5-YEAR REVIEW

Short Form Summary

Species Reviewed: Guam rail; ko'ko' (*Gallirallus owstoni*)

Current Classification: Endangered

FR Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife 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):

Anthony J.G. Tornito Fish and Wildlife Biologist, PIFWO
Cristian "CJ" Cayanan, 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 March 2025. The review was based on a review of current, available information since the last 5-year review for the ko'ko' or Guam rail (*Gallirallus owstoni*) (USFWS 2020, entire). The evaluation by Anthony J.G. Tornito and Cristian "CJ" Cayanan, Fish and Wildlife Biologists, 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 *http://ecos.fws.gov/ecp/species/5112*

Review Analysis:

Please refer to the final listing rule for the ko'ko' published on August 27, 1984 (available at https://www.govinfo.gov/link/fr/49/33881?link-type=pdf), the Amendment to the Recovery Plan published in 2019 (available at https://ecos.fws.gov/docs/recovery_plan/Guam_Rail_Final_Recovery_Plan_Amendment_20190820.pdf) and the previous 5-year reviews for the ko'ko'published in 2020 (available at https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3213.pdf), 2014 (available at https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2214.pdf), and 2009 (available at https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1430.pdf) for a

complete review of the species' status, threats, and management efforts. While threats not previously included in the prior 5-year review are included in this review, no new information regarding the species biological status have come to light since listing to recommend a change in the Federal listing status of the ko'ko' as endangered.

Regulatory background:

The ko'ko' is endemic to the island of Guam and was extirpated in the wild by 1987 due to predation by the introduced brown treesnake (*Boiga irregularis*) (Wiles et al. 1995, p. 38). In 1983, 22 ko'ko' were translocated to several Association of Zoos and Aquariums (AZA) institutions in the mainland United States and at Guam's Department of Agriculture, Division of Aquatic and Wildlife Resources (DAWR) to begin a captive propagation program (Haig and Ballou 1995, p. 446). In 1989 the USFWS published a final rule in the Federal Register establishing a nonessential experimental population of ko'ko' on the island of Rota, north of Guam (USFWS 1989, entire). Since then, there have been multiple releases of ko'ko' on Rota. In 2010 16 ko'ko' were released on Cocos Island under a Safe Harbor Agreement to establish a self-sustaining population of wild ko'ko' for future reintroduction on Guam (USFWS 1989, entire; USFWS 2008, entire; USFWS 2009, pp. 4-5; USFWS 2014, p. 2; USFWS 2020, p. 2). In 2023, the USFWS published "Technical Corrections for 62 Wildlife and Plant Species on the Lists of Endangered and threatened Wildlife and Plants" in the Federal Register, formally addressing the reclassification and CHamoru name for the species. The final rule updated the species name and taxonomy, changing it from Guam rail [*Rallus owstoni*] to the currently accepted name of Guam rail (ko'ko') [*Gallirallus owstoni*] (USFWS 2023, entire).

New status information:

- As of July 2025, the DAWR breeding population was comprised of 72 adult birds with 5 active breeding pairs (Blincko 2025, pers. comm.). A total of 10 chicks have been added to the flock through the calendar year in 2025. Interruptions from Covid and a loss of key captive rearing facility staff resulted in low numbers of chicks in 2020 and 2021 (Table 1).
- Conditions at the DAWR breeding facility deteriorated due to a number of factors: A little fire ant (LFA; *Wasmannia auropuncta*) infestation that began in 2021 and Typhoon Mawar in 2023 resulted in little to no breeding between 2021 and 2023 (Table 1). Damage to the fence surrounding the facility from Typhoon Mawar allowed for the incursion of dogs and pigs and the predation of 10 ko'ko' that year. Brown treesnake traps along the perimeter fence were also not operational for months after the typhoon (USFWS 2023 in litt., entire). In addition, staffing and procurement issues precluded the level of care needed and prevented regular maintenance of caging and vegetation.
- The USFWS sent a letter in 2023 identifying management issues and provided technical assistance to address LFA and facility management (USFWS 2023 in litt., entire).
- Breeding was reinitiated in July 2024 after LFA management was initiated.
- The age structure of the DAWR population is highly skewed toward older birds that are past breeding age and as such there are only 5 breeding pairs.

