

## **JOB PROGRESS REPORT RESEARCH PROJECT SEGMENT**

**STATE:** Territory of Guam

**PROJECT NO.:** W-1R-6  
**SUBPROJECT NO.:** W-4  
**STUDY NO.:** 1  
**JOB NO.:** 2

**JOB TITLE:** Survey for Mariana Crows and Their Nest Sites (1460, 1470)

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

### **SUMMARY**

Based on Mariana crow, *Corvus kubaryi*, call surveys and locations of known individuals, Guam's crow population was estimated at 12 birds. This number includes Rota crows released on Guam. Nine nests were recorded during the breeding season. Three eggs, all inviable, from two clutches were collected from the same breeding pair. Two nests, one a single-egg clutch, were lost possibly due to snake predation.

### **BACKGROUND**

The Mariana crow is found only on Guam and Rota and is the only species of crow in Micronesia. Though once found throughout Guam, surveys in 1981 estimated 380 crows (Engbring and Ramsey 1984) were present in northern Guam. This number was much lower than the estimate of 1,300 crows on Rota in 1982 (Engbring et al. 1986). By 1986, Michael (1987) reported that only 100 crows remained on Guam. By then, most of Guam's native forest birds had disappeared as a result of brown tree snake predation (Savidge 1987, Conry 1988, Engbring and Fritts 1988). In 1990, DAWR began annual crow surveys using tape-playback of crow calls to monitor their status. The initial survey found about 100 crows still present in northern Guam. Though crow numbers had decreased since 1981, distribution remained the same (DAWR 1990).

Efforts to reverse the decline of the Mariana crow began in 1986 with attempts to protect active nest sites from snake predation. Sheet metal sleeves and Tanglefoot®, an adhesive resin, were placed around trunks of active nest trees to act as a snake barrier and snake trapping was begun. During the early 1990s, increased nest protection was achieved with the development of electrical barriers and effective snake trapping (DAWR 1991).

In 1996, a select committee appointed by the National Research Council (NRC) completed a review of the Mariana crow recovery program (NRC 1997). Their report compliments and reiterates conservation recommendations for crows found in the recovery plan (Beck and Savidge 1990). Included in their recommendations were that all birds being held in the National Zoo and Houston Zoological Garden be released on Guam. In 1997, the crow population on Guam was augmented by the release of eight captive crows (six from the zoos and two from DAWR's breeding facility) into the wild in northern Guam. Currently, four of the released birds are doing well, the status of one is unknown, and three died 13-219 days after their release.

### **OBJECTIVES**

To inventory Mariana crows and their nest sites to implement recovery efforts, including predator control and other reproductive enhancement efforts (Beck and Savidge 1990).

## PROCEDURES

1. Recorded-call playback surveys for Mariana crows were conducted in northern Guam during July (Figure 1). 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. Numbers, distances, and plumage condition of the crows detected were recorded.
2. Areas in the northern Guam were searched during the breeding season (from October through May) for crows. Active nests were closely monitored and appropriate measures to protect them were taken. Locations of active nests were mapped.
3. Young, if found, were monitored.

## RESULTS

### Surveys

Mariana crows were surveyed on 14 transects totaling 211 stations in eight regions of northern Guam in July (Figure 1). Birds were present on two (14%) transects, which is the same as last year (DAWR 1997). A total of eight crows were recorded during playback surveys, including six birds in the Munitions Storage Area (MSA) and two single birds in the Northwest Field C3 area (Table 1). The number of birds recorded this year is lower than the actual number known to be surviving. Although Transect 1 in the MSA recorded ten birds, two observations were repeats of the same birds and were excluded from the total count. The six birds known from MSA included five Guam crows and a Rota female (known as “Fadang”) that was born in the Houston Zoo and released in March 1997.

Table 1. Summary of results from playback of tape-recorded Mariana crow calls conducted in July 1998. The location of the transect and these crows are shown in Figures 1 and 2, respectively.

<b>Transect</b>	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
<b>Total</b>	211	8	5	4

July 98 crow population estimate = 8+4 = 12 birds

No crows were recorded in the Pati Point area on Transect 7. However, a pair, known as the “Pipeline” pair and comprised of a Guam male and Rota female (“Pengua”),

continues to survive in the area (Figure 2). This pair made five nesting attempts during the breeding season. No other crows are known to exist in the Pati region.

