, but heavy rains associated with Typhoon Joan resulted in the opening being nearly sealed from 20-27 October. Water levels dropped quickly so that the entrance was almost fully open again by 31 October, when one swiftlet was seen entering the cave. Heavy rains during and after Supertyphoon Keith closed the cave's opening again from 4-14 November. Water levels fell so that several feet of the entrance was exposed by 19 November and it was entirely open by 2 December. Supertyphoon Paka dumped about 53 cm of rain on 15-16 December, closing the entrance yet again until 23 December. Most of this rain fell during the night and probably sealed off the cave quickly before the swiftlets had a chance to depart at dawn. A census of 34 swiftlets was made on 26 January (Table 3) and was slightly higher than last year's results (DAWR 1997), indicating that most birds were able to safely exit the cave at some point immediately after the storm. By 31 December, the water level had fallen so that most of the entrance was open. Guam entered drought conditions in early January and flooding was not a problem at the cave during the rest of the year.

Lumuna, Yigo – A search for swiftlets in this area was made on 29 January, representing the first time that observers have returned to the location since May 1993. Three birds were seen at one site, indicating the continued existence of this small colony. Efforts to find the colony's cave were again unsuccessful.

Mariana Crows

Fourteen transects totaling 211 stations were used to survey crows in eight regions of northern Guam during July (see DAWR 1991 for transect locations). Birds were present

on two (14%) transects (Table 4), which is the same number as last year (DAWR 1997). Eight crows were recorded during the survey, with six birds in the Munitions Storage Area (MSA) and two single birds southeast of Northwest Field (Table 4). Four other individuals are known to survive in the wild, giving a current population estimate of 12 birds for Guam. This estimate represents a 25% decline over last year's total (DAWR 1997).

Table 4. Summary of results from counts using playback of tape-recorded Mariana crow calls in July 1998. Locations of crows are shown in Figure 1.

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

July 1998 crow population estimate = 8+4 = 12 birds

Eight detections were made on Transect 1 in the MSA, but two were repeats of the same individuals and were excluded from the count totals. The six birds in the MSA (Figure 1) include five Guam crows and a Rota female known as "Fadang", which was born in the Houston zoo and released on 14 March 1997. Fadang is paired with a male Guam crow and made her first known nesting attempt on 11 February 1998. Only a few sticks were placed on the branch of an *Elaeocarpus* tree before the structure was abandoned. This was the pair's only nesting effort during the year.

No crows were recorded on Transect 7 in the Pati Point area, however, a pair known as the "Pipeline Pair" and comprised of a Guam male and Rota female ("Pengua") continues to survive there (Figure 1). This pair made five nesting attempts during the breeding season. No other crows remain in this area.

In the Northwest Field area, no birds were observed though a hand-reared Guam female was released in the area in February 1997 (3F, Figure 1). This female was last seen in April 1997. Her current status is unknown.

The Tarague region harbors two pairs of crows (Figure 1). On the western side of the area a Guam-born pair, known as the "Mag 8 Overlook Pair", was recorded during the MSA survey (Transect 1). This pair ranges eastward to the Tarague cliffline. A Rota pair comprised of "Faia" and "Ahgao" occupies the upper eastern Tarague plateau (Figure 1; 8, 9 Pair) and made two known nesting attempts during the year. The ranges of the two pairs overlap slightly, but no interactions were observed.

The number of crows on Guam continues to be very low because of the lack of any successful reproduction. The population will not survive much longer without the translocation of additional birds from Rota. Yearly results of Mariana crow playback surveys are listed in Figure 2.

