5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Halcyon cinnamomina cinnamomina* (Sihek, Guam Micronesian kingfisher)

Current Classification: Endangered

FR Notice announcing initiation of this review:
[USFWS] U.S. Fish and Wildlife Service. 2018. Initiation of 5-Year Status Reviews for 156 Species in Oregon, Washington, Hawaii, Palau, Guam, and the Northern Mariana Islands. Federal Register 83(88):20088-20092.

Lead Region/Field Office:
Region 12, Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, HI
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Name of Reviewer(s): Provide name(s) and phone number(s)
Toni Mizerek, Fish and Wildlife Biologist; 671-989-6746
John Vetter, Animal Recovery Coordinator; 808-792-9406
Megan Laut, Conservation and Recovery Team Manager, 808-792-9409

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), beginning on January 2, 2020. The review was based on a review of current, available information since the last 5-year review for *H. cinnamomina cinnamomina* (USFWS 2014). The evaluation by Toni Mizerek, Biologist was reviewed by John Vetter, Animal Recovery Coordinator and by Megan Laut, Conservation and Restoration Team Manager.

Review Analysis:
Please refer to the previous 5-year review for *Todiramphus cinnamominus cinnamominus* published on July 14, 2014 (available at https://ecos.fws.gov/docs/five_year_review/doc4418.pdf), for a complete review of the species' status, threats, and management efforts to 2014. No significant information regarding the species biological status has come to light since listing to warrant a change in the Federal listing status of *H. cinnamomina cinnamomina*.

Status information:
The sihek is believed to have been extirpated in the wild by 1988 (Wiles *et al*. 2003) and is now found only in captivity (Bahner and Bier 2007). Between 1984 and 1986, 29 sihek were translocated to several zoological institutions in the mainland United States to begin a captive propagation program. By 1990, the captive population reached 61 individuals and hovered around this number of individuals until 2003 ($\lambda = 1.00$) due to high mortality and poor reproductive success. By 2014, the captive population reached the maximum population size of 157, more than doubling in size (mean $\lambda = 1.055$). Since 2014, space available has been limited resulting in a managed population decline of 3.4% and population growth rate of 0.976 (Newland and Ferrie 2020). There are currently

135 sihek in captivity distributed across 25 institutions (24 Association of Zoos and Aquariums accredited institutions in the mainland United States and a breeding facility on Guam) (Newland and Ferrie 2020).

In 2015, the Federal Register described the reclassification of *Halcyon cinnamomina cinnamomina* to *Todiramphus cinnamominus* (80 FR 35862):

> *Consequently most recent authorities (e.g., Woodall 2001, p. 134; Dickinson 2003) have restricted Halcyon to the African species; other species in the group have been classified under the genera Todiramphus (including the Micronesian kingfisher), Pelargopsis, and Syma. When the Micronesian kingfisher was classified within Todiramphus, its specific epithet was changed to cinnamominus for consistency with the gender of the new genus name. Del Hoyo et al. (2014, p. 606) reviewed the three subspecies of Micronesian kingfisher (T. cinnamominus on Guam, T. pelewensis on Palau, and T. reichenbachi on Pohnpei) under the species delimitation criteria of Tobias et al. (2010, pp. 1–23), and concluded that they were distinct at the species level based on differences in plumage pattern, wing and tail proportions, body size, and voice. Consequently, the listed population on Guam is now classified as a full species, Guam kingfisher (Todiramphus cinnamominus). The taxonomic change does not affect the range or endangered status of the taxon.*

However, the change was not formalized and the taxon remains officially listed as *Halycon cinnamomina cinnamomina* by the U. S. Fish and Wildlife Service. Future actions will address this change.

New threats:

- There are no new threats known at this time. Habitat loss and degradation from agricultural, urban, and military development and training, as well as the continued presence of the predatory brown treesnake (*Boiga irregularis*; BTS), continue to be the primary threats to this species in its former range and prevent reestablishment of the species.

New management actions:

- Reintroduction/translocation

  Planning for release of sihek from captivity is ongoing. There have been three stakeholder planning workshops which identified objectives of sihek conservation translocation and different alternative scenarios for translocations; determining how to increase captive population size, looking at disease risks around translocations and logistics of trial releases to small 'learning' sites; and addressing cultural values around sihek releases and potential economic impacts (Trask, ZSL, pers. Comm. 2020). A translocation plan for releases to small 'learning' sites is currently being created. This plan, as well as experience and knowledge gained from these initial learning site releases, will inform the translocation plan for releases to establishment sites (Trask, ZSL, pers. Comm. 2020).

- Population viability analysis (PVA)

  The impact of breeding depression was estimated and incorporated in the captive population PVA to simulate different management scenarios and releases into the wild. The suggested inbreeding depression reinforces the need to increase the captive population size to reduce the rate of increase in inbreeding and loss of genetic diversity into the future. An increased population size would also support releases into the wild without impacting the viability of the population.
- Conservation of habitat

  The Department of Defense and the U.S. Fish and Wildlife Service (FWS) have entered into two agreements to protect and/or manage habitat for sihek and other federally listed species on Guam. A 2020 Memorandum of Understanding between Joint Region Marianas and the FWS outlined a mutual understanding regarding the intentions and future considerations of a Department of Defense Readiness and Environmental Protection Integration Initiative to address conservation of upland vegetation communities for the sihek as well as other federally listed species on Guam. In 2015 a Memorandum of Agreement between the Department of the Navy and the FWS designated 5,234 acres (2,118 ha) of habitat for the recovery and survival of the sihek in Northern Guam in response to loss of habitat described in the 2015 Marine Corps Relocation Biological Opinion (USFWS 2015a,b).

