

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

**STATE:** Territory of Guam

**PROJECT NO.:** E-2-2

**SUB-PROJECT:** C

**JOB NO.:** 1

**JOB TITLE:** Establishment of an Experimental Population of Guam Rails on Rota or Other Islands in the Marianas

**PERIOD COVERED:** October 1, 1998 to September 30, 1999

### **SUMMARY**

One hundred Guam rails (*Gallirallus owstoni*) were released at the Sagua'gagha area of Rota in February and August 1999. Twenty-two of the birds were released inside a 2.5-ha enclosure. Extensive efforts were made to remove predators from the release area, but none predators were trapped. Fifty-one birds were equipped with radio transmitters. Fourteen radio-marked rails were confirmed dead, with 5 of the deaths due to predation by feral cats. Nine radio-marked rails survived to the end of FY99. Eight of nine radio-marked birds escaped the enclosure within 10 days. Rails released in February survived an average of 103 days, with four birds living to the end of FY99 (237 days). Birds released in August survived an average of 29.9 days, with five living to the end of FY99 (63 days). Rails moved an average of 888 m from their release site (range 200-3,000 m). Reproduction was documented as 4 nests successfully hatched. Releases should continue with cohorts of 50 or more birds every 3-6 months until a self-sustaining population is established.

### **INTRODUCTION**

Census data collected between 1960 and the early 1980s documented the reduction in range and numbers of the Guam rail (Witteman et al. 1990). In 1984, only about 20 rails were known to remain in the wild and the species was added on the U.S. Endangered Species List. In 1982, the DAWR decided to develop a captive breeding program for the Guam rail and by 1986, all known remaining rails were collected (n = 21). The extirpation of the Guam rail from the wild was due primarily to predation pressure from the introduced brown tree snake (*Boiga irregularis*). The captive propagation program was organized under the auspices of the American Zoo and Aquarium Association (AZA) and presently includes the cooperation of 14 mainland zoos. The rails demonstrated an immediate propensity for breeding in captivity and to date over 700 rails have been produced in captivity (Orndorff 1999).

The captive management of the Guam rail uses the metapopulation approach, which calls for the establishment of more than one subpopulation (Foose et al. 1986). This has been accomplished by dispersing the captive rails into two primary captive populations on Guam and in U.S. zoos. Because reintroduction of the Guam rail to part of its historical range on Guam is a recovery objective, the establishment of an experimental wild population on snake-free Rota was proposed (USFWS 1989), to serve as a third genetic reservoir to prevent genetic drift and inbreeding, and to ensure the maintenance of behavioral adaptations for the wild. Reintroductions of captive produced animals are less likely to succeed than translocations of wild-caught animals because of behavioral deficits (Griffith

et al. 1989). Experience gained in releasing Guam rails on Rota will provide valuable information, and perhaps birds, useful for future reintroductions.

## **OBJECTIVES**

1. Establish a non-essential, experimental wild population of the Guam rail in suitable snake free habitat on Rota, Commonwealth of the Northern Mariana Islands (CNMI).
2. Release up to 120 captive-produced rails per year from the propagation facility of the Division of Aquatic and Wildlife Resources (DAWR) to initiate establishment of rails on Rota.
3. Release captive-produced rails from the propagation facilities of cooperative mainland zoos to initiate establishment of rails on Rota.
4. Monitor survival, dispersal, reproduction and establishment of released rails through radio telemetry.

## **PROJECT HISTORY**

In 1987, a cooperative agreement was signed between the Government of Guam, CNMI, and the U.S. Fish and Wildlife Service (USFWS) outlining the responsibilities of each entity for the introduction. An environmental assessment was prepared for the USFWS covering the introduction of the Guam rail to Rota. The DAWR reached an informal agreement with Dr. Stuart Pimm, University of Tennessee, by which a graduate student resided on Rota to monitor the initial two rail introductions in cooperation with the DAWR as a part of his dissertation research. Dr. Pimm was successful in receiving several grants from international conservation organizations to support efforts to monitor the introductions on Rota.

After a permit to establish an “experimental population” of Guam rails on Rota was published (USFWS 1989), 22 rails were released at a site on the Sabana on Rota in December 1989 and January 1990. All but one rail were released with radio transmitters attached in order to monitor their dispersal, mortality and possible breeding success. The site proved to be unsatisfactory probably due to the presence of dense grassland habitat. Of the 22 released birds, the whereabouts of 9 were unknown as their radios failed, 4 were killed by vehicles, 2 were killed by cats, 2 apparently died of starvation, 1 died of poisoning, and 4 died of unknown causes (Witteman et. al. 1990, DAWR 1991).

In February 1991, 33 rails were released at the forest edge in I Chenchon Park near the Bird Sanctuary overlook (Witteman and Beck 1991). This release appeared to be more successful than previous ones. Releases were discontinued until the spring of 1995 due to the low production of rails at captive breeding facilities.