- The AZA program has 28 birds, with just six breeding pairs (Blincko 2025, pers. comm.).
- Three zoos will no longer be participating in the ko'ko' program, thus reducing the number of birds the AZA program can sustain and produce.
- Bird transfer between the DAWR and AZA program has ceased since at least 2020 because the only airline with a direct flight to Guam from the continental United States has stopped carrying birds in cargo.
- The last release of ko'ko' on Rota took place in 2020.
- Surveys on Rota were conducted in 2022 and16 birds were detected (Table 2). In 2023, 18 birds were detected. In 2024, Guam DAWR staff were unable to detect any birds, indicating a likely decline or extirpation from the island. Increasing wildfire and feral cats remain the primary threat to ko'ko' persistence on Rota. (Thompson 2025a, in litt., entire).
- A population of 22-48 birds is estimated on Cocos Island, derived from multiple survey techniques. The age structure of this population is unknown.
- In sum, 122-148 ko'ko' occur in the world, with just 11 breeding pairs in captivity and an unknown number on Cocos Island.
- The amount of habitat needed to support ko'ko' survival and recovery on Guam was estimated in the 2025 Biological Opinion for Expansion of Aircraft Operations Area at Northwest Field, and Munitions Storage Area (MSA-1), Anderson Air Force Base, Guam. Based on a population of 5,000 ko'ko', an estimated 41,184 acres (16,667 hectares) of habitat are needed. Using a minimum population of 1,000 ko'ko' in both northern and southern Guam, then a minimum of 8,236 acres (3,333 hectares) for each ko'ko' subpopulation is needed (USFWS 2025, pp. 91-93).
- Based on satellite imagery of remaining habitat on Guam through the end of 2024, USFWS estimates there are a total of 44,118 acres (17,854 hectares) of potential ko'ko' habitat on Guam, 21,678 acres (8,773 hectares) in northern Guam and 22,440 acres (9,081 hectares) in southern Guam (Amidon 2025, in litt., p. 1).

Table 1. Breeding summary from DAWR's ko'ko' breeding program from 2015 through March 2025, tabulated by calendar year (Thompson 2025a, in litt., entire).

Year	Pairs	Nests	Chicks
2015	8	51	45
2016	10	42	26
2017	12	52	56
2018	9	31	28
2019	7	33	15
2020	6	14	10
2021	12	5	1
2022	13	35	6
2023	16	17	0
2024	6	27	11
2025	5	14	10

Table 2: Number of ko'ko' stations surveyed on the island of Rota and number of ko'ko' detected from 2011 through 2024 by DAWR staff.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022	2023	2024
Counts	355	275	387	344	331	297	332	342	434	?	85	107
Detections	230	100	279	183	150	89	81	74	181	16	18	0

New threats:

