5-YEAR REVIEW

Short Form Summary

Species Reviewed: Palila (*Loxioides bailleui*)

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):
Colleen Cole, 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 April, 2025. The review was based on a review of current, available information since the last 5-year review for the palila (*Loxioides bailleui*) (USFWS 2020, entire). The evaluation by Colleen Cole, 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 *http://ecos.fws.gov/ecp/species/6583*)

Review Analysis:
Please refer to the Revised Recovery Plan for Hawaiian Forest Birds (USFWS 2006, entire) and the previous 5-year reviews for the palila published on July 31, 2009, August 19, 2020; and August 25, 2015 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/3036.pdf) 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 palila as endangered.

Palila occur only on the island of Hawai‘i, in one core population, in subalpine, dry forest habitat on the southwestern slope of Mauna Kea (Hunt et al. 2025, p.1). The palila population has been surveyed annually from 1998 to 2025 to determine abundance, population trends, and spatial distribution. The most recent analysis in 2025 is included here.

New status information:

- Within the 64.4-km2 core survey area of the southwestern flank of Mauna Kea, the number of palila detected decreased by 21.8% from 2021 to 2022 (101 in 2021 and 79 in 2022; Hunt et al. 2025, p.7). There was a 38.0% decrease in detections between 2022 and 2023 (79 in 2022 and 49 in 2023), and a slight increase of 8.2% between 2023 and 2024 (49 in 2023 and 53 in 2024; Table 1; Hunt et al. 2025, p.7). The most recent population estimate of palila is 666 (Hunt et al. 2025, p. 7).

Table 1. Palila Population Estimates (Hunt et al. 2025, Table 3, p. 11)

Year	Estimated Abundance in the Core Survey Area	Lower Limit	Upper Limit
2019	1,436	1,034	1,944
2020	1,310	936	1,747
2021	679	444	956
2022	545	367	742
2023	596	374	842
2024	666	412	970

No palila were detected outside of the core survey area during annual counts between 2020 and 2024 (Figure 1).

