

5-YEAR REVIEW

Short Form Summary

Species Reviewed: Micronesian Megapode or Sasangat

(*Megapodius laperouse laperouse*)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2014. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 5 species in Oregon, Palau, Guam, and the Northern Mariana Islands. Federal Register 79(32):9263-9264.

Lead Region/Field Office: Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai'i

Name of Reviewer(s):

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Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS). The review was based on a review of current, available information since the last 5-year review for the Micronesian Megapode (USFWS 2010). This review was improved by comments from the local CNMI Department of Lands and Natural Resources and the Division of Fish and Wildlife. The evaluation by Annie Marshall with Fred Amidon, Fish and Wildlife Biologists, was reviewed by the Mariana Islands Team Manager and the Conservation and Restoration Team Manager before submission to the Programmatic Deputy Field Supervisor for review and approval.

Background:

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the previous 5-year review for the Micronesian Megapode published on August 27, 2010 (available at http://ecos.fws.gov/docs/five_year_review/doc3338.pdf) for a complete review of the species' status, threats, and management efforts. We recommend that the Micronesian Megapode be reclassified as threatened based on new survey information.

The Micronesian Megapode, known as *sasangat* in Chamorro and *sasangal* in Carolinian, is a pigeon-sized bird of the forest floor. The family Megapodiidae, in the order Galliformes (*e.g.*, chickens, turkeys, pheasants, quail), is found in the broader Indo-

Australasian region of the world, including islands in the western Pacific, Australia, New Guinea, the islands of Indonesia east of the Wallace line, as well as the Andaman and Nicobar Islands in the Bay of Bengal (Dekker *et al.* 2000, Pratt *et al.* 1987, USFWS 1998). This subspecies is endemic to the Mariana Islands and differs slightly from the Palauan subspecies (*Megapodius laperouse senex*) in color, vocalizations, and morphology (USFWS 1998). The Micronesian Megapode once occurred throughout the Mariana archipelago, but was extirpated from Guam, Rota, and possibly Saipan in the 19th and early 20th centuries (USFWS 1998). Remnant populations were believed to persist on Aguiguan, Tinian, and Farallon de Medinilla (FDM), as well as a small reintroduced population on Saipan (USFWS 1998). Larger numbers were believed to remain on the mostly, uninhabited northern islands of Anatahan, Sarigan, Guguan, Pagan Maug, Alamagan, Asuncion, and possibly Agrihan (USFWS 1998). It is not known how many individuals existed at the time of listing (USFWS 1970). There were an estimated 1,440 to 1,975 individuals on 11 to 12 islands in the Mariana Archipelago in 1998 (USFWS 1998).

In 2009 and 2010, the USFWS Pacific Islands Fish and Wildlife Office coordinated surveys in the Commonwealth of the Northern Mariana Islands (Amidon *et al.* 2011). Based on these surveys, the current range-wide population estimate for the Micronesian Megapode is approximately 10,727 individuals (95% CI; 6,682-15,445) with the majority of birds on the islands of Sarigan, Guguan, and Asuncion (Amidon *et al.* 2011; Table 1). During the surveys, megapodes were counted on Aguiguan, Saipan, Anatahan, Sarigan, Guguan, Alamagan, Pagan, Asuncion, and Maug. The FDM information is from a 2009 survey of FDM (Vogt 2009).

The current status for the Micronesian Megapode, as known, is provided in Table 2 below. Threats to the species (Table 2) continue, including habitat loss and degradation, overgrazing by feral ungulates (goats, pigs, and cows), predation by introduced species (rats, feral dogs, cats, and pigs, and monitor lizards), the potential for the introduction of the brown treesnake (*Boiga irregularis*), possible competition from introduced Phasianidae (pheasants, quail, and francolins), poaching, stochastic events (volcanism, typhoons, and drought), and more recently, climate change (USFWS 1998, 2010).

New status information:

- The most recent population estimate for the Micronesian Megapode in the Mariana Islands is over 10,500 individuals on 12 islands with the majority of the population found on Sarigan, Guguan, and Asuncion (Amidon *et al.* 2011; Table 1).

New Threats:

- Human Disturbance - Military activities mortality and reduced viability – Department of the Navy’s (DON) CNMI Joint Military Training (CJMT) proposed training on Pagan could generate noise levels, increase the chances of invasive species introductions, and increased human presence on the island that could negatively impact the Micronesian Megapode on that island. In addition, FDM continues to be used as a bombing target.