- Since the 2020 review, brown treesnakes have re-invaded Cocos Island and were officially documented in 2020. A snake captured on the atoll in 2023 was found to have rodent remains in its stomach contents. Genetic testing was conducted and the contents are believed to be of mouse origin (Siers, 2025, in litt., entire) Camera traps have been put out on Cocos Island to determine if there are rodents present on the island; however, no rodent activity has been captured on the camera traps (Thompson 2025, pers. comm.).
- In 2024, Guam experienced a substantial increase in wildfire activity, with 267 fires burning a total of 8,440 acres (3,416 hectares) - equivalent to 6.22% of the island's total land area (USFS 2025, entire). Fires also occurred on Cocos Island in March and April 2024, impacting ko'ko' habitat on the island and encroaching on ko'ko' nests (Mazurek 2024, in litt., entire). Wildfires are a threat not only to ko'ko' habitat, but to individuals as well. However, no ko'ko' remains or other signs of fatalities were detected following these wildfires.
- LFA were documented at the DAWR captive rearing facility for ko'ko' in 2021. LFA were observed swarming food dishes, resulting in the food becoming inedible and disrupting the feeding by ko'ko' (Thompson 2025b, in litt., entire). Further, ant bites are extremely painful, so the presence of ants likely precluded breeding, as ants would disrupt incubation and brooding. LFA is an invasive species first detected in northern Guam in 2011, but likely arrived between 2000 and 2007 (Raymundo and Miller 2012, pp. 85-86). It is an opportunistic and generalist species, nesting in warm, moist, and shaded areas that can be human-made or natural and feeding on whatever is available such as nectar, plant parts, other invertebrates, and animal feces (Montgomery et al. 2022, pp. 6-7). As of January 2025, there have been 240 confirmed LFA sites throughout the island with an estimated 25 new sites per year (Rosario et al. 2025, in litt., p. 5), ultimately reducing the amount of suitable habitat for ko'ko' on Guam.
- Procurement and staffing issues at DAWR have prevented regular maintenance and care of the facility. Perimeter fence damage allowed for dog and pig predation of ko'ko' in 2023 and is still in need of repair or replacement. Caging is rusted and needs to be replaced. Brown treesnake trapping along the perimeter fence is not being implemented at full capacity. LFA treatment is ongoing, but the recommended vegetation management to reduce reinfestation is not being fully implemented.

New management actions:

Threat Management

- Research and eradication of brown treesnakes are conducted by USDA NWRC and USGS and community-driven removal efforts conducted by Friends of Islan Dåno' on Cocos Island. To date, there have been 125 brown treesnakes removed from Cocos Island (Hopkins 2025 in litt., entire).
- USFWS provided technical assistance to Guam Department of Agriculture staff to address the LFA infestation at the rail facility. Baiting, monitoring, and vegetation management are ongoing and will need to be maintained in perpetuity because lands surrounding the facility are infested. The LFA population at the railyard could increase rapidly if control ceases.
- USFWS provided technical assistance to DAWR to address captive program management. DAWR will be applying for a 10(a)(1)(A) recovery permit inclusive of protocols for animal care, facility maintenance, pair selection, and a translocation plan once the population has rebounded such that it can sustain translocation.
- The National Park Service in conjunction with the U.S. Geological Survey, U.S. Fish and Wildlife Service, and the Colorado State University - Center for Environmental Management of Military Lands (CEMML) began conducting removal of invasive species, including LFA from the War in the Pacific National Historic Park, Asan Beach Unit for up to 10 years, in 2024 (USFWS 2024, pp. 1-10).
- Funded via cooperative agreements with the Naval Facilities Engineering Systems Command (NAVFAC) and the Marine Corps Base Camp Blaz, CEMML is managing 19 LFA treatment sites on Department of Defense (DoD) managed lands on Guam as of March 2025 (Puliafico and Williams 2025, in litt., entire).

Habitat restoration

- In 2020, a Memorandum of Understanding between Joint Region Marianas (JRM) and USFWS outlined a mutual understanding regarding the intentions and future considerations of a DoD Readiness and Environmental Protection Integration (REPI) Program to address conservation of upland vegetation communities. Subsequently, the Guam REPI Habitat Conservation Initiative Implementation Plan 2022 – 2027 was written. The vision of the plan is to advance the conservation, restoration, and enhancement of Guam's limestone forests, ravine forests, and savanna habitats to establish precursory conditions towards improving the baseline status of federally listed threatened and endangered species. The two locations identified in the plan, Taguan and Masso, do not currently contain ko'ko' individuals, but could benefit the species once habitat enhancement is complete (NFWF 2022, entire).

Table 3. Status and trends of ko'ko' from listing through current 5-year review.