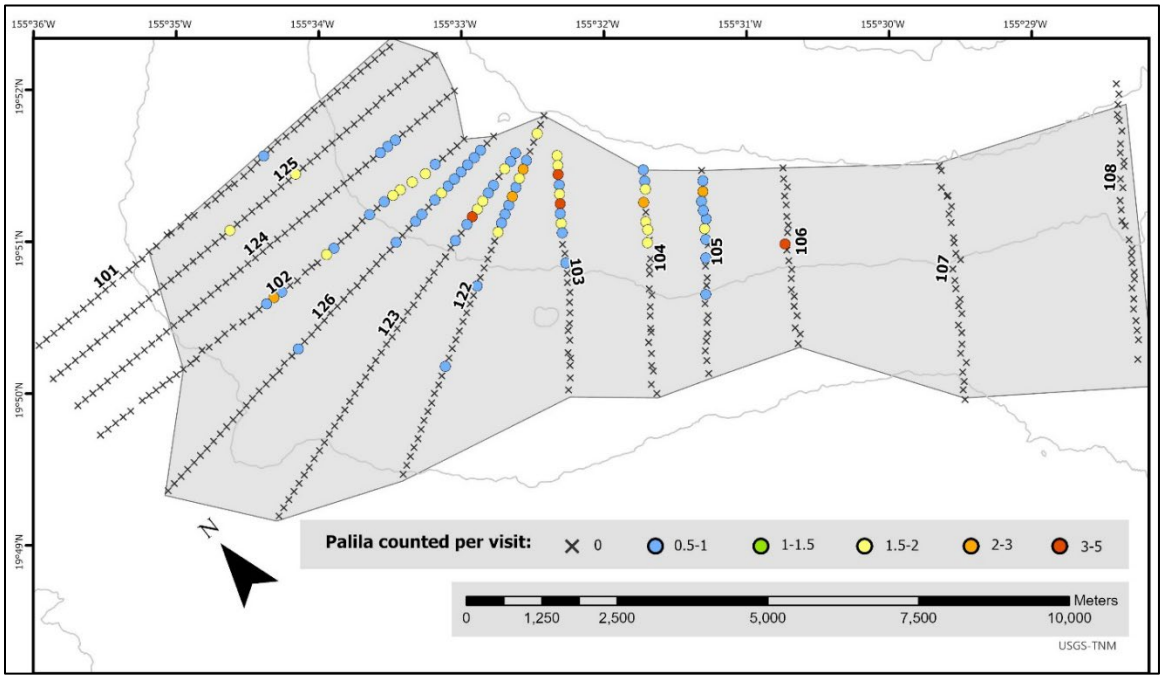

Figure 1. Palila detected per visit across 2022–2024 surveys. ✕ symbols mark stations where no palila were detected during 2022–2024 surveys regardless of survey effort. (Hunt et al. 2025, p.8, Figure 3)

From 1998 to 2005, the palila population varied between 4,000 and 6,800 individuals, with the exception of a drop in 2000. After 2005, the population steadily decreased until

2011. Between 2014 and 2024, the population estimates fluctuated moderately, reaching a peak in 2019. On average, the population declined by 203 birds per year from 1998 to 2024 (Hunt et al. 2025, p. 6).

