5-YEAR REVIEW

Short Form Summary

Species Reviewed: yayaguak, chachaguak (Mariana swiftlet, *Aerodramus bartschi*)

Current Classification: Endangered

FR Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Nevada, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 88(56):17611–17614.

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

Name of Reviewer(s):

Bronson Curry, Fish and Wildlife Biologist, PIFWO
John Vetter, Animal Recovery Coordinator, PIFWO
Megan Laut, Recovery Team Manager, PIFWO

Methodology used to complete this 5-year review: This review was conducted by staff of the PIFWO of the U.S. Fish and Wildlife Service (USFWS), beginning in January 2025. The review was based on a review of current, available information since the last 5-year review for the yayaguak or chachaguak (Mariana swiftlet, *Aerodramus bartschi*) (USFWS 2020, entire). The evaluation by Bronson Curry, Fish and Wildlife Biologist, was reviewed by John Vetter, the Animal Recovery Coordinator, and Megan Laut, the Recovery Program Manager.

Background:

For information regarding the species' listing history and other facts, please refer to the USFWS Environmental Conservation Online System database for threatened and endangered species at https://ecos.fws.gov/ecp/species/8166.

Review Analysis:

Please refer to the Recovery Plan—originally published in 1991 (USFWS 1991, entire), later amended in 2019 (USFWS 2019, entire)—and the previous 5-year reviews for the yayaguak, published in 2010, 2015, and 2020 (available at https://ecos.fws.gov/ecp/species/8166), for a complete review of the species' status, threats, and management efforts. No new threats or no new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of the yayaguak as endangered.

The yayaguak is a cave-roosting bird endemic to the Mariana Islands. Historically known from the islands of Guam, Rota, Aguiguan, Tinian, and Saipan, the yayaguak has declined significantly throughout its range and is now extirpated from Rota and Tinian (Cruz et al. 2008; USFWS 1991; Valdez et al. 2011 and references therein). Threats to

the species continue, including human disturbance of caves, predation by the brown treesnake (*Boiga irregularis*), loss and degradation of foraging habitat, nest loss due to introduced insects, and severe weather events (Morton and Amidon 1996; USFWS 2010).

Although the yayaguak was originally described as a subspecies of the Vanikoro swiftlet (under the name *Aerodramus vanikorensis bartschi*), research by Browning (1993, pp. 101−104) identified morphological features and aspects of nest structure that suggested a need to elevate the yayaguak to full species status (USFWS 2023, p. 7139). Further genetic research by Lee et al. (1996, pp. 7093−7096) led to the adoption of the currently accepted scientific name *Aerodramus bartschi* along with the simplified English common name "Mariana swiftlet" (USFWS 2023, p. 7139).

New status information:

- The most recent minimum population estimate is approximately 4,479 yayaguak in the Mariana Islands, with 3,293 birds in nine colonies on Saipan, 338 in three colonies on Aguiguan, and 848 in three colonies on Guam (CNMI DFW 2022, p. 24; Liske-Clark et al. 2018, p. 14; Parker et al. 2025, pers. comm.).

- Researchers from the U.S. Geological Survey (USGS) and the CNMI Division of Fish and Wildlife (CNMI DFW) surveyed twelve caves on Aguiguan, June 6–14, 2022, to evaluate the use of videographic monitoring tools for yayaguak and paye'ye' (Pacific sheath-tailed bats, *Emballonura semicaudata rotensis*) on Aguiguan (USGS-PIERC 2022, p. 1). The methods tested included thermal imaging, near-infrared imaging, acoustic sampling, and the standard method of entrance/exit counts by observers stationed outside the cave entrance. Six of the twelve caves surveyed were confirmed to be used by yayaguak (USGS-PIERC 2022, p. 5). Preliminary results from a one-hour entrance count using thermal imaging showed 309 yayaguak entering the cave, although birds continued to enter the cave after the recording period ended (USGS-PIERC 2022, p. 5). For comparison, a total of 338 yayaguak were counted by CNMI DFW biologists stationed outside three caves during surveys in 2016 (Liske-Clark et al. 2018, p. 14), which did not include the cave surveyed by USGS in 2022 (USGS-PIERC 2022, p. 5). Because the CNMI DFW surveys were more comprehensive in scope, this number remains the best estimate of Aguiguan's yayaguak population until the results of the USGS-PIERC (2022) surveys are made available.