Date	No. Adult Wild Individuals	Downlisting Criteria Identified in Recovery Plan	Downlisting Criteria Completed?
1984 (listing)	No individuals in the wild (In 1983, 22 rails were captured in the wild and moved to captive facilities)	No recovery plan developed yet.	No
1990 (recovery plan, USFWS 1990, entire)		Population of a minimum of 2,000 rails on Guam (1,000 in northern Guam and 1,000 in southern Guam).	No
		Brown treesnakes are controlled or eradicated on Guam.	No
1999 (unpublished DAWR report on captive propagation of rails)	120 individuals at the DAWR captive facility; No data on number of individuals at mainland zoos but report states that 14 rails hatched at mainland zoos.	Population of a minimum of 2,000 rails on Guam (1,000 in northern Guam and 1,000 in southern Guam). The population would be maintained for at least 5 consecutive years, and should be re-evaluated.	No
		Brown treesnakes are controlled or eradicated on Guam.	No
2009 (5-year review)	158 (104 on Guam) individuals in 16 (including Guam) captive propagation facilities and experimental population of approximately 60 to 80 individuals.	Population of a minimum of 2,000 rails on Guam (1,000 in northern Guam and 1,000 in southern Guam). The population would be maintained for at least 5 consecutive years, and should be re-evaluated.	No
		Brown treesnakes are controlled or eradicated on Guam.	No

2019 (recovery plan amendment, USFWS 2019, entire)		Criterion 1: Guam rail populations in captive propagation programs on Guam and in the mainland United States maintain adequate population size, demographic characteristics (sex ratio, age structure, and reproductive success), and representation of genetic diversity to support reintroduction to Guam.	No
		Criterion 2: Guam rails occur in three or more viable populations in the wild, with at least one population in northern Guam, exhibiting ecological, morphological, behavioral, and genetic diversity representative of the species.	No
		Criterion 3: Over a minimum 15-year period, Guam rail population data 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 demographic monitoring	No
		Criterion 4: Habitat is protected and management has been established to the extent that Criteria 2 and 3 above are achieved.	No
		Criterion 5: Threats to the species, including the identified primary threat of predation by introduced predators such as the brown treesnake and feral cats (*Felis catus*), are effectively managed to minimize mortality and meet population targets in Criterion 3.	Partial

2020 (5-year review)	Approx. 24 on Cocos Island (2019) Approx. 200 on Rota (2020)116 individuals in Guam captive propagation facilities (2020).	Criterion 1: Guam rail populations in captive propagation programs on Guam and in the mainland United States maintain adequate population size, demographic characteristics (sex ratio, age structure, and reproductive success), and representation of genetic diversity to support reintroduction to Guam.	No
		Criterion 2: Guam rails occur in three or more viable populations in the wild, with at least one population in northern Guam, exhibiting ecological, morphological, behavioral, and genetic diversity representative of the species.	No
		Criterion 3: Over a minimum 15-year period, Guam rail population data 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 demographic monitoring	No
		Criterion 4: Habitat is protected and management has been established to the extent that Criteria 2 and 3 above are achieved.	No
		Criterion 5: Threats to the species, including the identified primary threat of predation by introduced predators such as the brown treesnake and feral cats (Felis catus), are effectively managed to minimize mortality and meet population targets in Criterion 3.	Partial

2025 (5-year review)	22-48 on Cocos Island, 0 Rota; 72 in DAWR facilities, 28 under care in AZA zoos	Criterion 1: Guam rail populations in captive propagation programs on Guam and in the mainland United States maintain adequate population size, demographic characteristics (sex ratio, age structure, and reproductive success), and representation of genetic diversity to support reintroduction to Guam.	No
		Criterion 2: Guam rails occur in three or more viable populations in the wild, with at least one population in northern Guam, exhibiting ecological, morphological, behavioral, and genetic diversity representative of the species.	No
		Criterion 3: Over a minimum 15-year period, Guam rail population data 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 demographic monitoring	No
		Criterion 4: Habitat is protected and management has been established to the extent that Criteria 2 and 3 above are achieved.	No
		Criterion 5: Threats to the species, including the identified primary threat of predation by introduced predators such as the brown treesnake and feral cats (*Felis catus*), are effectively managed to minimize mortality and meet population targets in Criterion 3.	Partial

Table 4. Threats to the ko'ko' and ongoing conservation efforts.