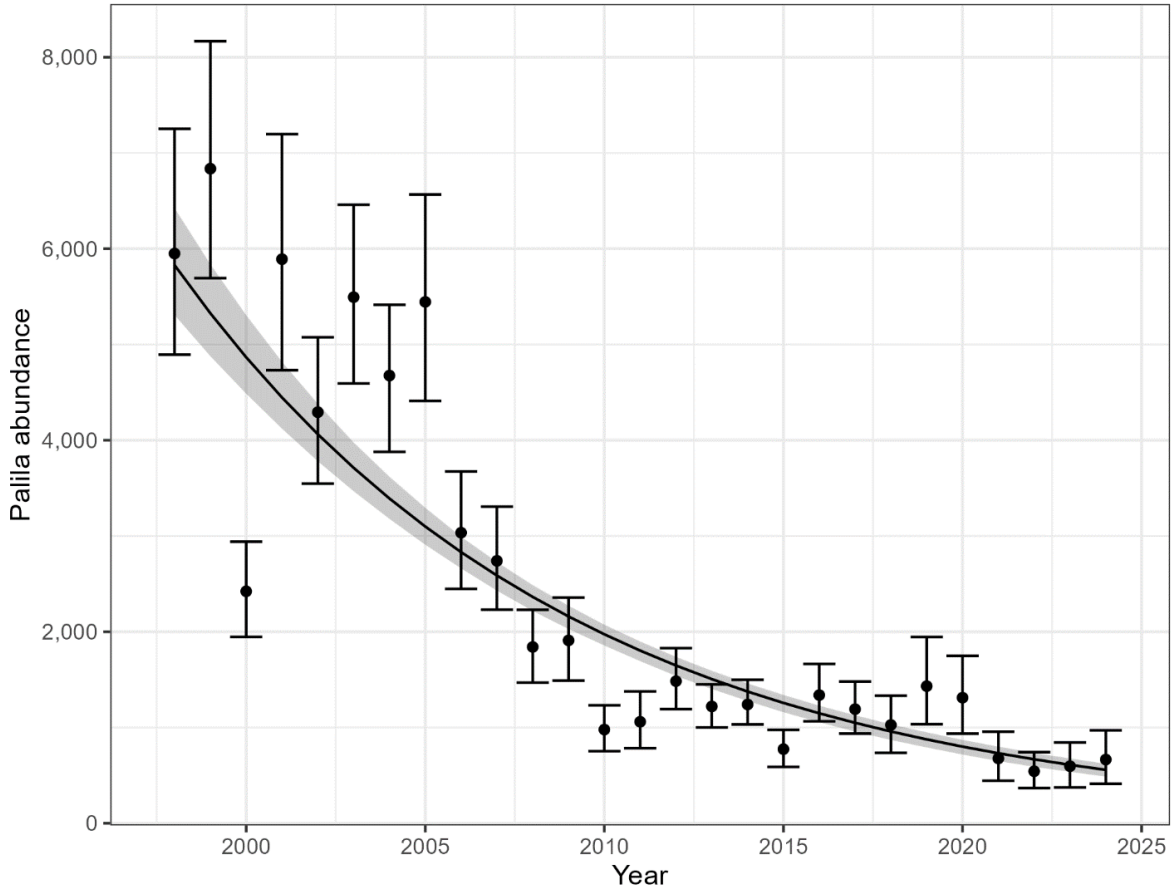

Figure 2. Annual palila population estimates from 1998 through 2024 inside the core survey area on the western slope of Mauna Kea (Hunt et al., 2025, p. 12, Figure 5).

- Captive Populations: The San Diego Zoo Wildlife Alliance manages a population of palila at its facilities in Hawai‘i. As of March 2025, the Keauhou Bird Conservation Center (KBCC) on the island of Hawai‘i held 8 birds and no palila at the Maui Bird Conservation Center (Masuda 2025, pers. comm.).

- The current captive flock includes five females and three males. The range of ages is two to 12 years old (Bailey 2025, pers. comm.). Due to the lower survival rate and reproductive success of palila in captivity, there are plans to release the captive reared palila possibly in 2026 (Masuda 2025, pers. comm.).

New and ongoing threats:

- Drought continues to be a significant threat to palila as Hawai‘i is experiencing long-term drying trends in annual rainfall (Frazier et al. 2022, entire). Drought exacerbates the risk of wildfire, tree mortality, and increased browsing pressure from animals searching for moisture (Frazier et al. 2022, entire).

- Food web disruption – Climate change and frequent drought are also thought to disrupt food webs for forest birds, including palila. Caterpillars are important food items for palila, critical for nestling development. A healthy caterpillar population is dependent on a healthy forest, with high quality plants leading to increased caterpillar mass and density. Chronic drought reduces plant quality in māmane (*Sophora chrysophylla*). Recent data suggest the palila trophic position has declined significantly as caterpillars are far less common in their diet. Warming and drought decreases māmane quality, reducing caterpillar abundance which contribute to decreased palila survival and recruitment (Van Houtan et al. 2024, p.7).

New management actions:

- The Hui Palila (Hui), a group of biologists from state, federal, and non-profit entities participated in a weeklong Strategic Decision Making (SDM) workshop for a facilitated discussion and process to provide informed recommendations to Hawai‘i State Division of Forestry and Wildlife (DOFAW) and USFWS leadership for ensuring the persistence of palila in the next 5 years, preventing imminent extinction and arresting its decline. Several management practices have been implemented to various extents and with various success, but there is now increased urgency to evaluate the effectiveness of ongoing strategies and develop new tools to stoop the decline. Because the exact causes of the species' ongoing decline and the effect of management actions are uncertain, it is challenging to recommend the best conservation strategy while considering funding constraints, ongoing environmental changes, public sentiment, genetic health, and the dynamics of palila's small population. The Hui strove to provide options for recovery actions with consideration of logistical, political, cultural, social, ecological, and climatic factors.

  The Hui recommended three strategies for ensuring the persistence of palila within five years:

  1. Kīpuka Management - Create kīpuka or islands of intensive management through five actions: 1) building a 0.8-2.0 km^2 cat-proof fenced exclosure in the occupied, upper elevations of palila core habitat; 2) increase and enhance the availability of caterpillars (critical food resource during nesting); 3) outplant native understory and overstory plants; 4) conduct intensive invasive weed control; and 5) reduce fire risk through forest management.
  2. Supplemental Feeding - The hui considered four approaches to managing and improving palila food resources in the current occupied habitat: 1) enhance plant quality so that more caterpillars are produced; 2) reduce threats to key caterpillar prey through monitoring and control of predatory insects; 3) releasing captive-reared caterpillar prey; and 4) delivering additional food types at feeding stations.
  3. Rear-and-Release - Rear-and-release involves pulling eggs from wild palila, transporting them to KBCC for hatching and fledging, and then returning them to an aviary on Mauna Kea for environmental conditioning and release the following spring as second-year (i.e., 10-month-old) birds. The Hui proposed a novel approach for improving the transition from captivity to wild by building a large aviary on Mauna Kea that would encompass sizable

