Mariana Common Moorhen
(*Gallinula chloropus guami*)

5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii

5-YEAR REVIEW

Species reviewed: Mariana Common Moorhen (*Gallinula chloropus guami*)

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5-YEAR REVIEW
Mariana Common Moorhen/ *Gallinula chloropus guami*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:
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Lead Field Office:
Pacific Islands Fish and Wildlife Office, Gina Shultz, Deputy Field Supervisor, (808) 792-9400

Cooperating Field Office(s):
N/A

Cooperating Regional Office(s):
N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning on March 8, 2007. The Recovery Plan for the Mariana Common Moorhen (= Gallinule), *Gallinula chloropus guami* (USFWS 1991) was the primary source of information for this five-year review. However, updates on the status and biology of this species were also obtained from other sources, mainly from local agencies and researchers recently or currently working on this species. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Vertebrate Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and Territory of Guam. Federal Register 72(45): 10547-10550**.**

1.3.2 Listing history

Original Listing
FR notice: USFWS. 1984. Endangered and threatened wildlife and plants; determination of endangered status for seven birds and two bats of Guam and the Northern Mariana Islands. Federal Register 49(167): 33881-33885**.**
Date listed: August 27, 1984
Entity listed: Species
Classification: Endangered

Revised Listing, if applicable
FR notice: N/A
Date listed: N/A
Entity listed: N/A
Classification: N/A

1.3.3 Associated rulemakings: None

1.3.4 Review History:
Species status (FY 2008 Recovery Data Call [September 2008]):
Stable

1.3.5 Species' Recovery Priority Number at start of this 5-year review:
9

1.3.6 Current Recovery Plan or Outline
Name of plan or outline: Recovery plan for the Mariana common moorhen (=Gallinule), *Gallinula chloropus guami*
Date issued: September 1991
Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?
__X__ ***Yes***
_____ ***No***

2.1.2 Is the species under review listed as a DPS?
____ ***Yes***
_X__ ***No***

2.1.3 Was the DPS listed prior to 1996?
____ ***Yes***
____ ***No***

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

____ ***Yes***
____ ***No***

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

____ ***Yes***
____ ***No***

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

____ ***Yes***
_X__ ***No***

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Yes***
____ ***No***

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

_X__ ***Yes***
____ ***No***

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

_X__ ***Yes***
____ ***No***

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

The threats (Factors A, B, C, and E) affecting this species are discussed in Section I, Reasons for Declines and Current Threats, of the recovery plan (USFWS 1991). The main threat to the Mariana common moorhen currently is loss and degradation of wetland habitat (Factor A), including filling, alteration of hydrology, invasion of habitat by nonnative plants, and unrestricted grazing. The second greatest threat to the species is predation by introduced species. The impacts of disease are not known at this time (Factor C: predation and disease). Other natural or manmade factors (Factor E) that threaten the species are environmental contaminants and fires. Overutilization (Factor B) may have been a threat in the past in the form of hunting as the Mariana common moorhen was historically used as a food item by the local Chamorro people. Although hunting of the species is not currently allowed, poaching may be a problem (USFWS 1991). The inadequacy of existing regulatory mechanisms (Factor D) is not known to be a concern at this time.

Downlisting criteria

To protect and manage wetlands and maximize Mariana common moorhen productivity and survival throughout its range, downlisting criteria are:

(1) A total of 240 ha (600 acres) of suitable wetland habitat on Guam, 120 ha (300 acres) on Saipan, and 30 ha (75 acres) on Tinian should be protected and managed.

(2) Population densities should be equal to or greater than 2.5 birds/ha (1bird/acre), or 600 adult birds for Guam, 300 for Saipan, and 75 for Tinian.

(3) Population numbers and densities must be maintained for 5 consecutive years.

Delisting criteria

Delisting criteria for the Mariana common moorhen have not been determined. Action number 4 in the recovery plan is to determine the biological parameters needed for development of delisting criteria (USFWS 1991).

At this time, none of the recovery criteria from the recovery plan have been met. Almost none of the primary wetlands listed in Table 1 are protected or managed and even fewer of the secondary wetlands in Table 1 have been protected. Second, Mariana common moorhen populations are still at lower levels on all three islands than needed for downlisting. Finally, population numbers appear to be fluctuating and may have declined at some wetlands (Stinson *et al*. 1991, Takano 2003, Takano and Haig 2004a, b, USFWS 1991).

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

The most recent work on the Mariana common moorhen was conducted in 2001 (Takano 2003, Takano and Haig 2004a, b). This research suggests that moorhens on Tinian and Saipan should be treated as a single demographic unit due to movements between the islands at the onset of the wet season (Takano and Haig 2004b).

No intra-island movement was detected for moorhens radio-tagged on Guam. The home range of birds on Guam averaged 3.1 ± 4.8 ha (SD) and mean core area differs during the wet and dry seasons (Takano and Haig 2004a). Females were found to have smaller mean core areas than males during the dry season. Rivers were found to be important for moorhens on Guam and their use of rivers increased during the wet season. The extent of moorhen use of rivers was previously unrealized (Takano and Haig 2004a).