- CNMI DFW biologists surveyed two caves on Aguiguan in February 2021 and counted a total of 140 yayaguak (Roark et al. 2022, p. 6). Five out of seven caves surveyed were confirmed to be occupied by yayaguak (Roark et al. 2022, p. 6).

- CNMI DFW surveys yayaguak caves on Saipan twice annually, in April and October. Nine caves on Saipan are known to be inhabited, but due to access issues, only seven caves were surveyed in April 2022 (CNMI DFW 2022, p. 24). The latest available survey data suggest a minimum population estimate of 3,293 yayaguak on Saipan (CNMI DFW 2022, p. 24). Modeling of population trends from 1998 to 2022 suggests that the yayaguak population on Saipan is stable to slightly declining (CNMI DFW 2022, p. 24–25).

- A videographic monitoring study (2019–2023) of three caves on Guam showed that Mahlac Cave accounts for approximately 77% of the known yayaguak population on Guam (Gorresen et al. 2024, p. 143). Survey data from 2019, 2022, and 2023 yielded average colony size estimates of 577 birds for Mahlac Cave, 157 for Maemong Cave, and 32 for Fachi Cave (766 total) (Gorresen et al. 2024, p. 143). The estimated population size on Guam ranged from 676 to 861 birds over this time period (Gorresen et al. 2024, p. 146), a marked decline from the previous estimate of 1,549 birds reported in the 2020 five-year review (USFWS 2020, p. 2). Possible explanations for this drop in numbers include a population crash, variation in survey methods, yayaguak roosting in unknown and unmonitored caves, and the impacts of predator management efforts (i.e., brown treesnake removal) in and around the caves (Gorresen et al. 2024, p. 146).

- The U.S. Department of the Navy (DON) and Guam Department of Agriculture and Wildlife Resources (Guam DAWR) survey yayaguak caves on Guam quarterly using a combination of entrance/exit counts and in-cave visual counts. The most recent surveys (as of June 2025) recorded 680 birds in Mahlac Cave, 144 in Maemong Cave, and 25 in Fachi Cave (848 total) (Parker et al. 2025, pers. comm.).

- Separately, USGS conducts ongoing videographic monitoring of these caves using the same thermal imaging technique employed by Gorresen et al. (2024). The most recent videographic surveys (as of April 2025) recorded 517 birds in Mahlac Cave, 156 in Maemong Cave, and 35 in Fachi Cave (708 total) (Paxton 2025, pers. comm.).

- In addition to videographic surveys, USGS researchers have experimented with the use of stereographic imaging and LIDAR mapping to scan the interior surfaces of yayaguak caves on Guam in order to better understand the species' roosting habitat needs (USGS-PIERC 2024, p. 6). Experimental data were collected in 2024 and 2025, with additional data collection planned to coincide with updates to the videographic population monitoring system (USGS-PIERC 2024, p. 6; Parker et al. 2025, pers. comm.).

- USGS researchers have deployed audio recorders inside unoccupied caves on Guam to detect possible visitation by yayaguak. In 2022, three unoccupied caves were monitored for three weeks, but no yayaguak vocalizations were detected (USGS-PIERC 2024, p. 16). Refinements to the system are planned that will allow for longer audio recorder deployments in the future.

- USGS researchers have established experimental radio telemetry stations to study yayaguak movements and foraging ecology at the landscape level. Beginning in April 2023, automated telemetry stations were set up at four locations near yayaguak caves on Guam, capturing the movements of yayaguak carrying radio transmitters at distances greater than five kilometers from the roost (USGS-PIERC 2024, pp. 14–15). Additional radio telemetry work was conducted in 2024 and 2025, and analysis of the data is ongoing (Paxton 2025, pers. comm.).

- In conjunction with the radio telemetry study, captured yayaguak were banded with federal bird bands to collect mark-recapture data that will be used to model yayaguak survival. Banding is expected to continue through November 2026 in order to obtain a large enough sample for robust survival estimates (USGS-PIERC 2024, p. 16).