māmane and naio (*Myoporum sandwicense*) trees, providing a similar environment to the release site. Other ideas to increase release success could include housing a wild adult male palila in a separate chamber of the field aviary to provide mentorship. The Hui proposed a goal of rearing at least 10 juvenile palila annually into the occupied palila core habitat. Captive reared juveniles deemed suitable for release would be color banded and radio-tagged for monitoring. An annual assessment of the released bird's survival and contribution to the wild population would occur and help inform whether this is an appropriate action to continue. Birds that are deemed un-releasable could be retained for captive propagation. In previous studies, wild palila have renested after eggs are harvested so there should be minimal impact to the population.

- Habitat restoration and management – The Mauna Kea Forest Restoration Project (MKFRP) conducts weed control, forest restoration, forest monitoring, fence monitoring and maintenance, community outreach, volunteer trips, and ungulate control at Puʻu Mali Restoration Area on the north slope of Mauna Kea and in the Kaʻohe Game Management Area (GMA) and in the core palila habitat within Mauna Kea Forest Reserve on the west slope. From 2021 to date, an average of 15,000 to 20,000 native seedlings have been planted per year by volunteer groups (approximately 200-300 volunteers per year). There is a 70% overall success rate of plantings (Asing, in litt., 2025a, entire).

- Predator control – The MKFRP and DOFAW continue to conduct predator trapping on the west slope at Kaʻohe GMA and in the Mauna Kea Forest Reserve on the west slope as well as in the Puʻu Mali Restoration Area on the north slope. In 2024, MKFRP increased trapping efforts, installing more traps at Kaʻohe GMA, increasing trap numbers each year from 391 in 2020 to 1,011 in 2024. Since 2020, MKFRP trapped 371 cats, 508 mongoose, and 85 rats on the west slope of Mauna Kea. Cat captures ranged from a low of 38 cats per year to a high of 121 cats captured in 2021 (Asing, in litt., 2025b, entire). DOFAW installed a rat control grid of 600 self-resetting traps in the upper elevation core habitat in 2023 and then moved the grid down to mid elevation in 2024 when tracking tunnels showed zero rat presence at the upper elevation site (Wang 2025, pers. comm.).

- Ungulate control (sheep) – DOFAW conducts quarterly control efforts for mouflon sheep (*Ovis orientalis orientalis*) on Mauna Kea, mostly focused on the core palila area. Between January 2020 and June 2023, DOFAW has removed 1,092 sheep via aerial control. Another 937 animals have been removed by hunters as self-reported at hunter check stations (Cole 2025, in litt., entire). DOFAW removed 287 animals on average each year. The number of sheep remaining on Mauna Kea is an estimated 600 individuals (Cole 2025, pers. comm.). The population has increased over the last five years due to ingress from large, unmanaged feral sheep populations on adjacent properties. DOFAW staff report that ingress occurs because of frequent vandalism of the palila critical habitat fence including cutting fence wire (Cole 2025, pers. comm.).

- Ungulate control (pigs) – MKFRP have controlled feral pigs (*Sus scrofa*) in Kaʻohe Restoration Area (Asing 2025a, in litt., entire). Additionally, this area was opened for pig hunting with dogs in the fall of 2024 and hunters reported removing 129 feral pigs in the pilot three-month hunting season for this area (Pang-Ching 2025, in litt., entire).

- Fencing – To date, there are 62.5 miles (100 kilometers) of fencing around palila critical habitat and around the Kaʻohe Restoration Area and Puʻu Mali Restoration Area. Currently, 2 miles (3.2 kilometers) are left to be contracted and replaced (Asing 2025a, in litt., entire). The MKFRP currently maintains these fences on Mauna Kea (Asing 2025a, in litt., entire).