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Surveys in 2001 indicate that the moorhen population may have decreased on Tinian and Guam since 1991 when surveys were previously conducted on all three islands (Stinson *et al*. 1991, Takano and Haig 2004a). Although more moorhens were counted on Saipan in 2001 than 1991, there are some differences in methodology and the number of wetlands surveyed between the two years (the 2001 survey was more comprehensive) that make evaluating changes in the numbers difficult. Because multiple surveys were conducted simultaneously on Saipan and Tinian, the 2001 results may be more accurate than previous survey efforts (Takano and Haig 2004a). However, increased accuracy of counts does not resolve issues such as survey effort or differing methodology.

In addition to the decline of Mariana common moorhens on Guam reported by Takano and Haig (2004a), the number of moorhens has recently decreased at Fena Lake, potentially due to the loss of *Hydrilla verticillata* (a wetland plant used by moorhens as a nesting substrate) resulting from eutrophication of the lake after a typhoon (A. Brooke, U.S. Navy, pers. comm. 2008). While it is possible the Guam population has not declined overall since the 2001 surveys and that birds moved to other wetlands, comprehensive surveys on Guam would be needed to assess that possibility.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

The population structure of the Mariana common moorhen was recently examined using mitochondrial DNA from 35 individuals from Guam and Saipan. The results suggest a severe lack of genetic diversity and support the view of a single conservation unit for the Mariana common moorhen (Evans *et al*. 2005).

2.3.1.4 Taxonomic classification or changes in nomenclature:

No new information

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

In 1995, Mariana common moorhens were observed at artificial wetlands created at a golf resort on the island of Rota (Worthington 1998). Prehistorical evidence suggests that moorhens once occurred on Rota but were extirpated possibly due to human-related loss of wetlands, elimination of wetlands due to sea-level changes, hunting, or introduced predators (Becker and Butler 1988, Steadman 1992, Stinson *et al*. 1991). It is not known whether the birds moved to Rota from Guam, Tinian, or Saipan. Guam is closer, but moorhens on all islands show considerable inter-island movement (Worthington 1998) and to date, inter-island movement has not been confirmed from Guam (Takano 2003). Moorhens were still present on Rota in 2002 (Takano and Haig 2004a).

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

Fena Lake experienced a loss of wetland vegetation, possibly due to eutrophication after a recent typhoon, potentially making it less desirable for Mariana common moorhens. Recent surveys indicate a decline in numbers of moorhens using the lake (A. Brooke, pers. comm. 2008). Most of the other wetlands in the Mariana Islands are also in compromised condition due to a number of factors (see Synthesis section below).

Sightings of brown treesnakes (*Boiga irregularis*) on Saipan suggest that it may be in the process of becoming established there (Rodda and Savidge 2007). The brown treesnake was accidentally introduced to Guam around 1949 causing the extirpation or extinction of 13 of Guam's 22 native breeding birds (Rodda and Savidge 2007) and is strongly suspected of preying on moorhens (Takano and Haig 2004a). The spread of the brown treesnake to Saipan, Tinian, or Rota would likely have a negative impact the Mariana common moorhen population.

2.3.1.7 Other:

The possibility of avian influenza or West Nile virus reaching the Mariana Islands from Asia or the U.S. mainland is a recent concern. The impact these two diseases may have on the Mariana common moorhen is not known at this time, but they could have deleterious impacts if they reach the Mariana Islands.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms) [see Synthesis, section 2.4]

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

2.3.2.3 Disease or predation:

2.3.2.4 Inadequacy of existing regulatory mechanisms:

2.3.2.5 Other natural or manmade factors affecting its continued existence:

2.4 Synthesis

According to the National Wetland Inventory maps for the Commonwealth of the Northern Mariana Islands (CNMI), in 1983 there were approximately 300 ha (740 acres) of wetlands (although this figure apparently does not include some wetland types) on Saipan, Tinian, Rota, and Pagan, or less than 2 percent of the total land area of the CNMI (Burr *et al*. 2005). Undated anecdotal reports indicate that there used to be three times as many wetlands in the CNMI as occur now (Burr *et al*. 2005). Guam has more wetlands and a wider variety of wetland types than does the CNMI, and significant losses of wetlands have occurred on Guam as well, although it is difficult to quantify the extent of the losses (Wiles and Ritter 1993). The 1983 National Wetland Inventory maps for Guam indicate that there were approximately 2,023 ha (5,000 acres) of wetlands at that time, or slightly less than 4 percent of the total land area of Guam (Guam EPA 2008).

The condition of remaining wetlands in the Mariana Islands is generally poor for a number of reasons, including filling, dredging, altered hydrology, invasive introduced plants, introduced vertebrate predators, ungulate disturbance, fires, erosion, pollution, and even volcanic activity (Stinson 1993, Wiles and Ritter 1993). Development and implementation of a plan is essential to secure and manage the wetlands necessary for the recovery of this species. The ability to secure and protect wetlands is made more difficult due to the fact that in the

CNMI, only those of Chamorro descent may own lands. However, the National Park Service has leased lands at American Memorial Park on Saipan which includes the last mangrove wetland on Saipan, and it is possible to develop cooperative agreements with private landowners. For example, the Guam Division of Aquatic and Wildlife Resources is working on a Safe Harbor Agreement for the Guam rail (*Gallirallus owstoni*). The CNMI government has also considered the possibility of establishing a wetland mitigation bank in the future (Gilman 1997).