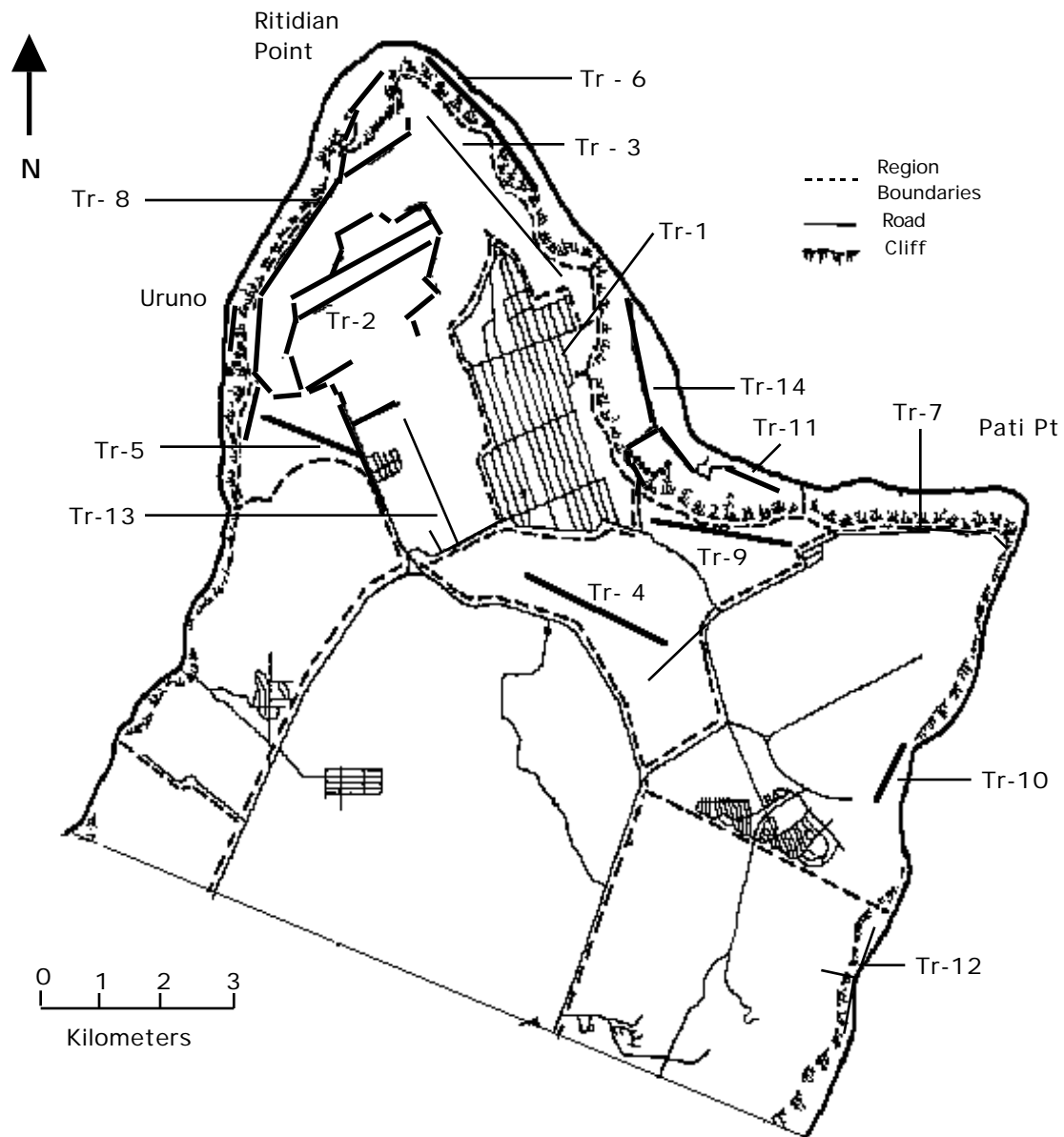


Figure 1. Locations of Mariana crow survey transects on Guam.

The Tarague region harbors two pairs of crows (Figure 2). Towards southern Tarague region, a Guam pair known as the “Mag 8 Overlook” pair was recorded on Transect 1 in the MSA. A Rota pair, known as “Faia and Ahgao”, occupies the upper Tarague Plateau (see Figure 2; 8,9 Pair) and made two known nesting attempts. Though the Mag 8 Overlook pair is known to fly between the MSA cliffline and the Tarague plateau, no interaction between this pair and the Faia/Ahgao pair was observed.