Beginning in 1995, the release site was moved further inside the forest to the east from the 1991 release site. So far, 267 rails have been released on Rota: 21 in December 1989, 33 in February 1991, 15 in March 1995, 30 in August 1995, 15 in September 1995, 15 in April 1996, 19 in April 1997, 19 in June 1998, 50 in February 1999, and 50 in August 1999 (DAWR 1995-1998).

## **METHODS**

### Study Site Description

The release area is a coastal limestone cliff area located on the eastern end of the island on a narrow shelf of native limestone forest bound by upper and lower limestone cliffs. South of the shelf and bordering the ocean is a large seabird nesting colony. The remaining area is a mixture of native forest pockets, scrub (secondary growth), and clearings with coconut plantings.

### Release Method

Guam rails arrived on Rota via commercial airplane. Fifty rails (25 males, 25 females) were released between 9-12 February 1999 and 50 more (25 males, 25 females) were released between 4-6 August 1999. All birds had serially numbered aluminum bands on the right leg. Twenty-seven of the 100 birds were placed inside a temporary 2.5 ha enclosure that was constructed at the eastern end of the former release area that was built before the June 1998 release. The enclosure is constructed of 6' x 1" chicken wire and is tacked to trees in the forest using staples, wire, and plastic ties.

### Predator Control

As many as 17 live traps were set along the trail in the release area to control feral cat (*Felis domesticus*) and monitor lizard (*Varanus indicus*) populations. Cat traps were placed 100-200 m apart along the trail for a distance of about 2 km. Canned cat food was used as bait. Traps were set for capture all day as monitor lizards were also targeted for capture. Following capture of a cat or monitor lizard, the animal was killed with a pellet gun, weighed, measured, classified to age and sex, and its gut contents checked for remains of rails.

### Radiotelemetry

Fifty-one birds (26 in February, 25 in August) were equipped with backpack mounted radio transmitters (Holohil Systems Ltd.). Radio-marked birds were relocated using a Telonics TR-2 portable receiver/scanner and a hand-held antenna. Locations of radio-marked rails were recorded according to the station (every 25 m along the main trail) to which they were the closest. If rails dispersed out of the release area and away from the trail, general topographical and geological features were used to describe the bird's location. Birds were periodically flushed to determine if nests or broods were present. Data was collected on survivorship, mortality, and dispersal. Extensive ground searches were made to locate birds that dispersed and whose radio signals could not be found in the release area.

### Supplemental Feeding

Supplemental food stations were set up inside the enclosures and in the release area in an attempt to get the rails to stay in the release area. The food (captive diet) was presented in the same manner on Rota as it was in captivity on Guam. Every morning, fresh food was put in a plastic dish under a tent of aluminum and wood to protect it from rain. Once it was determined that a station was being used, a temporary blind was placed near the station to visually monitor the birds. Feeding and mating behaviors were recorded.

## RESULTS

### Predator Control

No cats or monitor lizards were trapped during 796 trap nights this fiscal year (Table 1).

Table 1. Predator trapping results at the rail release area on Rota, 1995-1999.

Year	trap nights	monitor lizards		feral cats	
		Total No. caught	Cature rate per 1,000 trap nights	No. caught	per 1,000 trap nights
1995	1,322	5	3.78	9	6.81
1996	3,218	9	2.80	10	3.12
1997	1,498	2	1.34	4	2.67
1998	1,858	1	0.54	9	4.84
1999	796	0	0.00	0	0.00
<b>Total</b>	8,692	17	1.96	32	3.68

### Mortality, Survival, and Movements

Based on radio-marked birds with known fates (n=23, either counted as alive or dead at the end of the reporting period), mortality was 61% and survivorship was 39% (Table 2). Assuming the mortality rate of non-radio-marked birds was the same as radio-marked birds, an estimated 39 birds are still surviving as of 30 September 1999. If birds with unknown fates were considered alive at the end of the reporting period, the number of birds alive would significantly increase to 74. If birds whose fates were unknown were considered dead at the end of the reporting period, the number alive would be as few as 18 (see Table 2).

Five of the 14 deaths were due to cat predation, while 6 birds died of unknown causes. One bird died when it was trapped in a cat trap for several days, and two were run over by vehicles. Of the 28 radio-marked birds with unknown fates, 9 birds had mortality signals turn on but the transmitters were not recovered, 3 birds dropped their transmitters, 3 radios failed prematurely, and contact was lost with 13 birds (Table 2).

Table 2. Fates of 51 radio-marked rails released on Rota in 1999.

	Dead	Radio Failure	Mortality Signal	Lost Signal	Dropped Transmitter	Alive
February	6	3	4	6	3	4
August	8	0	5	7	0	5
<b>Totals</b>	14	3	9	13	3	9

Rails released in February lived an average of 103 days (237-day reporting period, range = 3 – 237) and moved a mean of 908 m from the release site (range = 200–2,300 m). Birds released in August lived an average of 29.9 days (63-day reporting period, range = 4 – 63) and moved an average of 867 m from the release site (range 200-3,000 m) (Tables 3, 4). Nine birds (four from February, five from August) lived to the end of the reporting period.