- Fire management – Approximately 16 miles (26 kilometers) of fire/fuel breaks are in place at Kaʻohe GMA, which are maintained by DOFAW. DOFAW began a process of widening 30 miles of fuel breaks to 33 feet (10 m) on either side of road using brush removal, tree clearing, and bulldozing to bare soil (USFWS 2022, entire; Asing 2025a, in litt., entire)

- Habitat Assessment – To assess māmane flowers and seed pods, phenology surveys were conducted on a quarterly basis on the north and west slopes in 2019 but then stopped with Covid in 2020. Phenology surveys started again in 2023, occurring every other month on four transects on the west slope only (Kalā Asing, MKFRP, 2025, pers. comm.). Data analysis for this project has not been completed.

- Surveys – Annual palila surveys are coordinated by MKFRP and DOFAW staff in February of each year to monitor the range and abundance of palila (Hunt et al. 2025, entire). Additionally, beginning in 2022, MKRFP has coordinated quarterly surveys of a subset of transects and stations. On average, quarterly surveys are conducted on 132 stations across 9 transects (Camp et al. 2025, entire).

- Distribution and Habitat Use - A large grid of 134 automated recording units (ARU) were deployed in August 2024, across the core palila habitat to determine range movement and potential density estimates. ARUs are programmed to record daily from sunrise to 11am in ten-minute intervals. ARUs are also programmed to record from 2.5 hours before sunset to 30 minutes after in ten-minute intervals to capture roost site locations (Cole 2024, pers. comm.)

- Avian Disease Monitoring – Blood samples were collected from palila mist-netted in 2020 and tested for avian diseases including malaria. The results were negative (Thow 2025, in litt., entire). Additionally, in October 2023, DOFAW staff deployed eight mosquito trap stations (one BG Sentinel, one gravid trap per station) over four nights on the west slope near Puʻu Lāʻau and did not capture any mosquitos (Thow 2025, in litt., entire).

Table 2. Status and trends of palila from listing through current 5-year review.

Date	**No. wild individuals**	**Downlisting Criteria identified in Recovery Plan**	**Downlisting Criteria Completed?**
1967 (listing)	Unknown	No recovery plan developed yet.	N/A
1977 (critical habitat designation)	Unknown	No recovery plan developed yet.	N/A
1978 (recovery plan, USFWS 1978)	1,400 individuals	1. Protect existing habitat from further degradation	Partially
		2. Improve palila habitat	Partially
		3. Monitor palila population	Yes
		4. Identify factors limiting palila population growth other than loss of habitat	Yes
		5. Develop and implement a public relations program	Partially
1986 (recovery plan, USFWS 1986)	2,269 individuals (USFWS 1986); ~2,000 individuals (Leonard et al. 2008)	1. Maintain existing palila habitat	Partially
		2. Improve palila habitat	Partially
		3. Monitor palila population	Yes
		4. Identify factors, other than deterioration of habitat, limiting palila population growth, and take corrective action as needed	Yes
		5. Develop and implement a public information program to acquaint government leaders and the public with the palila and the recovery program.	Partially
2006 (revised recovery plan, USFWS 2006)	3,958 individuals (Camp et al. 2014)	1. Palila occur in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity	No
		of the species, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna	

		Kea, and at least one other location on Hualālai or Mauna Loa, over a 15-year period.	
		2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason.	No
		3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.	No
		4. The threats that were responsible for the decline of the species have been identified and controlled.	Partially (threats identified)
2009 (5-yr review)	2,518 individuals (Camp et al. 2014); 2,640 individuals (USFWS 2009)	1. Palila occur in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity of the species, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna Kea, and at least one other location on Hualālai or Mauna Loa, over a 15-year period	No

		2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason.	No
		3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.	No
		4. The threats that were responsible for the decline of the species have been identified and controlled.	Partially (threats identified)
2015 (5-yr review)	2,070 individuals (Camp et al. 2014)	1. Palila occur in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity of the species, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna Kea, and at least one other location on Hualālai or Mauna Loa, over a 15-year period.	No