Crows were not recorded in Northwest Field. The fate of a hand-reared female Guam crow, which was released here in February 1997, remains unknown.

When the number of birds recorded during the survey is added to the number of missed birds (excluding repeats) minus the loss of the released hand-reared bird, an estimate of about 12 crows is obtained. This represents a 25% decrease from last year's estimate. The decrease is a result of the death of several captive crows released in the wild. The number of crows on Guam continues to be very low (Figure 3) because of the lack of reproduction. This population will not persist much longer without translocating crows from Rota to Guam.

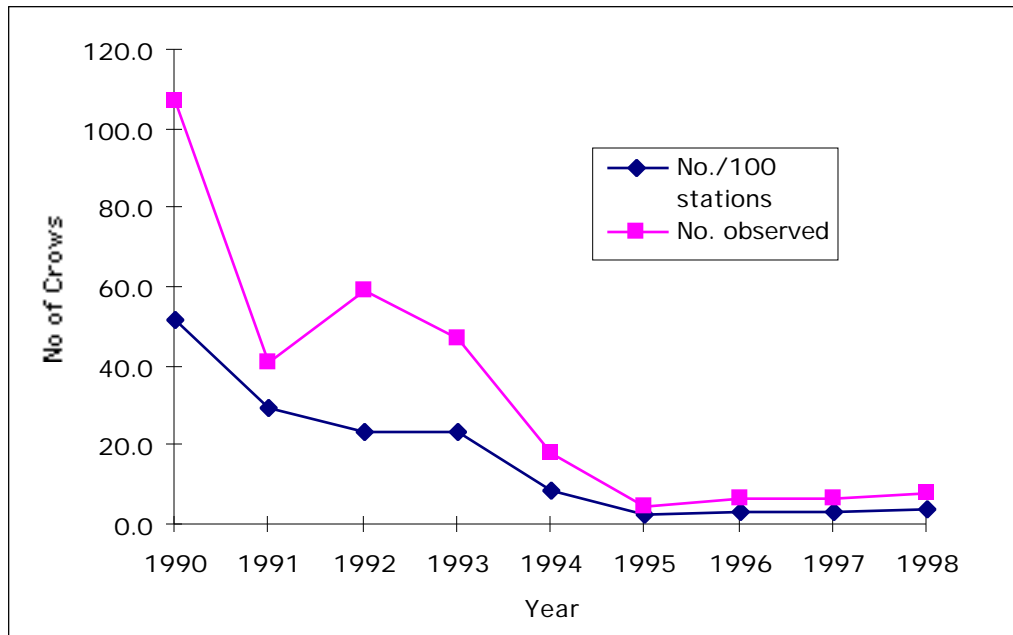


Figure 3. Yearly results of Mariana crow playback surveys conducted on Guam. The number of birds estimated in 1998 includes four Rota crows released in the wild in 1997.

### Active nests

Nesting activity increased during the 1997-1998 breeding season. Nine nests were recorded this year (Table 2, Figure 4) compared to a single nest during 1996-1997. Three eggs pulled from two nests were inviable. Two other clutches were preyed on possibly by monitor lizards (*Varanus indicus*). This was the second consecutive year that no eggs hatched.

A Rota-Guam pair constructed six of the nine nests (Table 2). All were located in *Ficus* trees, except for one which was constructed in an *Aglaia mariannae* and later moved by DAWR staff to a nearby *Ficus* to allow snake-proofing. Nesting continued after the nest was relocated and the pair eventually laid two eggs. Unfortunately, neither egg was viable. Super typhoon Paka destroyed one of this pair's nests. A Rota/Rota pair built two nests in the Tarague plateau region (Table 2). One nest was already abandoned when it was discovered on February 11. The second nest discovered on March 16 in a *Guamia* tree was abandoned probably as a result of disturbance caused by two hill mynas (*Gracula religiosa*). Both birds were shot to prevent further disturbances.

Table 2. Summary of crow nests built on Guam, the stage in which they were found, and their outcome in FY98. Productivity of crows is summarized in Table 3. Pairs A, B, and C are the Pipeline/Pengua, Faia/Ahgao, Mag 8 Overlook pairs, respectively.