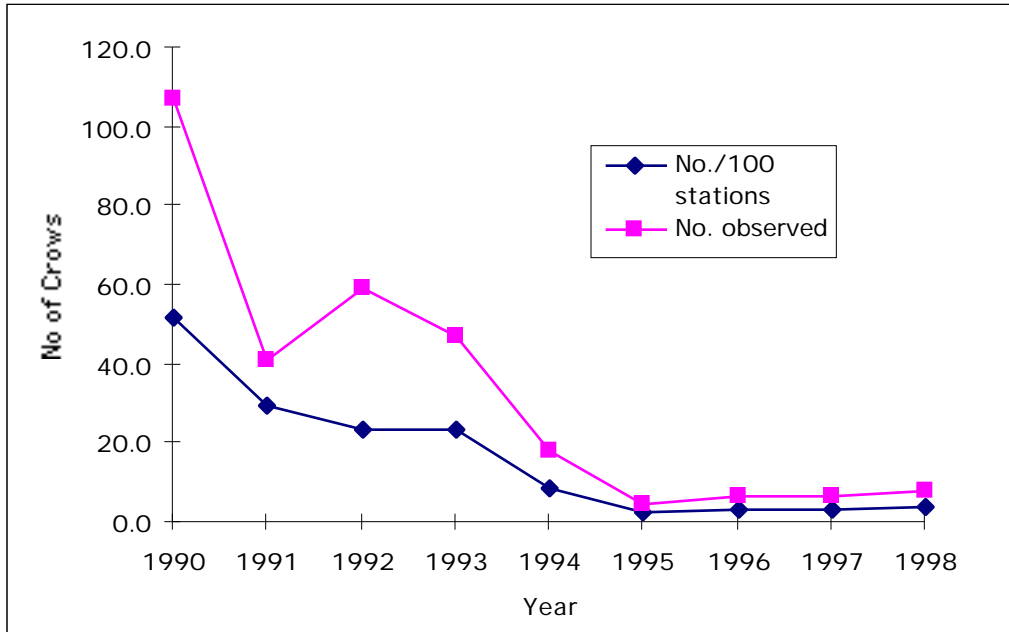


Figure 2. Yearly results of Mariana crow playback surveys conducted on Guam. The number of birds estimated in 1998 includes 4 crows released into the wild during FY97.

Micronesian Starlings

The six plywood nest boxes set out for starlings last year on AAFB were examined on 7 November. A complete nest was found in one box with an open top, while a partial nest cup was found in a box with a side opening. Neither nest could be aged. A follow-up survey made on 27 January determined that all six boxes survived Supertyphoon Paka. A pair of adults was seen using a box with an open side on this date, but an examination of contents was not made.

A juvenile starling was seen inside the front gate of NCTAMS on 29 October. This was followed by sightings of an adult near the fire station on 27 January and a pair of adults at an unidentified location in late August. These are the first reports of starlings on NCTAMS in several years.

Pacific Reef Herons

Repeated observations of reef herons on the small offshore islet several hundred meters south of Ylig Bay led to the discovery of a nest with a fully grown juvenile on 5 July. Further sightings over the next few weeks confirmed the presence of two immatures capable

of flight. Both birds were still being fed entirely by their parents and neither was seen to forage on its own. At dusk, all four birds would fly off the island to roost in nearby trees along the main shoreline. All four herons were completely dark gray. Nesting has been documented at very few sites on Guam and has not been previously noted for this location.

Notable Species Recorded on Guam During FY98

Noteworthy records of birds for Guam in FY98 are presented here. An Audubon's shearwater (*Puffinus lherminieri*) was captured in Tumon on 5 December and examined by DAWR staff. A little egret (*Egretta garzetta*) was observed at the Agfayan Bay aquaculture ponds on 28 December. An unusually large mixed flock of about 75 brown (*Sula leucogaster*) and red-footed (*S. sula*) boobies was seen outside the mouth of Apra Harbor on 21 August. The flock contained approximately equal numbers of both species.

A flooded vacant construction site next to the Agana Shopping Center mall attracted several species of interest during the year, including a great egret (*Ardea alba*) on 15-20 November. An unidentified pond-heron (*Ardeola* sp.) in winter plumage appeared at the Piti mitigation wetland on 19-20 November. A moderately-sized *Buteo*-like hawk was seen along or just south of the Tarague basin cliffline on 6-7 November and 11 February.