Threat	Listing Factor	Current Status	Conservation/Management Efforts
Habitat loss or degradation	A	Ongoing	The Guam REPI plan will restore and enhance two locations on Guam, Taguan and Masso.
Introduced predators	C	Increasing	Brown treesnake control efforts are ongoing on Guam and Cocos Island; cat control on Rota began in 2012.
Human persecution	E	Insufficient data	
Typhoons	E	Ongoing	None
Reproductive and small population problems	E	Ongoing	Efforts are underway to maintain and augment two experimental populations (Rota, Cocos Island) and continue the captive breeding program.
Disease	C	Insufficient data	None
Invasive species (Little Fire Ant)	C	Ongoing	Guam DOAG Division of Aquatic and Wildlife Resources, National Parks Service, and DoD are treating infected sites within their respective managed lands.
Wildfire	A	Ongoing	Guam DOAG Forestry and Soil Resources Division conducts education and outreach to prevent human activities that may result in wildfires.

Synthesis:
There are approximately 122-148 ko'ko' in the world comprised of both captive (100 birds) and wild individuals (22-48 birds). Currently, the only confirmed wild population of ko'ko' is on Cocos Island with an estimated population of 22-48 birds. The population estimate for the experimental population on Rota peaked at 279 individuals; however, releases of birds stopped after 2020 and surveys by Guam DAWR did not detect any birds in 2024 and 2025.

Interruptions from the pandemic in 2020 and loss of key breeding center staff resulted in low production in captivity at DAWR in 2020 and 2021. An invasion by LFA detected in 2021 followed by Typhoon Mawar in 2023 resulted in cessation of breeding. The LFA infestation was not reported to USFWS until after Typhoon Mawar. LFA are being managed at the DAWR rail facility and the area is routinely monitored, maintained, and

treated to prevent the population from irrupting. DAWR reinitiated ko'ko' breeding in July of 2024.

The pandemic also impacted AZA breeding capacity, as did the loss of the ability to transport of birds to Guam. The number of AZA zoos participating in the program is limited, and the loss of transport to Guam reduces options for placing any birds produced in a year.

The only confirmed extant wild population of this species is threatened by the ongoing presence brown treesnakes on Cocos and by fires there. Since the brown treesnake detection on Cocos Island in 2020, agency and community-based eradication efforts have been ongoing. Rodent incursion on the island is also suspected but is unconfirmed.

The pause in breeding at DAWR, the cessation of releases on Rota and likely loss of that population, the loss of AZA breeding facilities, and the inability to easily transport birds from the mainland to Guam has resulted in a steep decline in the captive population, with just 11 breeding pairs identified worldwide.

The primary threats to ko'ko' include limited reproduction and small population size; and in the wild, habitat loss and degradation from agricultural, urban, military development and training, fires, the continued presence of the predatory brown treesnake, and feral pigs, cats, and dogs. Some of these threats are being addressed but not at the level needed to reestablish the species on Guam.

Downlisting and delisting objectives are provided in the amended recovery plan for ko'ko' (USFWS 2019, pp. 3-4). The ko'ko' may be considered for downlisting when the following five criterion are met. Criterion 1: Guam rail populations in captive propagation programs on Guam and in the mainland United States maintain adequate population size, demographic characteristics (sex ratio, age structure, and reproductive success), and representation of genetic diversity to support reintroduction to Guam. Criterion 2: Guam rails occur in three or more viable populations in the wild, with at least one population in northern Guam, exhibiting ecological, morphological, behavioral, and genetic diversity representative of the species. Criterion 3: Over a minimum 15-year period, Guam rail population data 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 demographic monitoring. Criterion 4: Habitat is protected and management has been established to the extent that Criteria 2 and 3 above are achieved. And criterion 5: Threats to the species, including the identified primary threat of predation by introduced predators such as the brown treesnake and feral cats, are effectively managed to minimize mortality and meet population targets in Criterion 3.

The ko'ko' may be considered for delisting when the following four criterion are met. Criterion 1: Guam rails occur in five or more viable populations in the wild, with at least two populations in northern Guam, exhibiting ecological, morphological, behavioral, and

genetic diversity representative of the species. Criterion 2: Over a minimum 30-year period, Guam rail population data 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 demographic monitoring. Criterion 3: Habitat is protected and management has been established to the extent that Criteria 1 and 2 above are achieved. And criterion 4: Threats to the species, including the identified primary threat of predation by introduced predators such as the brown treesnake and feral cats, are sufficiently managed to minimize mortality and meet population targets in Criterion 2.