- Guam was struck by a category 4 typhoon (Typhoon Mawar) on May 24, 2023, approximately six weeks after the last set of videographic surveys by Gorresen et al. (2024). The three caves with yayaguak populations were surveyed in July 2023 to assess the typhoon's impact, then surveyed again in November 2023 (Paxton et al. 2024, p. 2). The July 2023 surveys showed a 7% and 8% decline from pre-Mawar numbers at Mahlac Cave and Maemong Cave, respectively; Fachi Cave was still inhabited by yayaguak but could not be directly counted at the time (Paxton et al. 2024, p. 3). While these declines were not significantly outside the range of normal fluctuations in population size observed during the 2019–2023 period, the November 2023 surveys showed more dramatic declines of 22%, 19%, and 40% from pre-Mawar numbers at Mahlac, Maemong, and Fachi, respectively (Paxton et al. 2024, p. 3). Possible explanations for these declines include the typhoon's impacts on food resource availability (for both the yayaguak and its predators, i.e., rodents and snakes), overall forest health, and yayaguak reproductive success. These impacts may have been less visible in the weeks immediately following the storm, but they were readily apparent by six months post-typhoon (Paxton et al. 2024, p. 6).

New threats:
- There are no new threats known at this time.

New management actions:
- Threat management – Predator management (i.e., brown treesnake control) within and around yayaguak caves on Guam is ongoing. Control methods include deployment of toxicant baits along perimeter fences and weekly in-cave removal of snakes by hand; there is also a proposal to initiate rodent control using automatic traps.

- Threat management – Research into brown treesnake control methods may lead to improvements in snake suppression that could benefit the yayaguak on Guam. Areas of ongoing research include an investigation of acetaminophen toxicity in Marianas bird species and a study of snake-control bait take by little fire ants (*Wasmannia auropunctata*).

- Habitat restoration – At least one cave occupied by yayaguak is partially obstructed by non-native trees growing in front of the entrance, constricting the airspace and possibly also facilitating entry by the brown treesnake, an arboreal species. DON has proposed trimming these trees, beginning in 2025, to maintain the flyway and remove a possible source of entry by the brown treesnake.

Table 1. Status and trends of yayaguak from listing through current 5-year review.

Date	No. Adult Wild Individuals	Downlisting Criteria Identified in Recovery Plan	Downlisting Criteria Completed?
1984 (listing)	50 on Guam, Aguiguan may be stable, Saipan declining (USFWS 1984)	No recovery plan developed yet.	N/A
1991 (recovery plan)	400 on Guam, 970 on Aguiguan, and 3,160 on Saipan (USFWS 1991)	1. Minimum subpopulations of 2,000 birds on Guam, 2,000 on Rota, 1,000 on Aguiguan, and 2,000 on Saipan.	No
		2. Populations must be distributed among at least five caves on each island except Rota.	No
		3. On Guam, at least two of the five occupied caves must be in northern Guam, and two in southern Guam.	No
		4. Total population numbers, once increased, must be sustained over three consecutive years.	No
2010 (5-year review)	>5,000 individuals, with the majority on Saipan (>5,000), <500 on Aguiguan, and 900–1,150 on Guam (Cruz et al. 2008, USFWS 2010)	1. Minimum subpopulations of 2,000 birds on Guam, 2,000 on Rota, 1,000 on Aguiguan, and 2,000 on Saipan.	Partially: >5,000 on Saipan
		2. Populations must be distributed among at least five caves on each island except Rota.	No
		3. On Guam, at least two of the five occupied caves must be in northern Guam, and two in southern Guam.	No