		2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason.	No
		3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.	No
		4. The threats that were responsible for the decline of the species have been identified and controlled.	Partially (threats identified; limited control)
2020 (5-yr review)	1,051 individuals (Genz et al. 2018)	1. Palila occur in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity of the species, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna Kea, and at least one other location on Hualālai or Mauna Loa, over a 15-year period.	No

		2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been	No
		stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason.	
		3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.	No
		4. The threats that were responsible for the decline of the species have been identified and controlled.	Partially (threats identified; limited control)
2025 (5-yr review)	666 individuals (Hunt et al. 2025)	1. Palila occur in two or more viable populations or a viable metapopulation that represent the ecological, morphological, behavioral, and genetic diversity of the species, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna Kea, and at least one other location on Hualālai or Mauna Loa, over a 15-year period.	No

		2. Either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason.	No
		3. Sufficient recovery area is protected and managed to achieve criteria 1 and 2 above.	No
		4. The threats that were responsible for the decline of the species have been identified and controlled	Partially (threats identified; limited control)

Table 3. Threats to the palila and ongoing conservation efforts.

Threat	**Listing factor**	**Current Status**	**Conservation/ Management Efforts**
Ungulates – degradation of habitat and herbivory	A, C, E	Ongoing	Partial: ungulate removal from critical habitat is ongoing
Invasive introduced plants	A, E	Ongoing	Partial: MKFRP conducts weed control on Mauna Kea
Fire	A	Increasing	Partial: expansion and maintenance of fire breaks in core habitat is ongoing
Predation	C	Ongoing	Partial: MKFRP and DOFAW conduct cat and mongoose trapping in core habitat and on the north slope is ongoing

Avian Disease	C	Ongoing	No
Stochastic events - drought	E	Ongoing	No
Stochastic events - low numbers	E	Ongoing	Partial: captive population maintained by San Diego Zoo Wildlife Alliance.
Climate change	A, E	Increasing	No

Synthesis:
Despite extensive conservation efforts, the palila remains in a precarious state, with its population continuing a long-term decline within its limited range on the southwestern slope of Mauna Kea. The population has declined steeply in a few waves over the last 25 years and signs of stability have been followed by further decreases. The species faces a combination of persistent and intensifying threats, including habitat degradation from drought and wildfire, declining food resources, and predation by invasive species. Despite some recent gains in habitat restoration efforts and predator control, the overall trajectory remains negative, with population estimates showing strong statistical evidence of decline over multiple time scales.

To address this crisis, a coordinated group of agencies and experts (the Hui Palila) has proposed a suite of urgent recovery strategies focused on localized habitat protection, food supplementation, and the rear-and-release of captive-reared birds. These strategies aim to prevent extinction of palila over the next five years. Success will depend on sustained funding, adaptive management, and ongoing community and inter-agency collaboration.

Downlisting and delisting objectives are provided in the Revised Recovery Plan for Hawaiian Forest Birds (USFWS 2006). The palila may be downlisted from endangered to threatened when all of the following four criteria have been met, (1) palila occur in two or more viable populations, and viable populations exist on the southwestern slope of Mauna Kea, either the northern, eastern or the southern slope of Mauna Kea, and at least one other location on Hualalai or Mauna Loa, over a 15-year period; (2) either (a) quantitative surveys show that the number of individuals in each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or (b) demographic monitoring shows that each population or the metapopulation exhibits an average growth rate (λ or lambda) not less than 1.0 over a period of at least 15 consecutive years; and total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason; (3) sufficient recovery area is protected and managed to achieve criteria 1 and 2 above; and (4) the threats that were responsible for the decline of the species have been identified and controlled. The palila may be delisted when all four of the criteria above have been met for a 30-year period.

The downlisting goals for this species have not been met (Table 2), as there is only one population on the southwestern slope of Mauna Kea, the population continues to decline, palila habitat is not adequately managed, and while key threats to the palila have been identified, they are not adequately controlled (Table 3). Therefore, the palila meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue population surveys and monitoring to determine palila response to management actions and the effects of climate change.