No.	Pair ID	Nest no.	Date discovered	Nest stage	Tree species	Date Snake-proofed	Outcome
1	A	325	11/23/97	Building	<i>Ficus</i> sp.	11/25/97	Incubation
2	A	326	12/8/97	Platform	<i>Ficus</i> sp.	N/A	Destroyed by typhoon
3	A	327	1/5/98	Early cup	<i>Aglaia mariannae</i>	1/14/98	Incubation
4	A	328	1/22/98	Platform	<i>Ficus</i> sp.	1/22/98	Abandoned
5	A	329	2/8/98	Early platform	<i>Ficus</i> sp.	2/19/98	Incubation
6	B	330	2/11/98	Complete	<i>Drypetes dolichocarpa</i>	N/A	Abandoned
7	C	331	3/5/98	Platform	<i>Tristoropsis obtusangula</i>	3/12/98	Incubation
8	A	332	3/11/98	Platform	<i>Ficus</i> sp.	3/18/98	Incubation
9	B	333	3/16/98	Base/early cup	<i>Guamia mariannae</i>	3/18/98	Abandoned

The Mag 8 Overlook pair was the only other pair known to have built a nest. Their nest was found in the MSA cliffline area on March 11 in *Tristoropsis* tree and was later snake-proofed. A dummy egg was placed in the nest on March 13, after no eggs were laid. Observations revealed that nest attendance was normal. This was the second season the pair was made to incubate a dummy egg. The female was caught, banded, and fitted with a radio transmitter, which unfortunately failed two weeks later. A pair known as the “11B6” pair probably no longer exists. The banded female was not seen during this breeding season. The male is thought to have remated with the female, “Fadang”. This pair made their first and only nesting attempt on February 11. Only a few sticks were placed in the branch of an *Elaeocarpus* tree before the structure was abandoned.

Reproductive success of Mariana crows on Guam has been documented since 1991 (Table 3). The principal cause of the low productivity is infertility probably due to senescence. With the release of Rota crows, a change from no egg-laying activity last season to egg-laying this season was observed. However, the absence of viable eggs continues to be a problem. Although techniques have been developed to control snake predation at nests through snake trapping and electrical barriers, reproductive success can only be improved by releasing young crows from Rota into the Guam’s aged crow population.

Table 3. Summary of Mariana crow nesting productivity on Guam from 1990-1998. No eggs were laid during the 1996-1997 season. The eggs laid during the 1997-1998 season were from a pair with a Rota female that was released early in 1997.

<b>Clutch Size</b>	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
1	4	2	4	1	6	1	0	2
2	0	1	2	2	0	1	0	1
3	0	0	2	4	2	2	0	0
No. of Clutches	4	3	7	7	8	4	0	3
Total Eggs	4	4	12	17	12	9	0	4
Mean Clutch	1.0	1.3	1.7	2.4	1.5	2.3	0	1.3
SD	0.0	0.6	1.0	0.8	0.9	1.0	-	0.6
No. Hatched	0	3	0	3	1	3	0	0
No. Fledged	0	3	0	2	0	2	0	0

## **RECOMMENDATIONS**

1. Continue crow surveys.
2. Continue searches for active crow nests and take appropriate measures to protect them from snake predation.
3. Collect habitat use and reproductive information when crow nests are found.
4. Augment the crow population on Guam with crows translocated from Rota.