  The Department of the Navy began implementation of a 1,000 acre (405 ha) forest enhancement project to offset the loss of recovery habitat for the sihek and other species due to activities described in the 2017 reinitiation of the 2015 Biological Opinion on the Department of the Navy's relocation of U.S. Marine Corps from Okinawa to Guam and Associated Activities on Guam (USFWS 2017). The project will be fully enclosed by an ungulate exclusion fence with ungulate control, invasive plants will be removed and vegetation found in native limestone habitats with be outplanted.

Synthesis:

The remaining sihek habitat on Guam is still threatened by development, military activities, and ungulate impacts, and the techniques for large-scale control of BTS are still under development; the recovery goals for this species have not been met. Therefore, the sihek meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue captive propagation efforts to increase the population size by expanding facility capacity.
- Continue efforts to develop and refine BTS control techniques on a landscape scale and apply across sihek habitat.

- Continue and expand ungulate control and the creation of ungulate free areas across habitat.
- Translocate sihek to 'learning' sites prior to reintroduction to Guam.
- Restore native forests through Invasive plant monitoring and control.

Table 1. Status and trends of *Halcyon cinnamomina cinnamomina* from listing through current 5-year review.

Date	Information Source	Estimated Number	Population Trend
1984	Listing (USFWS 1984)	Unknown	Unknown
1986	29 sihek brought into zoos for captive propagation	29	Declining, presumed extirpated by 1988 (Wiles *et al*. 2003)
2007	Bahner and Bier (2007)	95	Stable
2014	Bahner, Philadelphia Zoo (pers.comm. 2014)	155	Improvements in husbandry have resulted in an increased population but lack of space at zoos limits further growth.
2020	Trask, Zoological Society of London (pers.comm. 2020)	135	Declining, lack of space at zoos limits further population growth

Table 2. Threats to *Halcyon cinnamomina cinnamomina* and ongoing conservation efforts.

Threat	Listing Factor	Current Status	Conservation/Management Efforts
Nonnative snake predation – Brown treesnake (BTS)	C	Ongoing	Ongoing research by USDA Wildlife Services and USGSBRD to control BTS on Guam
Habitat and natural process management and restoration	A, E	Ongoing	Military development threatens remaining suitable habitat for sihek, and feral animal populations further degrade existing habitat.
Reduced viability due to low numbers – low population size and inbreeding	E	Ongoing	Capacity of existing zoos is limited, and further increases in the population are limited unless more space is available at existing institutions or new institutions join the Species Survival Plan.

Climate change degradation of habitat	A, E	Increasing	Research

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SIGNATURE PAGE for 5-YEAR REVIEW on *Halcyon cinnamomina cinnamomina*

Pre-1996 DPS listing still considered a listable entity? _____

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

for **Field Supervisor, Fish and Wildlife Service**

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References:

Bahner, B., and L. Bier. 2007. Micronesian kingfisher Species survival plan population analysis and breeding plan, 28 February 2007. Association of Zoos and Aquariums Association Population Management Center, Chicago, Illinois. 22 pages.

Bahnner, B., and C. Groome. 2011. Micronesian kingfisher species survival plan population analysis and breeding plan, 11 August 2011. Association of Zoos and Aquariums Association Population Management Center, Chicago, Illinois. 27 pages.

Newland, S., and G. Ferrie. 2020. Population analysis and breeding transfer plan: Guam kingfisher *(Todiramphus cinnamominus)* AZA Species Survival Plan® Yellow Program. Lincoln Park Zoo.

[USFWS] U.S. Fish and Wildlife Service. 2014. Guam Micronesian kingfisher (*Todiramphus cinnamomina cinnamomina*) 5-year review summary and evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 6 pages.

USFWS. 2015a. Biological Opinion (BO) for the Department of Navy's Relocation of the U.S. Marine Corps from Okinawa to Guam and Associated Activities on Guam.

USFWS. 2015b. Memorandum of Agreement between the Department of the Navy and the U.S. Fish and Wildlife Service regarding Conservation of Guam Micronesian Kingfisher recovery habitat in Northern Guam.

USFWS. 2017. Reinitiation of the 2015 Biological Opinion on the Department of the Navy's Relocation of U.S. Marine Corps from Okinawa to Guam and Associated Activities on Guam.

Wiles, G.J., J. Bart, R.E. Beck, Jr., and C.F. Aguon. 2003. Impacts of the brown tree snake: patterns of decline and species persistence in Guam's avifuana. Conservation Biology 17:1350-1360.

Personal Communications

Trask, Amanda. 2020. Zoological Society of London. Email from Guam kingfisher translocation planning group postdoc, dated April 14, 2020. Subject: Guam kingfisher 5-year review.