		4. Total population numbers, once increased, must be sustained over three consecutive years.	No
2015 (5-yr review)	Approximately 6,750 individuals, >5,000 on Saipan, 1,000 on Guam, and 300–400 on Aguiguan (Grimm 2008, Valdez et al. 2011; P. Radley, DFW, unpubl. data)	1. Minimum subpopulations of 2,000 birds on Guam, 2,000 on Rota, 1,000 on Aguiguan, and 2,000 on Saipan.	Partially: >5000 on Saipan
		2. Populations must be distributed among at least five caves on each island except Rota.	No
		3. On Guam, at least two of the five occupied caves must be in northern Guam, and two in southern Guam.	No
		4. Total population numbers, once increased, must be sustained over three consecutive years.	Partially: >5,000 on Saipan since 2010 (Cruz et al. 2008; Valdez et al. 2011 cited P. Radley, DFW, unpub. data)
2019 (revised recovery plan)		An amendment to the recovery plan identified new downlisting and delisting criteria. The NEW downlisting criteria are used below.	
2020 (5-yr review)	Approximately 5,200 individuals, >3,817 on Saipan, 1,000 on Guam, and 338 on Aguiguan (Johnson et al.	1. Over a minimum 15-year period, Mariana gray swiftlet population data on Saipan, Aguiguan, and Guam show a stable or increasing trend (i.e., finite rate of annual population increase, or Lambda, greater	Partially: >3,000 on Saipan, but Guam and Aguiguan population goals have

	2018, DAWR 2020)	than or equal to 1) that is statistically significant, as determined through quantitative surveys of abundance or an index of abundance derived from quantitative surveys or demographic monitoring; and the average population throughout that time period is estimated to be at least 2,000 birds on Guam, 2,000 on Saipan, and 1,000 on Aguiguan.	not been met.
		2. Sufficient Mariana swiftlet roosting and nesting habitat (i.e., occupied and potentially-occupied caves) is protected and managed to achieve Criterion 1 above, with the populations distributed among at least five caves on each island. On Guam, at least two of the five occupied caves should be in northern Guam.	No; Guam has three occupied caves, all located in southern Guam.
		3. Threats to the species, including predation by introduced predators, nest damage, and pesticide impacts, are effectively managed so as to minimize mortality and to meet Criterion 1 above, and are expected to continue to be so for the foreseeable future.	No
2025 (5-yr review)	Approximately 4,479 individuals (3,293 on Saipan, 338 on Aguiguan, and 848 on Guam) (CNMI DFW 2022, p. 24; Liske-Clark et al. 2018, p. 14; Parker et al. 2025, pers. comm.)	1. Over a minimum 15-year period, Mariana gray swiftlet population data on Saipan, Aguiguan, and Guam show a stable or increasing trend (i.e., finite rate of annual population increase, or Lambda, greater than or equal to 1) that is statistically significant, as determined through quantitative surveys of abundance or an index of abundance derived from quantitative surveys or	Partially; >3000 birds on Saipan, but Guam and Aguiguan population goals have not been met.

		demographic monitoring; and the average population throughout that time period is estimated to be at least 2,000 birds on Guam, 2,000 on Saipan, and 1,000 on Aguiguan.	
		2. Sufficient Mariana swiftlet roosting and nesting habitat (i.e., occupied and potentially-occupied caves) is protected and managed to achieve Criterion 1 above, with the populations distributed among at least five caves on each island. On Guam, at least two of the five occupied caves should be in northern Guam.	No; Guam has three occupied caves, all located in southern Guam.
		3. Threats to the species, including predation by introduced predators, nest damage, and pesticide impacts, are effectively managed so as to minimize mortality and to meet Criterion 1 above, and are expected to continue to be so for the foreseeable future.	No

Table 2. Threats to the yayaguak and ongoing conservation efforts.

Threat	**Listing Factor**	**Current Status**	**Conservation/Management Efforts**
Habitat loss and degradation (cave disturbance)	A, E	Ongoing	No
Loss of foraging habitat	A	Ongoing	No
Predation by the brown treesnake on Guam	C	Ongoing	Partially; efforts to control the brown tree snake are ongoing.
Nest damage by cockroaches (species unknown)	E	Ongoing	Partially; efforts to control cockroaches at some caves on Saipan have been conducted.
Nest damage by mud-dauber wasps (*Vespula* spp.)	E	Ongoing	No

Pesticides	E	Unknown	No
Climate change and increased storms	E	Increasing	No

Syntheses:
The current global population of the species is estimated to be 4,479 individuals in the Mariana Islands, with 3,293 in nine colonies on Saipan, 338 in three colonies on Aguiguan, and 848 in three colonies on Guam. Key threats to the species include human disturbance of caves, predation by the brown treesnake, loss and degradation of foraging habitat, and nest loss due to introduced insects.