## **PROGRAM COST**

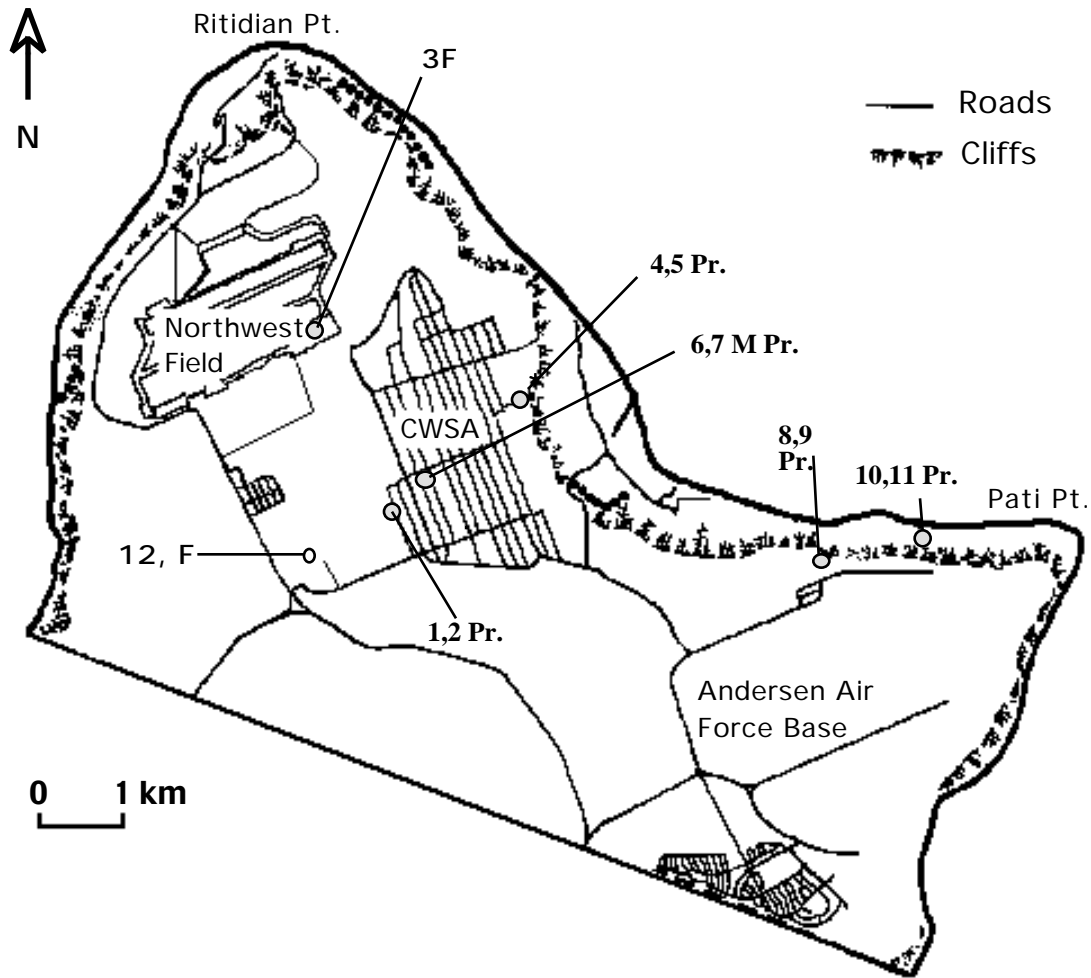
The estimated cost of the Mariana crow project under W-1R-6 is \$58,000.

## **LITERATURE CITED**

- Beck, R. E. B., Jr., and J. A. Savidge. 1990. Native forest birds of Guam and Rota of the Commonwealth of the Northern Mariana Islands recovery plan. U.S. Fish & Wildlife Service, Portland, Oregon. 86 pp.
- Conry, P. J. 1988. High nest predation by brown tree snakes on Guam. *Condor* 90:478-482.
- Division of Aquatic and Wildlife Resources (DAWR). 1990. Job Progress Reports - Federal Aid to Fish and Wildlife Restoration. Guam Department of Agriculture, Mangilao.

- Engbring, J. and F. L. Ramsey. 1984. Distribution and abundance of the forest birds of Guam: results of a 1981 survey. U. S. Fish and Wildlife Service, Dep. of Interior. FWS/OBS-84/20. 54p.
- Engbring, J., F. L. Ramsey, and V. J. Wildman. 1986. Micronesian forest birds survey, 1982: Saipan, Tinian, Agiguan, and Rota. U.S. Fish and Wildl. Serv. Rep.
- Engbring, J. and T. H. Fritts. 1988. Demise of an insular avifauna: the brown tree snake on Guam. Transactions of the Western Section of the Wildlife Society 24:31-37.
- National Research Council (NRC). 1997. The scientific bases for preservation of the Mariana crow. National Academy Press, Wash., D.C. 91 pp.
- Savidge, J. A. 1987. Extinction of an island forest avifauna by an introduced snake. Ecology 68:660-668.