Eight of nine radio-marked birds escaped the enclosure within 10 days during the reporting period. Only one bird stayed in the enclosure longer than 10 days (52 days), but it died inside the enclosure. Rails that escaped from the enclosure moved a mean distance of 850 m away from the release site, with the longest documented distance being 2.0 km.

## Reproduction

Five nests were documented during FY99 (Table 5). Average clutch size was 3.4 eggs (range 2 – 5). Birds released in February produced four nests, with nine of the 15 eggs hatching. One nest was found with two eggs that were laid by a female from the August release. This nest was still unhatched at the end of the reporting period. Nests were built an average of 1,280 m from the release site, all to the west-southwest. Nests tended to be in open areas of grasses and shrubs surrounded by secondary growth forest. In addition to documented nests, two juvenile rails were seen with a radio-marked adult male in the limestone forest below the Bird Sanctuary overlook, and chicks were heard with male 164.178 prior to the discovery of what appeared to have been a subsequent nest (Table 5).

Table 5. Nesting of Guam rails on Rota, 1999. Each of the radio-marked birds listed below paired and nested with non-radio-marked birds or birds whose radios slipped or malfunctioned.

Radio Frequency (Mhz)	Sex	Date Found	Date Hatched	# Eggs	# Hatched	Distance from Release Site (m)
164.011	F	6 Jul	14 Jul	4	3	1,200
		13 Aug <sup>a</sup>	23 Aug	5	2	1,200
164.709	M	27 Jul	11 Aug	3	3	1,700
164.178	M	23 Aug	27 Aug	3	1	1,100
164.114	F	27 Sep	-----	2	---	1,200

<sup>a</sup>Second nest of female 164.01

## **DISCUSSION**

Although no cats were trapped this fiscal year, 5 of the 14 rail deaths (36%) were attributed to cat predation. All of these deaths occurred down in the seabird colony, where daily cat trapping was logistically difficult. On one occasion, a large male cat was seen near the site of a rail kill. The decrease in capture rate and the high number of deaths contributed to feral cat predation in 1999 is an indication that trapping has been locally effective around the release site, but that an expanded effort is needed in the seabird colony where rails are dispersing. It is advisable to increase the cat trapping effort by either increasing the number of traps or by actively hunting cats at night, or both, and periodically relocating traps in order to minimize the chances that cats habituate to their location.

Although no monitor lizards were trapped during FY99, they are still a potential predator of adult rails, chicks, and eggs. Continuing to trap and remove monitor lizards from the area is advisable.

No aerial surveys were conducted this year to find lost birds. However, as 13 signals were lost, it is advisable to continue aerial surveys to locate those birds that have dispersed from the release area or are in areas inaccessible on foot.

The 2.5-ha corral in the release area was again not successful in reducing rail dispersal, as only one bird stayed in the pen longer than 10 days (52 days). If the pen is to be effective in keeping the rails from dispersing, the fence needs to be separated from the vegetation of the forest on the inside of the pen by 2-3 m. This will make it difficult for rails to escape by climbing the vegetation and jumping over the fence. Unfortunately, this option requires too much habitat modification to be considered a preferred method.

The nesting success documented in 1995 and 1999, when 45-50 birds were released together, indicates that releases of large cohorts of Guam rails is key in overcoming

dispersal and mortality, regardless of release method. No nesting was documented for any individuals released in smaller groups, either within or outside of the corral.

## **CURRENT STATUS OF PROGRAM**

Guam rails continued to be monitored on Rota by Stan Taisacan, formerly of the CNMI, Division of Fish and Wildlife. Mr. Taisacan is contracted by DAWR to assist with monitoring rails. Releases of at least 50 Guam rails per group will continue into FY00.

## **RECOMMENDATIONS**

1. Continue to trap and remove feral cats and monitor lizards from Sagua'gahga forest and surrounding areas.
2. Improve the enclosure to reduce the escape rate of rails.
3. Investigate the possibility of changing the release site or releasing some rails at the Bird Sanctuary parking area, where at least 5 pairs have established territories. Increase release cohorts to 50 birds minimum every 3-6 months until the birds become established. Resume periodic aerial surveys to find radio-marked birds that may have dispersed from the release area.
4. Continue the use of supplemental feeding stations as this may help to reduce dispersal and facilitates observation of birds.

## **ACKNOWLEDGEMENTS**

The USFWS and DFW staff on Rota were extremely helpful in supplying manpower and vehicles, and assisting with the transportation of rails and equipment into the forest. Stan Taisacan was contracted to assist with monitoring the movements, survival, and reproduction of rails after DAWR staff and volunteers returned to Guam. The Cincinnati Zoo sponsored Guam rail keeper Chris Edelen to participate in the February 1999 release. Chris assisted with predator control, and monitoring movements and survival of rails.

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