The recovery goals for this species have not been met nor have the threats been sufficiently managed. Therefore, the ko'ko' continues to meet the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Eradicate LFA populations in and around the captive rearing facility (railyard) at Guam DAWR and maintain vegetation and fence line to prevent future LFA infestations.
- Surveys / inventories –
    - Design surveys and monitoring of the Cocos Island population to determine population demographics and size.
    - Continue surveys on Rota to determine population persistence.
- Captive propagation
    - Increase productivity of the captive population so that it can sustain releases to Rota or other sites.
    - Consider bringing in some birds from the Cocos population to increase productivity of the DAWR and/or AZA population.
    - Develop predator (snake) avoidance training for application for releases on Guam in snake-controlled areas.
    - Address procurement and staffing issues at the DAWR facility
    - Ensure consistent population and facility management through the issuance of a 10(a)(1)(A) recovery permit.
- Predator monitoring and control –
    - Continue efforts to develop and refine brown treesnake control techniques and support small-scale and large-scale control and/or eradication efforts on Guam and Cocos Island.
    - Implement large-scale feral cat control and/or eradication.
    - Increase consistency and frequency of cat control on Rota prior to future releases.
- Population viability monitoring and analysis – identify demographic measures needed to sustain the captive population, looking at the AZA and DAWR populations separately, and together.
- Site / area / habitat protection – permanently secure and manage new fenced areas on Guam and Rota and the immediately surrounding buffer habitat
- Reintroduction / translocation –

    - Identify sites for establishing additional populations outside of Guam.
    - Develop a reintroduction plan for ko'ko' on Guam and set aside and protect recovery areas for ko'ko' on Guam.
- Develop expandable enclosure systems that can adapt and expand as snakes are eradicated from enclosures and new lands are acquired.

References:

See previous 5-year reviews for a full list of references. References for new information are provided below.

Montgomery, M.P., C. Vanderwoude, M. Lintermans, and A.J. Jasmyn Lynch. 2022. The little fire ant (Hymenoptera: Formicidae): a global perspective. Annals of the Entomological Society of America XX(X):1-22.

[NFWF] National Fish and Wildlife Foundation. 2022. Guam REPI Habitat Conservation Initiative Implementation Plan 2022 – 2027. 34 pp.

Raymundo, M.L. and R.H. Miller. 2012. Little fire ant, *Wasmannia auropuctata* (Roger) (Hymenoptera:Formicidae), established at several locations on Guam. Proceedings of the Hawaiian Ecological Society 44:85-87.

[USFS] U.S. Forest Service. 2025. State and Private Forestry Fact Sheet. Guam 2025. Vallejo, California. 6 pp.

[USFWS] U.S. Fish and Wildlife Service. 2008. Proposed Safe Harbor Agreement for the Guam Rail on Cocos Island, Guam. Federal Register 73(7):1893-1894.

[USFWS] U.S. Fish and Wildlife Service. 2019. Amendment to the Native Forest Birds of Guam and Rota of the Commonwealth of the Northern Mariana Islands Recovery Plan. U.S. Fish and Wildlife Service, Pacific Region. 8 pp.

[USFWS] U.S. Fish and Wildlife Service. 2020. *Gallirallus owstoni* (Guam rail, ko'ko') 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, Hawai'i. 8 pp.

[USFWS] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife and Plants; Technical Corrections for 62 Wildlife and Plant Species on the Lists of Endangered and Threatened Wildlife and Plants. Federal Register 88(22):7134-7177.

[USFWS] U.S. Fish and Wildlife Service. 2024. Biological Opinion for Asan Beach Park Brown Treesnake Control for Native Species Restoration Project Guam. USFWS Pacific Isalnds Fish and Wildlife Office, Honolulu, Hawai'i. 51 pp.