Report prepared by: Celestino F. Aguon and Lamont Henderson



**1&2 = 15B3 Pair, 3=Nunu, 4&5 = Mag 8 Pair, 6&7=Fadang/Male, 8&9=Faia/Ahgao, 10&11=Pengua/Pipeline Male, 12,F = Reno Female**

Figure 2. Location of known crows (in circles) at Northwest Field, Munitions Storage Area (CWSA), and Pati Point as of July 1998. Each location is noted as a, male (M), female (F), or a pair (Pr.). A hand-reared Guam crow's (3F) status is unknown. Pairs 1/2 and 4/5 are old Guam crows not capable of egg laying. Pairs 6/7 and 10/11 are composed of a Rota female crow and a male Guam crow. Pair 8/9 is composed of Rota crows.

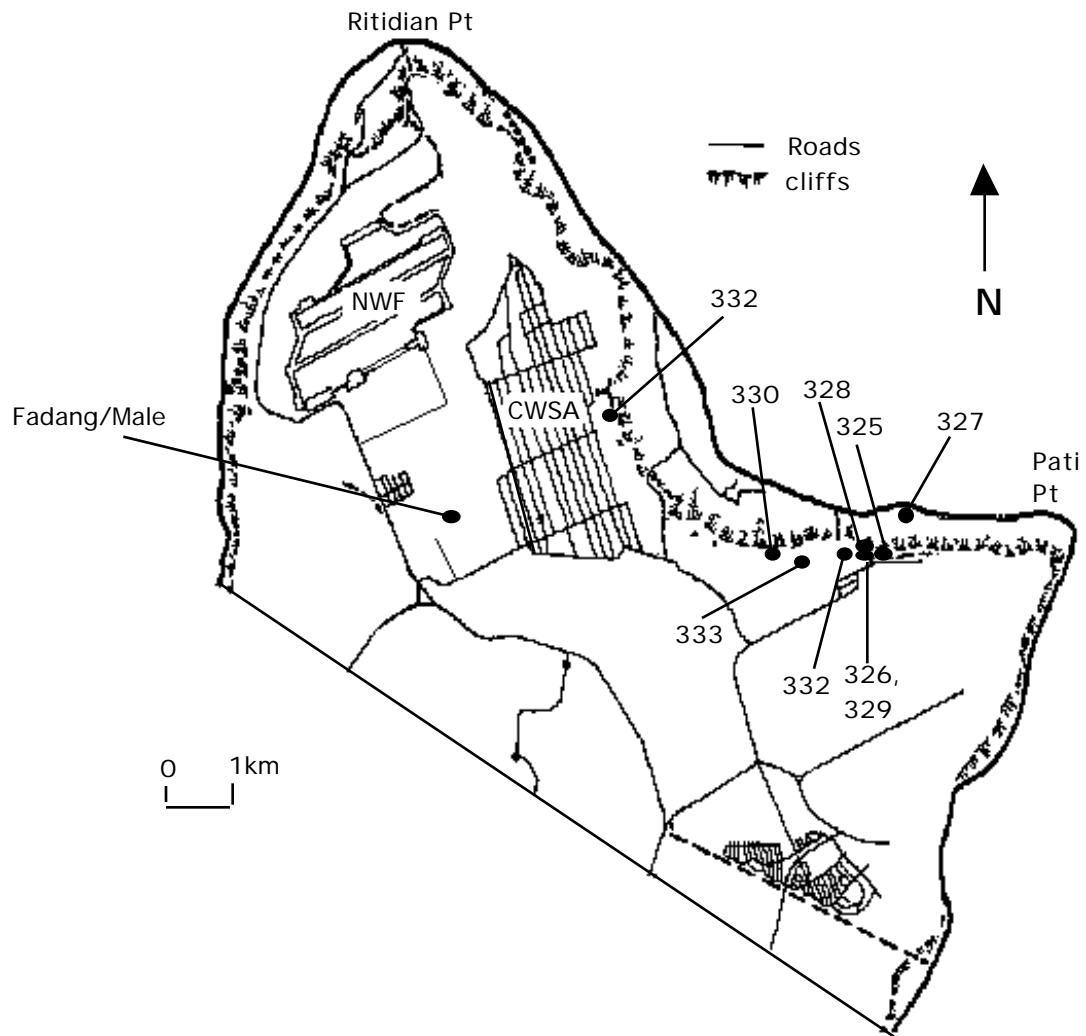


Figure 4. Locations of nests produced during the 1997-1998 crow breeding season. The Pipeline (Pengua and a male), Faia/Ahgao, and the Mag 8 Overlook pairs were the only pairs that constructed nests during the season. The Pipeline pair was the only pair that laid eggs.