New management actions:

- Predator / herbivore monitoring and control – Efforts continue on Guam to control the brown treesnake at ports of entry and on military lands. In recent years, acetaminophen has been used as a toxicant to control snakes within a 55-hectare (136-acre) fenced area on Anderson Air Force Base (AAFB), Guam. In addition, a brown treesnake strategic plan was finalized in 2015.
- Climate change degradation of habitat – Climate change may pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs in the near future. Typhoons may be the main threat to this species as a result of climate change. Climate models indicate that hurricanes in the northwestern Pacific are expected to increase in intensity (5.4%), frequency (2.8%) and duration (1.4%) by 2100 and continue to increase further into the future (Emanuel *et al.* 2008).

Synthesis:

Downlisting, and delisting objectives are provided in the recovery plan for Micronesian Megapode (USFWS 1998). To be downlisted to threatened: 1) there must be a brown treesnake interdiction and control plan in place and implemented for all of the Mariana Islands; 2) current threats to all extant megapode populations must be assessed and controlled; and 3) the comparatively large populations on Anatahan, Sarigan, Guguan, Pagan, and Maug must remain at their current levels or be increasing for a period of 5 years.

The downlisting goals for this species have not been met (Table 2) and not all threats are being managed (Table 3). If we use only the recovery plan as a guideline, the Mariana subspecies of the Micronesian Megapode meets the definition of endangered as it remains in danger of extinction throughout its range. But recovery plan guidelines are not our only consideration for a species' status.

The delisting criteria should also be considered: The total number of Micronesian megapodes in the Mariana Islands should be at least 2,650 birds distributed over 10 islands, including at least 2 populations of 600 birds or greater, 3 populations of 300 or greater, 2 populations of 200 or greater, and 3 populations of 50 or greater. All populations must be stable or increasing for 5 consecutive years after achieving these levels. Currently, the 10 island criterion has not been met, but the current estimate of 10,727 individuals is nearly five times greater than the 2,650 birds recommended for delisting. It is believed that the increased estimates are in part due to increased survey effort as many of the previous island surveys were limited in time and scope due to logistical constraints (Amidon *et al.* 2011). However, other factors also influenced the population estimates of that study and it will be important to conduct additional archipelago-wide surveys to better assess the status of this species.

The distribution goals of the delisting criteria have not been met: There are 2 populations of 600 or greater (Asuncion and Sarigan), 3 populations of 300 or greater (Guguan, Maug, and Alamagan), and 3 populations of 50 or greater (Aguiguan, Pagan, and Sarigan). However, there are not 2 populations of 200 or more as there are not 2 other populations (not including Anatahan (population crashed due to volcanic eruption) and FDM (still undergoing bombing activity)). This loss of distribution may not provide enough buffer against stochastic events. Another consideration is that 4-5 of the populations are in direct contact with humans to some extent (Saipan, Pagan, Alamagan, Aguiguan, and Agrihan) and human presence may increase on Pagan. Survey results show higher megapode densities on islands with low human presence, which are also islands without ungulates (Amidon *et al.* 2011).

In summary, although the 1998 recovery plan delisting goals have not been met, recent surveys (Amidon *et al.* 2011) indicate the Micronesian Megapode population is larger than previously understood and progress is being made on addressing the major threats (Table 2) so downlisting goals are nearly met. While the recent population estimate is higher than previous surveys indicated, additional archipelago-wide surveys are needed to determine the stability of the population. In addition, as long as ungulates are present on island with megapodes, habitat loss and degradation will continue to negatively impact the species. Based on this new information, we recommend the Micronesian Megapode should be reclassified as threatened.

Recommendations for Future Actions:

- Threats – predator / herbivore control research – Continue efforts to develop and refine brown treesnake control techniques to support large-scale control and/or eradication efforts. Continue to implement large-scale brown treesnake control and/or eradication efforts on Guam. Continue to work on preventing the establishment of the brown treesnake on other Mariana Islands from Guam. Determine what additional actions or changes are needed to address BTS interdiction/control.
- Threats – predator/herbivore control research – remove ungulates from the islands with larger megapode populations, including Aguiguan, Alamagan, and Pagan.
- Threats – predator/herbivore control research – Implement predator control and utilize improved methods as they become available.
- Habitat and natural process management and restoration – Determine how to improve the management of the islands with the largest megapode populations, especially those set aside as conservation areas. For example, consider rodent removal from Sarigan. In addition, Sarigan has not been officially designated by the CNMI as a conservation island.
 - Develop and implement plans to monitor Micronesian Megapode populations on all islands on a regular basis.
- Population biology research – Conduct essential research on the ecology and biology of the Micronesian Megapode in the Mariana Islands. Determine if megapodes can be supported and re-introduced to islands they have been extirpated from, for example, Rota and Tinian.

- Conduct a PVA to determine the minimum viable population number by island needed for recovery, and
- Conduct surveys every year for at least 10 years to determine actual status of the species.
- Invasive plant monitoring and control – Restore native forest and conduct forest restoration programs.
- Update the recovery plan (USFWS 1998). Use recent survey data to reevaluate and revise down- and delisting criteria as appropriate.
- There are past records of poaching, which may not be an issue currently, but may become a concern if people move permanently back to northern islands utilized by megapodes.