[USFWS] U.S. Fish and Wildlife Service. 2025. Biological Opinion for Expansions of Aircraft Operations Area at Northwest Field, and Munitions Storage Area (MSA-1), Andersen Air Force Base, Guam. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, Hawai'i. 133 pp.

***In Litteris*:**

Amidon, F. 2025. Email correspondence from Fred Amidon, USFWS PIFWO to Cristian "CJ" Cayanan and Anthony Tornito, USFWS PIFWO, regarding potential recovery habitat acreages for the sihek and ko'ko'. April 1, 2025. 3 pp.

Association of Zoos & Aquariums (AZA). Studbook Animals of Guam Rail. February 14, 2025. 4pp.

Hopkins, C. 2024. Slideshow Data Set of BTS Removed from Cocos Island. provided by Charlene Hopkins, USDA APHIS Wildlife Services, Guam to Mary Jo Mazurek, Invasive Species Team Manager, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office. April 5, 2025.

Mazurek, M.J. 2024. Email correspondence from M.J. Mazurek, USFWS PIFWO to other PIFWO staff members regarding a fire she observed on March 9, 2024, at Cocos Island (Islan Dåno). March 11, 2024. 2 pp.

Puliafico, K. and L. Williams. 2025. Little Fire Ants Control to Preserve Threatened and Endangered Species on Guam Military Installations. Presentation by Kenneth Puliafico and Lindsay Williams of the Colorado State University - Center for Environmental Managment Military Lands (CEMML) on March 13, 2025, CHST at the Mariana Islands Conservation Conference. 00:41:44-00:58:32

Richardson, M. 2023. Guam Rail Captive Rearing Facility LFA Treatment – November 13-27, 2023. Report prepared by Mike Richardson of USFWS, Pacific Islands Fish and Wildlife Office. Revised November 30, 2023. 27 pp.

Rosario, C., J. Mariano, L. Thompson, M. Richardson, and M. Mazurek. 2025. Creating An LFA-Free Zone on Guam – 1 Year Later: Project Description and 2024-2025 Results. Presented by Chris Rosario and Lauren Thompson of the Guam Department of Agriculture on March 13, 2025, CHST at the Mariana Islands Conservation Conference. 25 pp.

Siers, S., 2025. Email correspondence from Dr. Shane Siers, USDA-APHIS-WS, National Wildlife Research Center to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, regarding Cocos Rodent from BTS Stomach Contents. September 16, 2024.

Thompson, L. 2025a. Email correspondence from Lauren Thompson of Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, to Cristian “CJ Cayanan and Anthony Tornito, USFWS PIFWO, regarding the interaction of LFA and ko’ko’. April 17, 2025. 5 pp.

Thompson, L. 2025b. Review of Data on Ko'ko' (Guam rail, *Hypotaenidia owstoni*) for FWS 5-Year Review. Report prepared by Lauren Thompson of Guam Department

of Agriculture, Division of Aquatic and Wildlife Resources. March 17, 2025. 3 pp.

Personal Communication

Blincko, L. 2025. Video conference between Lianne Blincko, Scott Newland, Deidre Fontenot, Jade Woodling from AZA and Megan Laut, Pacific Islands Fish and Wildlife Office about the status of the ko'ko' population.

Thompson, L. 2025. Phone conversation between Lauren Thompson, Guam Department of Agriculture, Division of Aquatic and Wildlife Resources to Anthony J.G. Tornito, Pacific Islands Fish and Wildlife Office, regarding rodent sightings on Cocos Island. July 24, 2025.

U.S. FISH AND WILDLIFE SERVICE

SIGNATURE PAGE for 5-YEAR REVIEW on the Guam rail or ko'ko' (*Gallirallus owstoni*)

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: Anthony J.G. Tornito, Fish and Wildlife Biologist, PIFWO
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John Vetter, Animal Recovery Coordinator, PIFWO
Megan Laut, Recovery Team Manager, PIFWO

for **Field Supervisor, Pacific Islands Fish and Wildlife Office**

MEGAN LAUT Digitally signed by MEGAN LAUT
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