- Implement recommendations from SDM:
  - Kīpuka Management - Create kīpuka or islands of intensive management through five actions: 1) building a 0.8-2.0 km2 cat-proof fenced exclosure in the occupied, upper elevations of palila core habitat; 2) increase and enhance the availability of caterpillars (critical food resource during nesting); 3) outplant native understory and overstory plants; 4) conduct intensive invasive weed control; and 5) reduce fire risk through forest management.
  - Supplemental Feeding - The hui considered four approaches to managing and improving palila food resources in the current occupied habitat: 1) enhance plant quality so that more caterpillars are produced; 2) reduce threats to key caterpillar prey through monitoring and control of predatory insects; 3) releasing captive-reared caterpillar prey; and 4) delivering additional food types at feeding stations.
  - Rear-and-Release - Rear-and-release involves pulling eggs from wild palila, transporting them to KBCC for hatching and fledging, and then returning them to an aviary on Mauna Kea for environmental conditioning and release the following spring as second-year (i.e., 10-month-old) birds. The Hui proposed a novel approach for improving the transition from captivity to wild by building a large aviary on Mauna Kea that would encompass sizable māmane and naio trees, providing a similar environment to the release site. Other ideas to increase release success could include housing a wild adult male palila in a separate chamber of the field aviary to provide mentorship. The Hui proposed a goal of rearing at least 10 juvenile palila annually into the occupied palila core habitat. Captive reared juveniles deemed suitable for release would be color banded and radio-tagged for monitoring. An annual assessment of the released bird's survival and contribution to the wild population would occur and help inform whether this is an appropriate action to continue. Birds that are deemed un-releasable could be retained for captive propagation. In previous studies, wild palila have renested after eggs are harvested so there should be minimal impact to the population.

- Continue deployment of large-scale grid of automated recording units to determine fine-scale palila distribution on west slope of Mauna Kea. Focus management actions on consistently occupied habitat.

- Habitat protection and restoration
  - Increase frequency and improve efficacy of aerial hunting to remove all mouflon sheep from palila critical habitat.
  - When ungulates are removed from critical habitat, increased habitat management should occur in palila core habitat, including grass control and forest restoration.
  - Continue funding for the MKFRP for forest restoration, fence maintenance, and all other aspects of the MKFRP program.

- Research
  - Investigate methods to reduce or control invasive grass cover on Mauna Kea. Examine experimental approaches to restore māmane in heavily degraded areas and improve māmane tree vigor and density by applying fertilizer, giving water, and/or removing competing weeds in the less affected māmane forest habitats.
    - Identify a mycologist to collaborate on *Armillaria* (fungus affecting the roots of māmane) for root diagnostics; will need a plan and a research proposal.
    - Identify survey and research opportunities for *Cydia* caterpillars to determine overall function and abundance as an important food source for palila.

- Predator monitoring and control – Continue and expand predator control (particularly for cats) in all areas where palila breed, including on adjacent lands (Pōhakuloa Training Area).

- Continue care for the palila in captivity. Finalize planning for release of captive birds that meet release criteria.

- Fire monitoring and control – Implement fire risk reduction measures by establishing green fuel breaks and improving existing roadway fire breaks; improve fire detection and response by stationing fire response resources (such as water trucks and fire spotters) on the west slope of Mauna Kea in key habitat; and conduct other improvements where necessary to allow a rapid and effective ground and aerial response to fire. Establish partnership with Parker Ranch and the possibility of placing dip tanks along fencelines between the west and north slopes.
    - Weed monitoring and control – Continue funding the MKFRP for weed control, including *Delairea odorata* (cape ivy), *Ulex europaeus* (gorse), *Cenchrus setaceus* (fountain grass), *Senecio madagascariensis* (fire weed), and *Passiflora tarminiana* (banana poka) and any newly identified invasive plants.

References:
See previous 5-year reviews for additional references.