Table 1. Population size estimates of the Micronesian Megapode by island (Amidon *et al.* 2011).

Island	Estimate	Year	Source
Aguiguan	112	2009	Amidon <i>et al.</i> 2010
Tinian	<10	2008	Kessler and Amidon 2009
Saipan	151	2010	Amidon <i>et al.</i> 2011
FDM	28	2008	Vogt 2009
Anatahan	>20	2010	Amidon <i>et al.</i> 2011
Sarigan	2,135	2010	Amidon <i>et al.</i> 2011
Guguan	1,507	2010	Amidon <i>et al.</i> 2011
Alamagan	529	2010	Amidon <i>et al.</i> 2011
Pagan	147	2010	Amidon <i>et al.</i> 2011
Agrihan	<10	2010	Amidon <i>et al.</i> 2011
Asuncion	5,714	2010	Amidon <i>et al.</i> 2011
Maug	544	2010	Amidon <i>et al.</i> 2011
Uracus	0	2010	Amidon <i>et al.</i> 2011

Table 2. Status and trends of the Micronesian Megapode or Sasangat from listing through current 5-year review.

Date	No. adult wild individuals	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1970 (listing)	Unknown, but extirpated from Guam, Rota, Uracus (and probably Tinian).	No recovery plan developed yet.	N/A
1998 (Recovery plan, USFWS 1998)	1,440 to 1,975 on 11 to 12 islands in the Mariana Archipelago (USFWS 1998)	1. There must be a brown treesnake interdiction and control plan in place and implemented for all of the Mariana Islands.	No
		2. Current threats to all extant megapode populations must be assessed and controlled.	No

		3. The comparatively large populations on Anatahan, Sarigan, Guguan, Pagan, and Maug must remain at their current levels or be increasing for a period of 5 years.	No
2010 (5-year review)	Survey results undergoing analysis	1. There must be a brown treesnake interdiction and control plan in place and implemented for all of the Mariana Islands.	No
		2. Current threats to all extant megapode populations must be assessed and controlled.	No
		3. The comparatively large populations on Anatahan, Sarigan, Guguan, Pagan, and Maug must remain at their current levels or be increasing for a period of 5 years.	No
2016 (5-yr review)	10,727 individuals (95% CI; 6,682-15,445) (Amidon <i>et al.</i> 2011)	1. There must be a brown treesnake interdiction and control plan in place and implemented for all of the Mariana Islands.	Partial – BTS strategic plan finalized (BTTWG 2015). Barriers established at ports on Tinian and Saipan. Canine BTS detector dogs on Saipan, Tinian, and Guam. Rapid Response Team established and implemented for snake sightings. Testing large-scale toxicant use on Guam.
		2. Current threats to all extant megapode populations must be assessed and controlled.	Partial – Recent survey work in the Marianas assessed threats
		3. The comparatively large populations on Anatahan, Sarigan, Guguan, Pagan, and Maug must remain at their current levels or be increasing for a period of 5 years.	Partial - Surveys (Amidon <i>et al.</i> 2011) need to be repeated to determine if numbers are stable or increasing

Table 3. Status of threats to the Micronesian Megapode or Sasangat from listing through current 5-year review.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Habitat loss and degradation	A	Ongoing	Partial – establishment of Guguan, Asuncion, Maug and Uracus as wildlife sanctuaries by the CNMI. The Saipan Upland Mitigation Bank and the Micronesian Megapode Conservation Areas set aside on Saipan also include habitat used by the Micronesian Megapode.
Overgrazing by feral ungulates	A	Ongoing	Partial – removal of ungulates from Sarigan.
Predation by introduced species	C	Ongoing	Partial – Removal of ungulates from Sarigan. However, goats continue to be a major issue on Aguiguan, Pagan, Agrihan, and Alamagan and there are pigs and/or cows on some of these islands as well. Feral cats may also be an issue on Agrihan.
Potential for establishment of a brown treesnake population from Guam to other islands in the Mariana Archipelago	C	Ongoing	Partial – efforts to control the brown treesnake are ongoing
Potential poaching by humans	D, E	Unknown	No
Stochastic events such as typhoons and volcanic activity	E	Ongoing	No
Climate change and increased storms	E	Increasing	No

References:

See previous 5-year review for a full list of references. Only references not listed in that document are provided below.

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U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of
Micronesian Megapode or Sasangat (*Megapodius laperouse laperouse*)

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-year review:

- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- No Change in listing status

Field Supervisor, Pacific Islands Fish and Wildlife Office

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Date 9/30/16