Reports indicate that many of Guam's natural wetlands are heavily invaded by the *Phragmites karka* reed (Ritter and Savidge 1999, Takano and Haig 2004b). Lake Hagoi is also subject to encroachment by *Phragmites karka* and two seasonal wetlands on Tinian are overgrown with vegetation (USFWS 1996). Many wetlands on Saipan are also overgrown with vegetation, particularly *Phragmites karka* (A. Marshall, USFWS, pers. obs. 1994-2007). Permanent wetlands on Saipan and Guam are also impacted by the presence of tilapia (*Oreochromis mossambicus*) which is believed to degrade habitat for wetland birds by depleting the invertebrate prey base used by these birds (Marshall and Worthington 1996, USFWS 2005). Monitor lizards (*Varanus indicus*) were recorded in Lake Hagoi, Tinian during moorhen nest searches (USFWS 1996). The extent of predation on moorhens by monitor lizards is unknown, but monitor lizards are opportunistic and omnivorous, eating small mammals, insects, other lizards, birds, and eggs (McCoid and Witteman 1993; S. Vogt, U.S. Navy, pers. comm. 2006). In the Marianas, monitor lizard predation has been confirmed on Mariana common moorhen eggs (*Gallinula chloropus guami*), Micronesian megapodes (*Megapodius laperouse*) (S. Vogt, pers. comm. 2006), and a yellow bittern (*Ixobrychus sinensis*) chick in a nest in a coconut tree (G. Wiles, Washington Department of Fish and Game, pers. comm.., 2006). Establishment of the brown treesnake on Saipan or Tinian would also likely negatively impact the Mariana common moorhen population.

Another recent concern is that West Nile virus or avian influenza may reach the Mariana Islands and pose a risk to the Mariana common moorhen. There are embargos on shipping some birds to the islands, but more work is needed to help reduce the possibility of these diseases arriving here. Efforts are currently ongoing in the islands to monitor birds through surveillance and collection of dead birds for early detection of avian influenza.

There is much work to be accomplished in order to recover this species. The main threat is currently loss and degradation of wetlands. This is an issue that crosses several agencies and cooperation between managers is essential. Public outreach may also help to increase public interest in preserving wetlands and the native avifauna of the Mariana Islands.

Although the Mariana common moorhen still occurs on three islands in the Mariana Archipelago, little management occurs within the species' natural

habitat, numbers appear to have declined in many wetlands, and the major threats to the species have not been addressed. The habitat and population recovery goals for this species have not been met. Therefore, the Marian common moorhen meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
_X__ No change is needed

3.2 New Recovery Priority Number: N/A

Brief Rationale:

3.3 Listing and Reclassification Priority Number: N/A

Reclassification (from Threatened to Endangered) Priority Number: ____
Reclassification (from Endangered to Threatened) Priority Number: ____
Delisting (regardless of current classification) Priority Number: ____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Determine which of the primary and secondary wetlands are needed on each island for recovery and develop a plan that will prioritize efforts to work toward their protection and management. The rivers of Guam need to be incorporated into this determination.

- Work with Guam Division of Aquatic and Wildlife Resources, CNMI Division of Fish and Wildlife, and the U.S. Navy to develop: (a) standardized methodology for Mariana common moorhen surveys at the various wetlands; and (b) a plan to conduct regular monitoring of the wetlands on all islands for the Mariana common moorhen as well as monitoring the condition of the wetlands.

- Develop cooperative agreements with private landowners for wetlands that occur on private lands and that are determined to be necessary for recovery.

- Develop management plans for restoring the wetlands, incorporating methodology for removing nonnative invasive plants, improving hydrology, removing predators effectively, and removing grazing ungulates where necessary.

- Keep abreast of research on improvements in predator control and implement improved methodology.

- Conduct brown tree snake control at Guam wetlands. Continue brown tree snake surveillance and interdiction strategies to reduce the possibility of the brown tree snake becoming established on other islands.

- Minimize human disturbance of wetlands.

- Research biological parameters needed to determine delisting criteria.

- After delisting criteria are determined, all islands with Mariana common moorhen should be resurveyed to determine their status, and the recovery plan should be revised incorporating the new information.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Mariana Common Moorhen (*Gallinula chloropus guami*)

Current Classification: ___E___

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X__ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:_____

Review Conducted By:
Ann P. Marshall, Fish and Wildlife Biologist
Holly Freifeld, Vertebrate Recovery Coordinator
Marilet A. Zablan, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species
Gina Shultz, Deputy Field Supervisor

Approved: _____ Date 29 July 09
Acting Field Supervisor, Pacific Islands Fish and Wildlife Office