Camp, R.J., C.K. Asing, N. Hunt, A.Wang, C. Farmer, L. Nietmann and P.C. Banko. 2025. Fine-grained temporal population monitoring of a declining, critically endangered Hawaiian honeycreeper. Frontiers in Conservation Science 6:1564661. https://doi: 10.3389/fcosc.2025.1564661

Frazier, A. G., C.P. Giardina, T.W. Giambelluca, L. Brewington, Y.-L. Chen, P.-S. Chu, L. Berio Fortini, D. Hall, D.A. Helweg, V.W. Keener, R.J. Longman, M.P. Lucas, A. Mair, D.S. Oki, J.J. Reyes, S.G. Yelenik, and C. Trauernicht. 2022. A Century of Drought in Hawai‘i: Geospatial Analysis and Synthesis across Hydrological, Ecological, and Socioeconomic Scales. Sustainability 14(19): 12023. https://doi.org/10.3390/su141912023

Hunt, N.J., C.K. Asing, L. Nietmann, P.C. Banko, and R.J. Camp. 2025. 2022–2024 Status and trend of the palila (*Loxioides bailleui*). Hawai‘i Cooperative Studies Unit Technical Report HCSU-115. University of Hawai‘i at Hilo. 22 pages. https://hdl.handle.net/10790/5398

[USFWS] U.S. Fish and Wildlife Service. 2020. Palila (*Loxioides bailleui*) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i. 14 pages.

[USFWS] U.S. Fish and Wildlife Service. 2022. Supplemental Project Information and Incidental Take Statement (SPIITS) under PIFWO Programmatic Recovery Biological Opinion (TAILS number 2020-F-0028). U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i. 25 pages.

Van Houtan, K. S., T. O. Gagné, P. Banko, M. E. Hagemann, R. W. Peck, and C. T. Yarnes. 2024. Climatic drought and trophic disruption in an endemic subalpine Hawaiian forest bird. Biological Conservation 299:1-9. https://doi.org/10.1016/j.biocon.2024.110823

In Litteris:

Asing, K. 2025a. Email from Kalā Asing, coordinator of Mauna Kea Forest Restoration Project to Colleen Cole, PIFWO, regarding MKFRP management efforts including planting, fence construction, and fuel breaks. April 16, 2025.

Asing, K. 2025b. Email from Kalā Asing, coordinator of Mauna Kea Forest Restoration Project to Colleen Cole, PIFWO, regarding MKFRP predator control efforts. April 16, 2025.

Cole, I. 2025. Email from Ian Cole, DOFAW East Hawai‘i Wildlife Biologist to Colleen Cole, PIFWO, regarding DOFAW sheep control efforts on Mauna Kea. April 28, 2025.

Pang-Ching, J. Email from Josh Pang-Ching, DOFAW East Hawai‘i Game Biologist to Colleen Cole, PIFWO, regarding feral pig hunting program at Ka‘ohe Restoration Area. June 23, 2025.

Thow, C. 2025. Email from Cara Thow, DOFAW Wildlife Program supervisor to Colleen Cole, PIFWO, regarding DOFAW disease sampling and mosquito trapping on Mauna Kea. June 16, 2025.

Personal Communication

Asing, K. 2025. Mauna Kea Forest Restoration Project, Hui Palila Meeting. June 3, 2025

Bailey, H. 2025. San Diego Zoo Wildlife Alliance. 2025. Hui Palila Meeting March 12, 2025.

Cole, C. 2024. U.S. Fish and Wildlife Service. Hui Palila Meeting, October 16, 2025.

Masuda, B. 2025. San Diego Zoo Wildlife Alliance. 2025. Hui Palila Meeting March 12, 2025.

Wang, A. 2025. Text messages between Alex Wang, State of Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife to Colleen Cole, US Fishand Wildlife Service, Pacific Islands Fish and Wildlife Office, regarding A24 predator control grid on Mauna Kea. June 12, 2025.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW on palila (*Loxioides bailleui*)

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: Colleen Cole, Fish and Wildlife Biologist, PIFWO
John Vetter, Animal Recovery Coordinator, PIFWO
Megan Laut, Recovery Team Manager, PIFWO

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

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