The original recovery plan included interim downlisting criteria for the yayaguak and identified the development of delisting criteria as an objective (USFWS 1991, pp. iii, 25–35). New downlisting (Table 1) and delisting goals were identified in an Amendment to the Recovery Plan for Mariana Islands Population of the Vanikoro Swiftlet (*Aerodramus vanikorensis bartschi*) (USFWS 2019, pp. 3–4). A full description of the delisting criteria can be found in the amendment.

To be downlisted, yayaguak populations on Saipan, Aguiguan, and Guam must show a stable or increasing trend over a period of at least 15 years, and average population size estimates throughout that time period must reach at least 2,000 birds on Guam, 2,000 on Saipan, and 1,000 on Aguiguan. Sufficient roosting and nesting habitat must be protected and managed to achieve Criterion 1, and yayaguak populations must be distributed among at least five caves on each island. On Guam, at least two of the five caves must be located in northern Guam. In addition, threats to the species must be effectively managed to meet Criterion 1 and be expected to remain so for the foreseeable future.

To be delisted, yayaguak populations on Saipan, Aguiguan, and Guam must show a stable or increasing trend over a period of at least 30 years, and average population size estimates throughout that time period must reach at least 3,000 birds on Guam, 2,500 on Saipan, and 1,500 on Aguiguan. A self-sustaining yayaguak population must also be established on Rota. Sufficient amount of roosting and nesting habitat must be protected and managed to achieve Criterion 1, and yayaguak populations must be distributed among at least six caves on each island (excluding Rota). On Guam, at least three of the six caves must be located in northern Guam. In addition, threats to the species must be effectively managed to meet Criterion 1 and be expected to remain so for the foreseeable future.

Given that population estimates on only one out of three islands have met downlisting criteria and that threat management either has not been implemented or is still in an early stage of development, there are no known populations of yayaguak that meet the downlisting requirements. Therefore, the yayaguak continues to meet the definition of endangered, as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Population biology research – Conduct research into habitat use by yayaguak to identify limiting factors for yayaguak expansion on all islands.
- Predator control– Continue to research brown treesnake control techniques to support large-scale control and/or eradication efforts. Implement large-scale brown treesnake control and/or eradication efforts on Guam.
- Site and habitat protection – Permanently secure and manage all known occupied caves and surrounding habitats on Guam, Rota, and Saipan. Secure and manage potentially usable caves, including known historic caves.
    - Use acoustic monitoring to determine whether yayaguak are active near potentially usable caves.
    - Use LIDAR or other surface-scanning techniques to identify important habitat conditions to inform the selection of reintroduction/translocation sites (experimental use of surface scanning in Guam caves is ongoing).
- Captive propagation protocol development – Develop methods for translocating yayaguak.
- Reintroduction or translocation –
    - Develop a plan to reintroduce the yayaguak to Rota.
    - Develop a plan to reintroduce the yayaguak to caves in northern Guam.
- Population viability analysis (PVA) – Conduct PVA to determine the minimum viable population numbers needed for recovery on a per-island basis.
- Monitoring – Develop and implement plans to monitor yayaguak populations on all islands on a regular basis.
- The Navy is planning additional management actions, but implementation has been delayed. The following actions are planned:
    - Permanently secure and manage active yayaguak caves.
    - Survey for, secure, and manage additional colonies of yayaguak and potentially usable caves.
    - Conduct specific research on population biology and suspected limiting factors.
    - Promote population expansion into suitable historical habitat.
    - Develop and implement techniques for reintroduction of yayaguak into suitable habitat, as needed.
    - Monitor populations and develop criteria for delisting.

References:

See previous 5-year reviews for additional references.

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U.S. FISH AND WILDLIFE SERVICE

SIGNATURE PAGE for 5-YEAR REVIEW on yayaguak, chachaguak (Mariana swiftlet, *Aerodramus bartschi*)

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
____X____	No Change in listing status

Review Conducted By: Bronson Curry, Fish and Wildlife Biologist, PIFWO
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