A snowy plover (*Charadrius alexandrinus*) used Duncas Beach and the concrete pads at the Tiyan airfield from 7 October to 27 December. A black-winged stilt (*Himantopus himantopus*) occurred in the flooded lawn of the Trinity Baptist Church in Maimai, Chalan Pago on 7 October. Five stilts were seen at the Agana mall site on 13 October, with one bird still present on 12 November. Relatively large numbers of Black-winged Stilts were recorded on Guam on 13 September 1998, with five birds at the Agana mall site, two birds at the Tiyan pads, and six birds in the flooded fuel farm area of Andersen Air Force Base. An additional stilt was found injured along Route 4 at Pago Bay on 8 September, but did not show injuries consistent with being hit by an automobile when necropsied. These 14 birds represent the largest count of stilts ever for the island. Five additional stilts were seen at the Rota Golf Course ponds on 16 September, indicating that the autumn 1998 migration was unusually good for this species. The earliest date that a stilt was seen was on 3 September. One to two long-toed stilts (*Calidris subminuta*) was seen at the Tiyan pads from 7-20 September. A red knot (*Calidris canutus*), a new record for the Mariana Islands, occurred at Duncas Beach from 1-6 October. Two great knots (*Calidris tenuirostris*) were present at Duncas Beach from 11-15 November and three more birds were sighted at Togcha Beach on 15 November. A pectoral sandpiper (*C. milanotos*) was observed at Ordnance Annex on 31 October. A flock of 32 wood sandpipers (*Tringa glareola*), the largest number ever documented in Micronesia, was seen at the flooded Agana mall site on 12 November. Smaller numbers of Wood Sandpipers used the site from October to December. A common redshank (*T. totanus*) was observed at the AAFB landfill on 29 September. Two to four ruffs (*Philomachus pugnax*) continued to use the Tiyan pads until 12 November after seven birds first appeared there from 27-30 August 1997. Another ruff occurred at this site on 20 September 1998. An oriental pratincole (*Glareola maldivarum*) remained at Tiyan from 9 November-8 December.

A black-headed gull (*Larus ridibundus*) in adult breeding plumage was observed at the Ordot dump for about 1-2 weeks until 12 June. A gull-billed tern (*Sterna nilotica*) was recorded daily along the beach at Ritidian Point between 4-7 November.

Three fork-tailed swifts (*Apus pacificus*) were seen foraging over the fields at the headquarters of the Guam National Wildlife Refuge at Ritidian Point on 4-5 November. A white-vented needletail (*Chaetura caudacuta*), a new record for Micronesia was seen at Tagua Point on 4 November and above the Tarague cliffline on 7 November. Single barn

swallows (*Hirundo rustica*) were spotted at Naval Station on 19 August and close to Area 50 in Northwest Field on 11 September. DAWR staff shot and killed a hill myna (*Gracula religiosa*) and wounded a second individual in forest north of the AAFB runways on 18 March. The mynas had been interacting with a pair of nesting Mariana crows residing in the area, with the crows seen attempting to chase the mynas from the area. AAFB environmental personnel shot an additional hill myna near the base commissary on 6 July. No further reports of mynas have been received on the base since then (E. Henry, pers. comm.).

RECOMMENDATIONS

1. Develop and implement methods for controlling the brown tree snake.
2. Reinitiate censuses 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 Talofofu River valley about the use of pesticides on their farms.
4. Continue to census Mariana crows to estimate population size and distribution.
5. Continue breeding biology studies and attempts to snake proof nest sites of crows.
6. Continue predator control efforts on Cocos Island until complete eradication of monitor lizards and feral cats is attained.
7. 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 U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and private sector consultants.

PROGRAM COST

The estimated cost of the non-game bird project under W-1R-6 is \$33,000.

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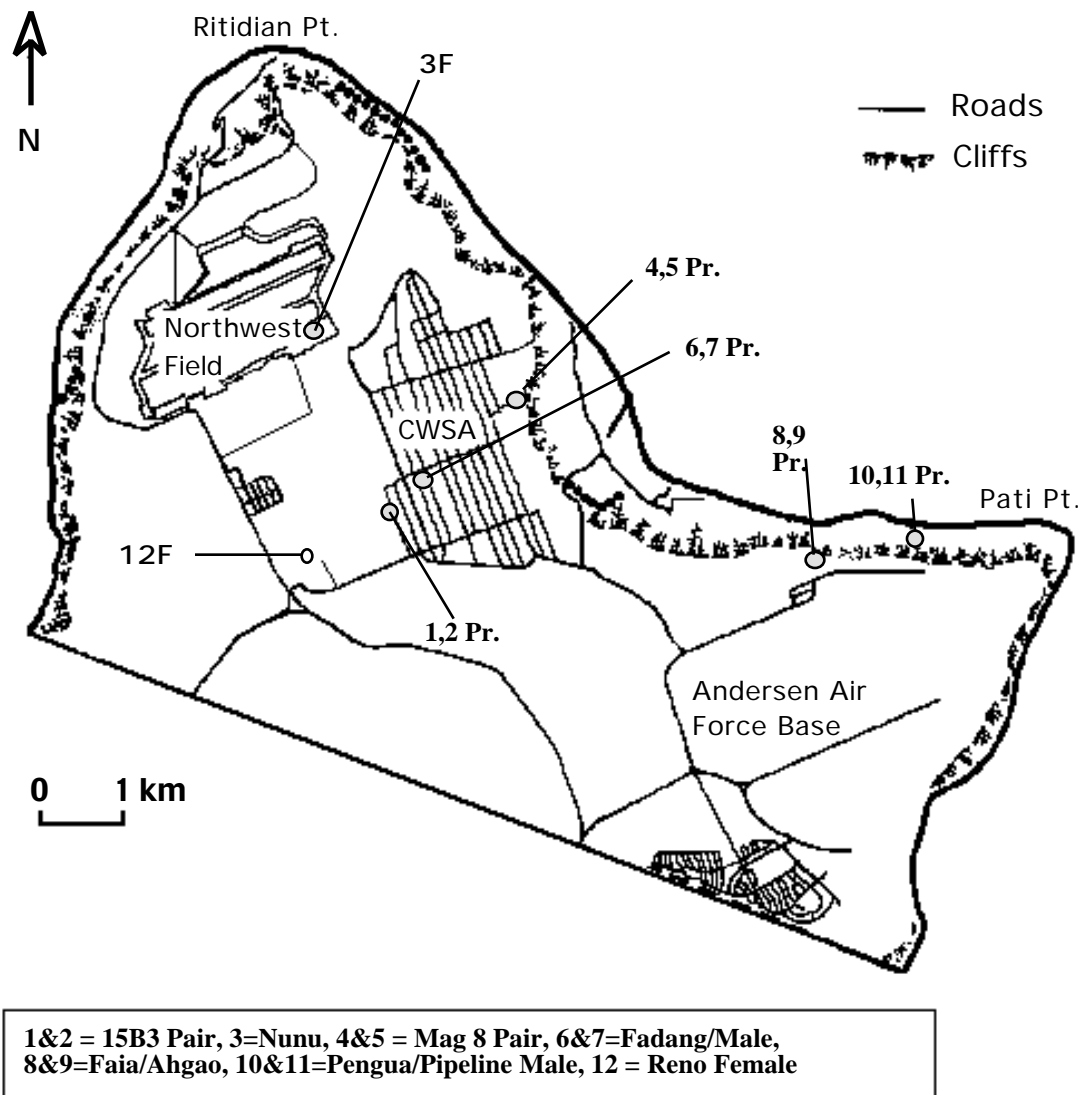


Figure 1. Location of known crows (in circles) on Andersen Air Force Base, as of July 1998. Each location is noted as a male (M), female (F), or a pair (Pr), with the number of each bird listed. Pairs 1/2 and 4/5 are old Guam crows that are not capable laying eggs. Pairs 6/7 and 10/11 are composed of a Rota female and a Guam male. Pair 8/9 is composed of Rota crows.